

Responsible Fishery Management (RFM)



U.S. Gulf of Mexico shrimp

Full Assessment Report

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Foreword

The Responsible Fisheries Management (RFM) Certification program is a third-party sustainable seafood certification program for wild capture fisheries owned by the Certified Seafood Collaborative (CSC), a 501(c)(3) non-profit foundation led by a diverse board of seafood and sustainability industry experts.

The program was previously owned by the Alaska Seafood Marketing Institute (ASMI) when it was known as the Alaska RFM program but when ownership passed to the CSC in July 2020 scope of the program was expanded to include other North American fisheries outside the State of Alaska.

The Responsible Fisheries Management (RFM) Standard is composed of Conformance Criteria based on the 1995 FAO Code of Conduct for Responsible Fisheries and the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries adopted in 2005 and amended/extended in 2009. The Standard also includes full reference to the 2011 FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Inland Fisheries which in turn are now supported by a suite of guidelines and support documents published by the UN FAO. Further information on the RFM program may be found at: <https://www.alaskaseafood.org/rfm-certification/>

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2 Glossary

Acronym	Full Name
ABC	Acceptable Biological Catch
ACL	Annual Catch Limit
ADCNR	Alabama Department of Conservation and Natural Resources
AL	Alabama
ALS	Accumulated Landing System
AM	Accountability Measures
ASPA	American Shrimp Processors Association
BiOp	Biological Opinion
BPL	Beam Plankton Trawls
BRD	Bycatch Reduction Device
cap	Corrective Action Plan
CPUE	Catch Per Unit Effort
CSC	Certified Seafood Collaborative
DPS	Distinct Population Segment
DWH	Deepwater Horizon MC 252
E.O.	Executive Order
EDM	Empirical Dynamic Model
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ELB	Electronic Logbook
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ETP	Endangered, Threatened and Protected
F	Fishing Mortality
FAO	Food and Agriculture Organization
FFWC	Florida Fish and Wildlife Conservation (Commission)
FGBNMS	Flower Garden Banks National Marine Sanctuary
FIN	Fish Information Network
FIS	Fishery Impact Statement
FL	Florida
FMP	Fishery Management Plan
GMFC	Gulf of Mexico Fisheries Council
GMFMC	Gulf Marine Fisheries Management Council
GOM	Gulf of Mexico
GOMMAPPs	Gulf of Mexico Marine Assessment Program for Protected Species
GOMSMP	Gulf of Mexico Shrimp Management Plan
GRRS	Gulf Royal Red Shrimp
GSMFC	Gulf States Marine Fisheries Commission
GSS	Gulf Shrimp System
HAPC	Habitat Area of Particular Concern
JEA	Joint Enforcement Agreement

Acronym	Full Name
LA	Louisiana
LDWF	Louisiana Department of Wildlife and Fisheries
LWFC	Louisiana Wildlife and Fisheries Commission
MBTA	Migratory Bird Treaty Act
MCS	Monitoring, Control and Surveillance
MFMT	Maximum Fishing Mortality Threshold
MMPA	Marine Mammal Protection Act
MMRD	Mississippi Marine Resources Department
MRFSS	Marine Recreational Fisheries Scientific Survey
MRIP	Marine Recreational Information Program
MS	Mississippi
MSA	Magnuson-Stevens Act
MSC	Marine Stewardship Council
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSST	Minimum Stock Size Threshold
MSY	Maximum Sustainable Yield
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service (NOAA)
NOAA	National Oceanographic and Atmospheric Administration
NPS	National Park Service
OLE	Office of Law Enforcement (NOAA)
OY	Optimum Yield
P	Principle (MSC)
P1	Principle 1
P2	Principle 2
P3	Principle 3
PI	Principle Indicator (MSC)
RFM	Responsible Fishery Management
SEDAR	Southeast Data, Assessment and Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
SSB	Spawning Stock Biomass
SST	Sea Surface Temperature
SWF	South West Florida
TED	Turtle Excluder Device
TPWD	Texas Parks and Wildlife Department
TX	Texas
USACOE	U.S. Army Corps of Engineers
USCG	United States Coast Guard
USFWS	U.S. Fish and Wildlife Service

3 Executive Summary

Brief intro and description of assessment process.

The US Gulf of Mexico Shrimp Commercial Fishery was assessed against the requirements of the -RFM Certification Program. The request for assessment was made by American Shrimp Processors Association (ASPA).

This report documents the assessment procedures for the certification of US GOM Shrimp commercial fisheries, to the RFM Certification Program. This is a voluntary program for North America fisheries and has been supported by Certified Seafood Collaborative (CSC) who wish to provide an independent, third-party certification program that can be used to verify that North America fisheries are responsibly managed according to the FAO Code of Conduct for Responsible Fisheries.

The assessment was conducted according to the Global Trust procedures for RFM Certification in accordance with EN45011/ISO/IEC Guide 65 accredited certification procedures. The assessment is based on the criteria specified in the Responsible Fisheries Management Standard Version 2.1. The RFM Standard is composed of conformance criteria based on the 1995 FAO Code of Conduct for Responsible Fisheries and the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries adopted in 2005 and amended/extended in 2009; hereafter generally referred to as the FAO Criteria. The Standard also includes full reference to the 2011 FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Inland Fisheries which in turn are now supported by a suite of guidelines and support documents published by the UN FAO.

The assessment is based on 4 major components of responsible management derived from the FAO Code of Conduct for Responsible Fisheries (1995) and Guidelines for the Eco-labelling of products from marine capture fisheries (2009); including:

- A. The Fisheries Management System**
- B. Science and Stock Assessment Activities, The Precautionary Approach**
- C. Management Measures, Implementation, Monitoring and Control**
- D. Serious Impacts of the Fishery on the Ecosystem**

These four major components are supported by 12 fundamental clauses (+ 1 in case of enhanced fisheries) that guide the RFM Certification Program surveillance assessment.

The assessment process included a desktop review of relevant new documentary information including but not limited to: the most current fishery assessment and stock evaluation reports, Council publications; relevant scientific publications; ecosystem status reports; fishery management plans and amendments thereof; changes to state and federal regulations; fishery enforcement statistics; environmental impact statements; marine mammal stock assessments; and strategic plans. The assessment process also included substantive meetings with representatives from each of the key fishery management agencies charged with management of the US GOM Shrimp commercial fisheries.

Assessment team meetings included representatives from: Texas Parks and Wildlife, Louisiana Department of Wildlife and Fisheries, Mississippi Department of Marine Resources, Alabama Department of Conservation and Natural Resources Fisheries, Florida Fish and Wildlife Conservation, Gulf of Mexico Fishery Management Council (GMFMC).

The Draft Report will be available for comment by stakeholders who register interest with Global Trust during a 30-day period.

A summary of the site meetings is presented in Section 5. Assessors included both externally contracted fishery experts and Global Trust internal staff ([Appendix 1](#)). Peer reviewers were comprised of external contracted fisheries consultants.

This report documents each step in the assessment process and presents the recommendation to the Certification Committee of Global Trust who will preside over the certification decision according to the requirements of ISO/IEC Guide 65 accredited certification.

Main strengths and weaknesses of the fishery.

Strengths:

- Comprehensive fishery-dependent and fishery-independent monitoring programs for shrimp stocks in all six jurisdictions.
- Effect of the fishery on commonly encountered habitats appear to be non-significant and reversible.
- Effects of the fishery on ecosystem structure and function appear to be limited and there are models that describe the GOM food chain and the effects from various fisheries on the components.
- A comprehensive suite of statutes, regulations, and rules exists at the federal and states levels in support of the fishery management frameworks.
- An established track record of inter-jurisdictional collaboration and cooperation.
- A comprehensive monitoring, control, and surveillance system throughout the Gulf for directed, bycatch, and protected species.

Weaknesses:

- A lack of annual stock assessments since 2018. A lack of updated time series of catch, effort and catch rate data, as well as survey biomass/abundance indices and a lack of commercial and survey size frequency distributions for each stock. A lack of evidence supporting exemption of GOM penaeid shrimp stocks from annual catch limits and accountability measures.
- There is also some lack of information on part of the observer catch classified under Pisces which affects main and minor associated species information.
- Detailed effort maps for the gears under assessment are currently not available and these affect some of the habitat scores.
- The absence of external reviews of the fishery-specific management system, particularly at state level (except for Louisiana).

Recommendation of the Team with respect to Certification.

The Assessment Team recommends that the management system of the applicant fishery, the U.S. Gulf of Mexico shrimp (Brown, White, and Pink shrimp) commercial fishery under federal (NMFS/GMFC) and state (Texas, Louisiana, Mississippi, Florida, and Alabama) management, fished with otter trawl, skimmer, and butterfly net (within US 200 nm EEZ), is certified against the CSC Responsible Fisheries Management Certification Program.

3.1 Assessment Team Details

The Assessment Team for this assessment was as follows; further details are provided in ([Appendix 1](#)):

- **Dr. Ivan Mateo – Lead Assessor, responsible for DDF, FC 9**
- **Dr. Gerald P. Ennis – Assessor 1, responsible for FC 4, 5, 6, 7, 8**
- **Mr. R. J. (Bob) Allain – Assessor 2, responsible for FCs 1, 3, 10, 11**
- **Mr. Matthew Jew – Assessor 3 , responsible for FC 2, 12**

3.2 Details of Applicable RFM Documents

This assessment was conducted according to the relevant program documents outlined in Table 1 below.

Table 1. Relevant RFM program documents including applicable versions.

Document title	Version number, Issue Date	Usage
RFM Procedure 2: Application to Certification Procedures for the RFM Fishery Standard	Version 6, September 2020	Process
Responsible Fisheries Management Certification Program Fisheries Standard.	Version 2.1, September 2020	Standard
Responsible Fisheries Management Certification Program Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in North America	Version 2.1, January 2021	Guidance to Standard
RFM Data Deficient Framework	Version 2.0, October 2016	addendum to Version 2.0 of the RFM Scoring Guidance

4 Fishery Applicant Details

Table 2. Fishery Applicant details and key contact information.

Applicant Information		
Organization/Company Name:	American Shrimp Processors Association	
Address:	Street:	P.O. Box 4867
	City:	Biloxi
	State:	MS
	Country:	USA
	Zip code	39535
Applicant Key Contact Information		
Name:	Laura Picariello	
Position:	Texas Sea Grant Program, Program Director, Sustainable Fisheries and Aquaculture	
E-mail:	lpicariello@tamu.edu	

5 Units of Assessment and Proposed Units of Certification

5.1 Units of Assessment

The proposed Units of Assessment are as described in Table 3 below.

Unit of Assessment (UoA)		
UoA 1-36		
Common to all UoAs (species and stocks)		
Species	Latin name:	<i>Farfantepenaeus aztecus</i>
	Common names:	Brown shrimp
	Latin name:	<i>Litopenaeus setiferus</i>
	Common names:	White shrimp
	Latin name:	<i>Farfantepenaeus duorarum</i>
	Common names:	Pink shrimp
Stocks	<ol style="list-style-type: none"> 1. Gulf of Mexico brown shrimp 2. Gulf of Mexico white shrimp 3. Gulf of Mexico pink shrimp 	
UoA 1-6		
Specific to these UoA		
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Federal waters	
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl • Skimmer net 	
Specific UoAs (resulting from combining the three species and two gear types in federal waters)	UoA 1. Federal waters, otter trawl, brown shrimp UoA 2. Federal waters, otter trawl, white shrimp UoA 3. Federal waters, otter trawl pink shrimp UoA 4. Federal waters, skimmer net, brown shrimp UoA 5. Federal waters, skimmer net, white shrimp UoA 6. Federal waters, skimmer net, pink shrimp	
Client group	American Shrimp Processors Association, Inc.	
Other eligible fishers	None, all shrimp fishing vessels with a valid federal permit are already eligible fishers.	
UoA 7-15		
Specific to these UoA		
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Louisiana state waters	
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl • Skimmer net • Butterfly wing net 	
Specific UoAs (resulting from combining the three species and three gear types in Louisiana state waters)	UoA 7. Louisiana, otter trawl, brown shrimp UoA 8. Louisiana, otter trawl, white shrimp UoA 9. Louisiana, otter trawl pink shrimp UoA 10. Louisiana, skimmer, brown shrimp UoA 11. Louisiana, skimmer, white shrimp UoA 12. Louisiana, skimmer, pink shrimp UoA 13. Louisiana, butterfly, brown shrimp UoA 14. Louisiana, butterfly, white shrimp UoA 15. Louisiana, butterfly, pink shrimp	
Client group	American Shrimp Processors Association, Inc	
Other eligible fishers	None, all shrimp fishing vessels with a valid state permit are already eligible fishers.	
UoA 16-18		
Specific to these UoA		
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Texas state waters	
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl 	
Specific UoAs (resulting from combining the three species)	UoA 16. Texas, otter trawl, brown shrimp UoA 17. Texas, otter trawl, white shrimp	

and one gear type in Texas state waters)	UoA 18. Texas, otter trawl, pink shrimp
Client group	American Shrimp Processors Association, Inc
Other eligible fishers	None, all shrimp fishing vessels with a valid state permit are already eligible fishers.
UoA 19-24	Specific to these UoA
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Florida state waters
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl • Skimmer net
Specific UoAs (resulting from combining the three species and two gear types in Florida state waters)	UoA 19. Florida, otter trawl, brown shrimp UoA 20. Florida, otter trawl, white shrimp UoA 21. Florida, otter trawl pink shrimp UoA 22. Florida, skimmer, brown shrimp UoA 23. Florida, skimmer, white shrimp UoA 24. Florida, skimmer, pink shrimp
Client group	American Shrimp Processors Association, Inc
Other eligible fishers	None, all shrimp fishing vessels with a valid state permit are already eligible fishers.
UoA 25-30	Specific to these UoA
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Alabama state waters
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl • Skimmer net
Specific UoAs (resulting from combining the three species and two gear types in Alabama state waters)	UoA 25. Alabama, otter trawl, brown shrimp UoA 26. Alabama, otter trawl, white shrimp UoA 27. Alabama, otter trawl, pink shrimp UoA 28. Alabama, skimmer, brown shrimp UoA 29. Alabama, skimmer, white shrimp UoA 30. Alabama, skimmer, pink shrimp
Client group	American Shrimp Processors Association, Inc
Other eligible fishers	None, all shrimp fishing vessels with a valid state permit are already eligible fishers.
UoA 31-36	Specific to these UoA
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Mississippi state waters
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl • Skimmer net
Specific UoAs (resulting from combining the three species and two gear types in Mississippi state waters)	UoA 31. Mississippi, otter trawl, brown shrimp UoA 32. Mississippi, otter trawl, white shrimp UoA 33. Mississippi, otter trawl, pink shrimp UoA 34. Mississippi, skimmer, brown shrimp UoA 35. Mississippi, skimmer, white shrimp UoA 36. Mississippi, skimmer, pink shrimp
Client group	American Shrimp Processors Association, Inc
Other eligible fishers	None, all shrimp fishing vessels with a valid state permit are already eligible fishers.

5.2 Potential Units of Certification

Based on the above Units of Assessment, the Units of Certification (*i.e.*, what would be covered by any resulting certificate if the fishery is ultimately certified) are as described in Table 4 below.

Table 4. Proposed Units of Certification details.

Units of Certification (UoCs).	
UoC 1-36	Common to all UoCs (species and stocks)
Species	Latin name: <i>Farfantepenaeus aztecus</i>
	Common names: Brown shrimp
	Latin name: <i>Litopenaeus setiferus</i>
	Common names: White shrimp
	Latin name: <i>Farfantepenaeus duorarum</i>
Stocks	Common names: Pink shrimp
	1. Gulf of Mexico brown shrimp
	2. Gulf of Mexico white shrimp
	3. Gulf of Mexico pink shrimp
UoC 1-6	Specific to these UoC
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Federal waters
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl • Skimmer net
Specific UoCs (resulting from combining the three species and two gear types in federal waters)	UoC 1. Federal waters, otter trawl, brown shrimp UoC 2. Federal waters, otter trawl, white shrimp UoC 3. Federal waters, otter trawl, pink shrimp UoC 4. Federal waters, skimmer net, brown shrimp UoC 5. Federal waters, skimmer net, white shrimp UoC 6. Federal waters, skimmer net, pink shrimp
Client group	American Shrimp Processors Association, Inc
Other eligible fishers	None, all shrimp fishing vessels with a valid federal permit are already eligible fishers.
UoC 7-15	Specific to these UoC
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Louisiana state waters
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl • Skimmer net • Butterfly wing net
Specific UoCs (resulting from combining the three species and three gear types in Louisiana state waters)	UoC 7. Louisiana, otter trawl, brown shrimp UoC 8. Louisiana, otter trawl, white shrimp UoC 9. Louisiana, otter trawl, pink shrimp UoC 10. Louisiana, skimmer, brown shrimp UoC 11. Louisiana, skimmer, white shrimp UoC 12. Louisiana, skimmer, pink shrimp UoC 13. Louisiana, butterfly, brown shrimp UoC 14. Louisiana, butterfly, white shrimp UoC 15. Louisiana, butterfly, pink shrimp
Client group	American Shrimp Processors Association, Inc
Other eligible fishers	None, all shrimp fishing vessels with a valid state permit are already eligible fishers.
UoC 16-18	Specific to these UoC
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Texas state waters
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl
Specific UoCs (resulting from combining the three species	UoC 16. Texas, otter trawl, brown shrimp UoC 17. Texas, otter trawl, white shrimp

Units of Certification (UoCs).	
and one gear type in Texas state waters)	UoC 18. Texas, otter trawl, pink shrimp
Client group	American Shrimp Processors Association, Inc
Other eligible fishers	None, all shrimp fishing vessels with a valid state permit are already eligible fishers.
UoC 19-24	Specific to these UoC
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Florida state waters
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl • Skimmer net
Specific UoCs (resulting from combining the three species and two gear types in Florida state waters)	UoC 19. Florida, otter trawl, brown shrimp UoC 20. Florida, otter trawl, white shrimp UoC 21. Florida, otter trawl, pink shrimp UoC 22. Florida, skimmer, brown shrimp UoC 23. Florida, skimmer, white shrimp UoC 24. Florida, skimmer, pink shrimp
Client group	American Shrimp Processors Association, Inc
Other eligible fishers	None, all shrimp fishing vessels with a valid state permit are already eligible fishers.
UoC 25-30	Specific to these UoC
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Alabama state waters
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl • Skimmer net
Specific UoCs (resulting from combining the three species and two gear types in Alabama state waters)	UoC 25. Alabama, otter trawl, brown shrimp UoC 26. Alabama, otter trawl, white shrimp UoC 27. Alabama, otter trawl, pink shrimp UoC 28. Alabama, skimmer, brown shrimp UoC 29. Alabama, skimmer, white shrimp UoC 30. Alabama, skimmer, pink shrimp
Client group	American Shrimp Processors Association, Inc
Other eligible fishers	None, all shrimp fishing vessels with a valid state permit are already eligible fishers.
UoC 31-36	Specific to these UoC
Geographical area	FAO Fishing Area 31, Atlantic Western-Central, US EEZ, Mississippi state waters
Fishing gear type(s) and, if relevant, vessel type(s)	<ul style="list-style-type: none"> • Otter trawl • Skimmer net
Specific UoCs (resulting from combining the three species and two gear types in Mississippi state waters)	UoC 31. Mississippi, otter trawl, brown shrimp UoC 32. Mississippi, otter trawl, white shrimp UoC 33. Mississippi, otter trawl, pink shrimp UoC 34. Mississippi, skimmer, brown shrimp UoC 35. Mississippi, skimmer, white shrimp UoC 36. Mississippi, skimmer, pink shrimp
Client group	American Shrimp Processors Association, Inc
Other eligible fishers	None, all shrimp fishing vessels with a valid state permit are already eligible fishers.

6 Background to the Fishery

6.1 Species Biology

Brown Shrimp

In the western north Atlantic, the brown shrimp (*Farfantepenaeus aztecus*) is distributed from the US northeast Atlantic coast southward throughout the Gulf of Mexico (Figure 1). They are found from Massachusetts to the Florida Keys, and along the Gulf Coast to northwestern Yucatan in Mexico¹.



Figure 1. Distribution of brown shrimp (Source: FAO.org).

Female brown shrimp are sexually mature at 5.5 inches (140 mm) total length (Henley and Rauschuber 1981). At mating, males place a spermatophore inside a receptacle on the female; the female releases her eggs, and they are fertilized externally (Cook and Lindner, 1970; Lassuy, 1983). Mature brown shrimp spawn in offshore waters of the Gulf of Mexico primarily during the fall and spring months. They typically spawn at night in waters 59 ft (18 m) or deeper in temperatures between 62.6 and 84.2°F. Brown shrimp may spawn more than once but decreasing water temperatures in the fall stop spawning activity (Perez-Farfante, 1969). Brown shrimp averaging 7.6 inches (193 mm) total length release an average of 246,000 viable eggs per spawning event. The fertilized eggs fall to the seafloor and usually hatch within 24 hours after fertilization (Kutkuhn, 1966; Christmas and Etzold, 1977). After hatching, brown shrimp go through numerous stages before becoming postlarvae, over a period of 1 to 25 days (Cook and Murphy, 1969; 1971).

Larvae are found offshore in the water column. Postlarvae migrate to inshore estuaries with incoming tides, mainly from February through April, with an additional minor peak in the fall. Postlarvae and juveniles are found in estuaries where they prefer the shallow vegetated habitats where the majority of their prey resides (Fry *et al.*, 2003). They use the cover provided by the vegetation to avoid predators (Zimmerman and Minello, 1984; McTigue and Zimmerman 1998). They also live on silty sand and non-vegetated mud bottoms.

In late spring/early summer juveniles move out of the nursery area and into deeper, open waters of the estuary (Copeland, 1965; Cook and Lindner, 1970; Parker, 1970) and from there offshore to deeper, saltier water where they live on silt, muddy sand, or sandy bottoms. They travel primarily at night, especially at or shortly after dusk, and bury themselves during the day. They are most commonly found in waters 90 to 180 ft (27.5 to 55 m) deep but have been reported at depths as great as 540 ft (164.5 m). Adult brown shrimp are most abundant along the continental shelf of the Gulf of Mexico, but seasonal movements correlating with water temperature also

¹ www.fisheries.noaa.gov/species/brown-shrimp

influence distribution. Other factors that affect their distribution include salinity, food availability, and currents (Larson et al., 1989).

Brown shrimp seem to have an annual life cycle; however, captive individuals have survived for over two years (Perez-Farfante, 1969). Female brown shrimp grow larger than males, up to 9.3 inches (236 mm) in total length; males grow up to 7.7 inches (195 mm) long (Tavares, 2002).

Brown shrimp larvae feed on phytoplankton and zooplankton (Zein-Eldin and Renaud, 1986; Minello and Zimmerman, 1991). Postlarvae feed mostly on phytoplankton, epiphytes, and detritus (Gleason and Zimmerman, 1984). Juveniles and adults feed primarily at night and are more carnivorous than younger shrimp. Juveniles and adults prey on polychaetes, amphipods, insect larvae, as well as detritus and algae.

Brown shrimp tend to rely more heavily on animal material in their diet than white shrimp. Predation of brown shrimp is most likely the greatest cause of mortality in estuaries (Minello *et al.*, 1989). Many finfish species and large crustaceans prey on brown shrimp. Brown shrimp are a primary food source for many estuarine and nearshore predators which include southern flounder, spotted seatrout, sand seatrout, Atlantic croaker, and red drum.

White Shrimp.

In the western north Atlantic, the white shrimp (*Litopenaeus setiferus*) is distributed from the US northeast Atlantic coast southward throughout the Gulf of Mexico (Figure 2). They are found from Fire Island, New York, to St. Lucie Inlet on the Atlantic Coast of Florida and in the Gulf of Mexico from the Ochlochonee River, Florida, to Campeche, Mexico².



Figure 2. Distribution of white shrimp (Source: FAO.org).

Female white shrimp are sexually mature at about 5.5 inches (140 mm) total length; males mature at about 4.7 inches (119 mm) total length. At mating, the male places a spermatophore on the female's abdomen and when the female releases the eggs the spermatophore releases sperm and fertilizes the eggs externally (Perez-Farfante, 1969). White shrimp spawn mainly from March to November, with peaks in June and July. Some females spawn up to four times in a season. As with brown shrimp, increasing water temperatures in the spring trigger spawning; decreasing temperatures in the fall stop spawning. White shrimp spawn offshore in waters between 29.5 and 111.5 ft (9 and 34 m) deep; however, a small portion of the population may spawn in estuaries and bays. Large

² www.fisheries.noaa.gov/species/white-shrimp

mature females release an estimated 0.5 to 1 million eggs per spawning event (Lindner and Cook, 1970; Williams, 1984).

White shrimp eggs are found near the seafloor. Larvae inhabit the water column in the same waters. White shrimp go through similar larval stages as brown shrimp over the course of 10 to 12 days. With the help of tides and currents postlarvae migrate through passes to inshore estuaries mainly from May through November, with peaks in June and September. White shrimp migrate farther into the estuaries than brown shrimp (Perez-Farfante, 1969; O'Connell *et al.*, 2005). Postlarvae and juveniles inhabit estuaries where they prefer mud and peat bottoms with large amounts of decaying organic matter or vegetative cover. Like brown shrimp, postlarval and juvenile white shrimp prefer vegetated habitats for the availability of prey and protection from predators. However, white shrimp are also found in areas with non-vegetated substrate more often than brown shrimp (Zimmerman and Minello 1984; Muncy 1984; Howe *et al.*, 1999). They can select more diverse habitat because they are better at catching free swimming prey than brown shrimp and are thus less reliant on vegetated habitat rich with stationary prey (McTigue and Zimmerman, 1998).

In these nursery areas juvenile white shrimp grow rapidly and become sub-adults in four to six weeks (Christmas *et al.*, 1976). They migrate from estuaries in late August and September as they grow larger and in response to cooling temperatures and move into deeper, saltier areas of the estuary and on to their offshore spawning grounds to complete their life cycle in the spring. Offshore, adult white shrimp inhabit the same general nearshore waters along the continental shelf as brown shrimp for the same general reasons of food supply and currents (Muncy, 1984). In offshore waters, adult white shrimp are most commonly found at depths less than 98 ft (30 m) but may occur in waters as deep as 270 ft (82.25 m; Tavares, 2002). They prefer soft mud or clay bottoms. White shrimp have a life expectancy of about 18 months (Klima *et al.*, 1982). Females grow larger than males, up to 10.1 inches (257 mm) in total length; males grow up to 6.9 inches (175 mm) long (Tavares, 2002).

As larvae, white shrimp feed on phytoplankton and zooplankton, as well as detritus suspended in the water column. Juvenile white shrimp feed on detritus and scavenge on the bottom sediment. As they mature, they also become predators. Juveniles and adults eat detritus, plants, microorganisms, invertebrates, and small fish (Perez-Farfante, 1969). White shrimp depend more heavily on plant matter than animal matter (McTigue and Zimmerman, 1998). Cannibalism is also common among adult white shrimp. Juvenile fish and some invertebrates eat post-larval and juvenile white shrimp, and a wide variety of finfish prey heavily on adult white shrimp.

Pink Shrimp

In the western north Atlantic, the pink shrimp (*Farfantepenaeus duorarum*) is distributed from the US mid-Atlantic southward throughout the Gulf of Mexico (Figure 3). Pink shrimp are found from the southern portion of the Chesapeake Bay to the Florida Keys and around the coast of the Gulf of Mexico, to Cape Catoche and the Isla Mujeres on the Yucatan Peninsula. They are most abundant off the southwestern coast of Florida and in the southeastern Gulf of Campeche.



Figure 3. Distribution of pink shrimp (Source: FAO.org).

Pink shrimp have a fairly fast growth rate which can depend on factors including water temperature and salinity and can grow up to 11 inches long. The species has a short lifespan, normally living for only 2 years. Gulf pink shrimp start reproducing when they reach around 3.3 inches (84 mm) long and spawning periods can vary from one location to another – in North Carolina waters, spawning lasts from late spring to July and in Florida, pink shrimp will spawn multiple times, with a peak lasting from April to July when the water is warmest³.

Along the outer continental shelf, males will mate with females by anchoring their sperm to the females. Females release about 500,000 to 1 million eggs near the ocean floor and the eggs are fertilized as they are released. Traveling along shoreward currents, newly hatched shrimp make their way to nursery habitats in estuaries during the late spring into early summer. Those that survive the winter will grow rapidly in estuaries and then migrate back to the ocean.

Larvae feed on plankton, while juvenile and adult shrimp are opportunistic feeders. They will eat a variety of things including copepods, small molluscs, diatoms, algae, and detritus. Sheepshead minnow and aquatic insects and their larvae feed on post-larval pink shrimp. Other crustaceans, such as grass shrimp and blue crabs prey on young shrimp. A variety of finfish also feed heavily on both juvenile and adult pink shrimp.

Pink shrimp are commonly found on sand, silt, or mud bottoms as well as amongst shells. Juveniles inhabit nursery areas with marsh grasses and may overwinter in estuaries where they will bury deep in the sand and mud to protect themselves from the cold. Young shrimp live and grow in nursery areas with marsh grasses in the South Atlantic and Gulf of Mexico. These grassy areas offer abundant food and shelter. As pink shrimp grow, they migrate seaward to deeper, saltier water. They travel primarily at night, especially around dusk, and bury themselves in the bottom substrate during the day.

Pink shrimp will bury themselves during the day and are much more active at night, especially around dusk. They are found at depths ranging from 6.5 to 300 ft (2 to 70 m) and exceptionally as deep as 755 ft deep (230 m) – though they are most abundant around 36 and 118 ft deep (11 and 36 m).

³ www.fisheries.noaa.gov/species/pink-shrimp

6.2 Fishery Location and Methods

The Gulf of Mexico shrimp fishery involves several species whose stocks are shared and co-managed by Federal agencies and agencies of the five Gulf States. Jurisdictional fishery management systems have evolved over many years through collaborative arrangements that include extensive collaboration of industry groups, other stakeholders and the public at large. Figure 4 and Figure 5 show the broad geographic scope of the US Gulf of Mexico shrimp fishery.



Figure 4. Illustration of Federal and State Water Boundaries in the Gulf of Mexico (Source: <https://gulfcouncil.org/fishing-regulations/federal/#1567024726348-197a283c-476c>).

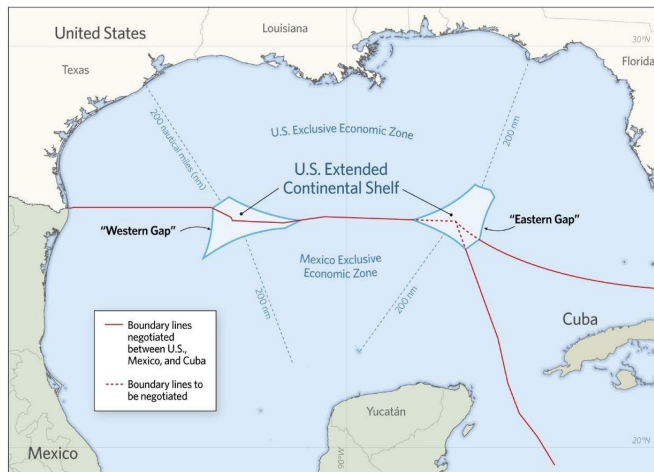


Figure 5. Illustration of Extended EEZs in the Gulf of Mexico (Source: https://www.state.gov/wp-content/uploads/2020/02/US_Mexico_2000_withExtension.pdf, <https://cu.usembassy.gov/united-states-cuba-sign-maritime-boundary-treaty/>).

The fishery is divided into two major harvesting components: a small vessel fleet operating primarily in State inshore/offshore waters using a wide variety of gears and fishing methods and a large vessel fleet operating primarily in offshore Federal waters using mostly otter trawls. The Gulf shrimp fishery is the largest of the US shrimp fisheries. In 2018, the 215.4 million lbs. and \$393.6 million of Gulf shrimp landings represented approximately 74% of the US combined shrimp landings by weight and 79% by value. Louisiana led all Gulf states

with 90.7 million lbs, followed in turn by Texas (72.1), Alabama (28.2), Florida West Coast (14.5), and Mississippi (9.9). As of 2020, there were 1,395 federally permitted Gulf shrimp vessels with permits issued to individuals in Texas (38.4% of Gulf shrimp vessels), Louisiana (25.6%), Florida (14.5%), Alabama (8.1%), and Mississippi (7%).

This validation report is focused on brown, white, and pink shrimp and their fisheries conducted within the Federal and five State jurisdictions. These shrimps are harvested essentially as an “annual crop” with abundance driven primarily by environmental conditions. Hydrological conditions in coastal nursery areas, particularly in early spring, play a large role in dictating the next shrimping season’s potential harvest. Those that survive the winter will grow rapidly in estuaries and then migrate back to the ocean. It is during this migration that each year class is targeted by the various fleets as they continue to grow and move from nearshore State to offshore Federal waters.

Brown shrimp is the most important species, with most catches made from June through October. The fishery is prosecuted to about 40 fathoms (240 ft). White shrimp are found in nearshore waters to about 20 fathoms (120 ft) from Texas through Alabama. The majority are taken from August through December, although there is a small spring and summer fishery. Pink shrimp are found off all Gulf states but are most abundant off Florida’s west coast. Most landings are made from October through May in 30 fathoms (180 ft) of water.

GOM shrimp Fishing Methods

A description of each of the most common gears used to catch GOM shrimp is provided below.

Otter trawls

Otter trawls have a pair of boards or metal plates (otter boards/trawl door) which attach to the sides of the net and keep the net open as it is pulled through the water. The two doors (metal or wood) travel at an angle in the water column which forces them apart and keeps the net open (the doors slide on the seabed). The rest of the net is made up of a footrope that may be weighted and spans the mouth of the net; and a tickler chain in front of the footrope that disturbs the bottom and startles shrimp (as well as crab and fish) of the substrate and into the net⁴. However, the use of trawls on coral reefs in the EEZ is prohibited and tickler chains are required to have a weak link (EFH- Amendment 3⁵). Trawl gear can cause damage to all types of marine bottoms if its tickler chain gets hung up on natural bottom structures. The goal of the weak link is to allow the tickler chain to drop away to prevent dragging and further damage to the bottom while trying to retrieve the rest of the trawl gear. This measure is expected to provide positive benefits to the biological environment by reducing the frequency with which trawl gear snags and damages bottom habitat.

Otter trawl vessels may use 1, 2, or 4 nets per vessel (bays/inshore 1 or 2 depending on state regulations, Gulf/offshore- 2/4 nets). For the quad rigs used offshore there is a sled in the middle, so on each side of the vessel there is a trawl door—trawl net—sled—trawl net—trawl door. A graphic of these nets is provided below.

⁴ Audubon. Habitat Impacts – Otter Trawls – TX Shrimp. <https://www.audubongulf.org/fips/texas-shrimp/otter-trawls/>

⁵ GMFMC. 2005. FINAL Generic Amendment Number 3 for Addressing Essential Fish Habitat Requirements, Habitat Areas of Particular Concern, and Adverse Effects of Fishing in Fishery Management Plans of the Gulf of Mexico. Gulf of Mexico Fishery Management Council https://gulfcouncil.org/wp-content/uploads/FINAL3_EFH_Amendment_508Compliant.pdf

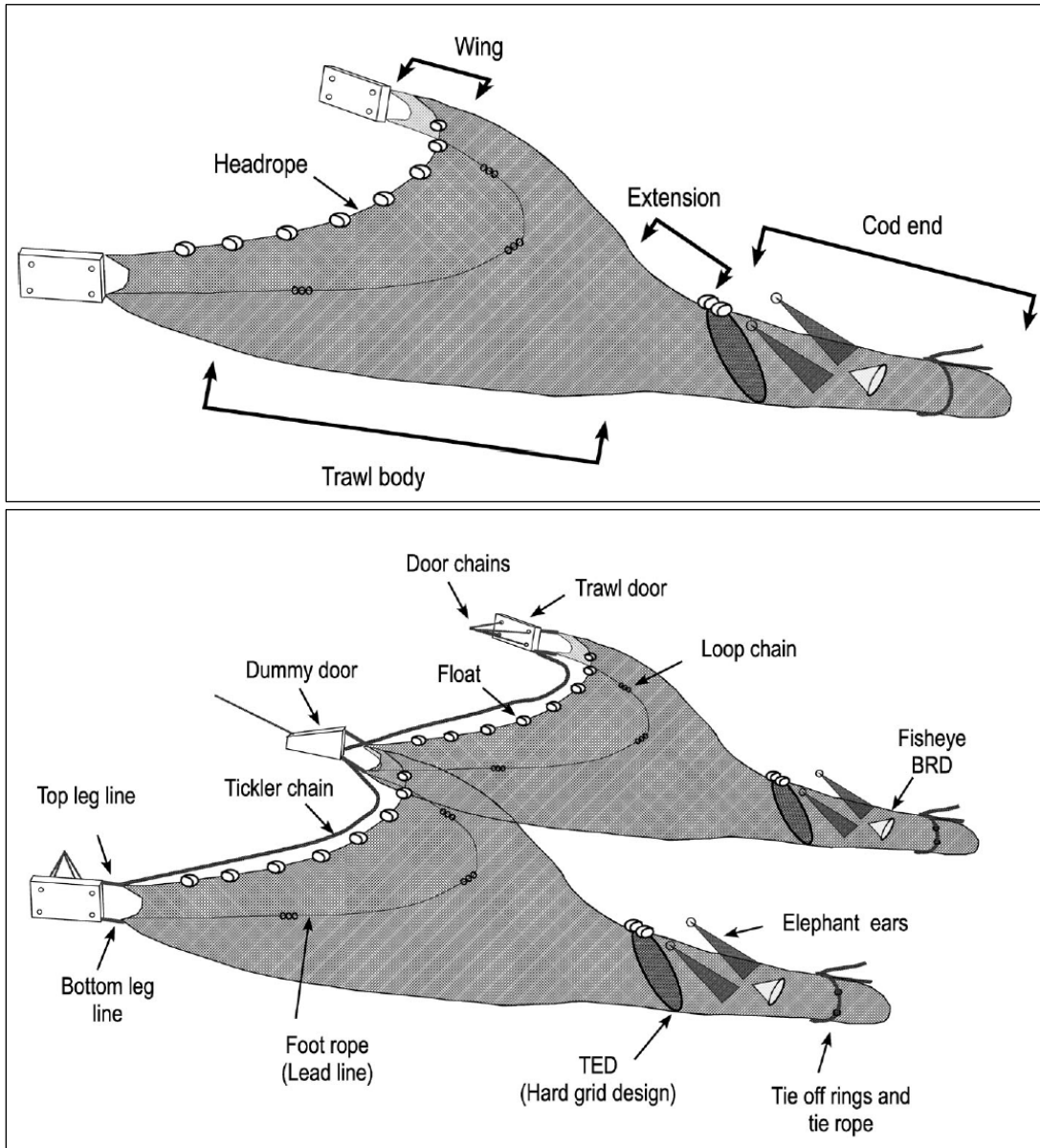


Figure 6. Typical gear configuration and gear components of US south-eastern shrimp vessel (Source Scott-Denton *et al.*, 2012.).

Skimmer trawl (net)

Design is different from otter trawls in that the nets are pushed, usually one on each side of the boat. The nets are supported by a tubular metal frame on three sides (top and sides) or L shaped frame that skims over the bottom on a weighted skid, holding the net along the bottom. Skimmers are usually used in shallower nearshore areas of 10 ft or less. A chained footrope and the tickler chain are used to stir up the bottom and raise the catch into nets ranging from 25 to 72 ft across. While skimmers may have more potential to damage nursery habitats and submerged aquatic vegetation in shallower water, they are expected to impact the bottom less than otter trawls since there are no trawl doors⁶.

⁶Audubon. Habitat Impacts – Skimmer Trawls – AL Shrimp <https://www.audubongulf.org/projects/alabama/alabama-shrimp/skimmer-trawls/#:~:text=While%20skimmers%20may%20have%20more,Nelson%201993%2C%20Steele%201993.>

Fishermen use paired skimmer nets primarily in inshore waters and tidal passes; they also use them extensively in shallow nearshore Gulf of Mexico waters.



Figure 7. Skimmer trawl boat (Source: National Fisherman⁷).

Butterfly wing net

Developed in the 1950s, butterfly nets are mounted to and held open by a pair of rigid rectangular metal frames and are pushed along each side the boat. These nets are used in shallow water mainly at night when the shrimp are near the surface of the water and/or jumping above the water surface. The rigging consists of two rectangular wing nets, or frames, with 3/4-inch mesh netting. They can be emptied without removing the entire net from the water. Butterfly nets are used exclusively in inshore waters and in tidal passes, particularly on strong outgoing tides. This type of net is generally used on small, fast luggers, and Lafitte skiffs, or is also mounted to docks or platforms along the bank of the waterway, or pontoons and fished in deep bayous, channels, and cuts in the presence of strong outgoing tides (called Paupiere nets). The difference between skimmer trawls and butterfly nets is that the skimmer has no frame on the bottom part of the opening, while the butterfly net has a square frame that completely encircles the mouth opening of the net. Neither has doors like those found on otter trawl gear.

According to LDWF, butterfly nets account for 3% of landings the Louisiana shrimp fishery⁸.

⁷ National Fisherman. 2019. December 23, 2019 NOAA finalizes TED rule for shrimp skimmer trawls <https://www.nationalfisherman.com/gulf-south-atlantic/noaa-finalizes-ted-rule-for-shrimp-skimmer-trawls>

⁸ LDWF. 2016. Louisiana Shrimp Fishery Management Plan. Louisiana Department of Wildlife and Fisheries Office of Fisheries. https://www.wlf.louisiana.gov/assets/Resources/Publications/Marine_Fishery_Management_Plans/2016_Shrimp_Fishery_Management_Plan.pdf



Figure 8. Paupiere shrimp net (example of a butterfly net). Picture by Darlene F. Boucher⁹.

6.3 Fishery Management Framework and Organization¹⁰

Federal fishery management is conducted under the authority of the *Magnusen-Steven Act (MSA)* (16 U.S.C 1801 et seq.), originally enacted in 1976 as the *Fishery Conservation and Management Act*. The MSA claims sovereign rights and exclusive fishery management authority over most fishery resources within the US exclusive economic zone (EEZ), an area extending 200 nautical miles (nm) from the seaward boundary of each of the coastal states, and authority over US anadromous species and continental shelf resources that occur beyond the exclusive economic zone.

Responsibility for federal fishery management is shared by the Secretary of Commerce (Secretary) and 8 regional fishery management councils that represent the expertise and interests of constituent states. Regional councils are responsible for preparing, monitoring, and revising management plans for fisheries needing management within their jurisdiction. The Secretary is responsible for promulgating regulations to implement proposed plans and amendments after ensuring management measures are consistent with the MSA and with other applicable laws. In most cases, the Secretary has delegated this authority between **NOAA Fisheries** and the Councils.

The **Gulf of Mexico Fishery Management Council (GMFMC)** is responsible for fishery resources in federal waters of the Gulf of Mexico (GOM) whose waters extend to 200 nm offshore from the 9-mile seaward boundary of the states of Florida and Texas, and the 3-mile seaward boundary of the states of Alabama, Mississippi, and Louisiana. The GOM has a total area of approximately 600,000 square miles (1.5 million km²), including state waters. It is a semi-enclosed, oceanic basin connected to the Atlantic Ocean by the Straits of Florida and to the Caribbean Sea by the Yucatan Channel. The length of the GOM coastline is approximately 1,631 miles. Florida has the longest coastline of 770 miles along its Gulf of Mexico coast, followed by Louisiana (397 miles), Texas (367 miles), Alabama (53 miles), and Mississippi (44 miles).

⁹ <https://www.flickr.com/photos/amaw/8013757460>

¹⁰ The baseline information is sourced from a NOAA document titled: *Environmental Impact Statement to Reduce the Incidental Bycatch and Mortality of Sea Turtles in the Southeastern U.S.* (November 2019): <https://media.fisheries.noaa.gov/dam-migration/99187727.pdf>

The GMFMC consists of 17 voting members: 11 public members appointed by the Secretary; 1 each from the fishery agencies of Texas, Louisiana, Mississippi, Alabama, and Florida; and 1 representing us. Non-voting members include representatives of the USFWS, USCG, and **Gulf States Marine Fisheries Commission (GSMFC)**, a non-regulatory body. The public is also involved in the fishery management process through participation on advisory panels and through Council meetings that, with few exceptions for discussing personnel matters, are open to the public. The regulatory process is also in accordance with the *Administrative Procedures Act*, in the form of “notice and comment” rulemaking, which provides extensive opportunity for public scrutiny and comment, and requires consideration of and response to those comments.

Regulations contained within fishery management plans are enforced through actions of our NOAA-OLE, the USCG, and the various state authorities. The OLE has 12 special agents and 3 enforcement officers in 7 duty stations (Corpus Christi, Texas; Galveston, Texas; Slidell, Louisiana; Niceville, Florida; Panama City, Florida; St. Petersburg, Florida; and Marathon, Florida) to address all agency enforcement concerns in the GOM region. As a result, NOAA-OLE relies heavily on the USCG and state law enforcement agencies for patrol and monitoring enforcement services. GOM coastal states are authorized to enforce federal laws and regulations through the Cooperative Enforcement Program, and funding for patrol services related to federal laws is received through the Joint Enforcement Agreement program.

The purpose of state representation at the Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters. The states are also involved through the GSMFC in management of marine fisheries. The commission was created to coordinate state regulations and develop management plans for interstate fisheries. State governments have the authority to manage their respective state fisheries. Each of the states exercises legislative and regulatory authority over their respective state’s natural resources through discrete administrative units. Although each agency is the primary administrative body with respect to the states’ natural resources, all states cooperate with numerous state and federal regulatory agencies when managing marine resources.

Fishers are required to comply with state and/or federal regulations, depending on where they fish. Some states have specific regulations for the different shrimp fisheries, which are briefly summarized below.

The **Texas Parks and Wildlife Department (TPWD)** manages the commercial shrimp fishery in three segments within its waters: the bay food shrimp fishery, the GOM offshore food shrimp fishery, and the bait shrimp fishery. There has been a limited entry program in effect for the Texas bay and bait shrimp fisheries since 1996, and since 2005 for the Gulf of Mexico shrimp fishery. Because TPWD allows licensed bait shrimp vessels to participate in the bay and Gulf of Mexico shrimp fisheries, bait shrimp trawlers are required to use turtle excluder devices (TEDs) in their nets (per 50 CFR 223.206(d)(2)(ii)(A)(2)). According to *Texas Administrative Code*, only beam and otter trawls are permitted to harvest shrimp from Texas waters.

The **Louisiana Department of Wildlife and Fisheries (LDWF)** issues commercial otter trawl, skimmer net, and butterfly net gear licenses to harvest shrimp in Louisiana waters. In Louisiana, butterfly net gear can be associated with vessels or affixed to platforms or docks adjacent to tidal passes. Regulations specific to Louisiana state waters specify that no person on a vessel shall use a double skimmer net having an individual net frame more than 16 ft measured horizontally or 12 ft measured vertically, or 20 ft measured diagonally, or with a lead line measuring more than 28 ft for each net in Louisiana waters. Additionally, reinforcement framing attached to the net frame shall not be considered in determining the dimensions of a double skimmer. A skimmer or butterfly net may be mounted no more than 24 inches from the side of the vessel and individual nets cannot be tied together in Louisiana waters. Lastly, Louisiana fishing regulations state that no person shall use sweeper devices,

leads, extensions, wings, or other attachments in conjunction with or attached to butterfly nets or skimmer trawls. In Louisiana, fishers use paired skimmer trawls primarily in inshore waters and tidal passes; they also use them extensively in shallow nearshore GOM waters. Skimmer trawls in Louisiana account for a significant amount of shrimp landings, averaging over 40% of total landings. Skimmer trawls ranging from 30-49 ft in length account for the highest proportion of shrimp landings among all vessel size classes (approximately 77% of total shrimp within the category and approximately 28% of total shrimp amongst all vessel categories).

The Mississippi shrimp fishery is managed by the **Mississippi Department of Marine Resources (MDMR)**, and the opening of the annual shrimp season is determined by the average size of shrimp documented in surveys conducted by the MDMR. Regulations specific to skimmer trawls in Mississippi specify that it shall be unlawful to use skimmer trawls or wing nets with a maximum size greater than 25 ft on the headrope and 32 ft on the footrope. Shrimp license issued by the MDMR do not differentiate by gear type.

Managed by the **Florida Fish and Wildlife Conservation Commission (FFWC)**, the Florida state food and bait shrimp fisheries employ otter trawls, skimmer trawls, roller frame trawls, and wing nets. The use of skimmer trawls is allowable in Florida state waters, and much of the historical effort occurred in the Florida Panhandle, specifically in Apalachicola Bay. While skimmer trawls are an authorized gear, *Florida Administrative Code 68B-31.004* states that TEDs are required on all otter and skimmer trawls, except for a single try net or rectangular rigid roller frame trawl that has an opening shielded with a grid of vertical bars spaced no more than 3 in apart. Recent information indicates there is very little skimmer trawl activity in Florida.

The **Alabama Department of Conservation and Natural Resources (ADCNR)** manages the Alabama shrimp fishery, and the Alabama Administrative Code (Chapter 220-3-.01) states that, "It shall be illegal for any person, firm or corporation to take or attempt to take shrimp or other seafoods in or from the inside waters of the State of Alabama by trawl or trawls used together the total width of which exceeds fifty (50) ft as measured in a straight distance along the cork line, which is the main top line containing corks. The use of more than two trawls is prohibited in the inside waters; provided however, that one "try trawl" not to exceed ten (10) ft as measured across the cork line may be used for sampling in addition to the above. In addition, wings shall be cut and tied to the wing line only on points and it shall be illegal to use a trawl or trawls on which the length of the top leg line exceeds the length of the bottom leg line, the length of the leg line being defined as the distance from the rear of the trawl door to the beginning of the wing." Alabama does not specify gear type for its commercial shrimp license. During 2011-2014, Alabama issued 621 resident shrimp licenses on average, with approximately 60% of the licenses issued to vessels less than 30 ft in length.

6.4 Stock Assessment Activities

Stock Identification

The shrimp stocks in the western Gulf of Mexico are shared by Mexico and the United States. Results of joint US/Mexico shrimp migration studies conducted during 1978-1981 indicate that both brown and pink shrimp cross the international boundary in both north-south and south-north directions (Rayburn and Vehrs, 1984).

In the 1970s, some of the south Texas fleet shrimped in Mexican offshore waters while the Mexicans operated almost entirely within their inshore waters. In 1976, the Mexican government declared a 200-mile EEZ and negotiated a bilateral treaty with the US to phase out all US shrimping in their zone by January 1, 1980. The Mexicans began enforcing their zone in 1982 (Rayburn and Vehrs, 1984). While it is recognised that the management activities of each nation could affect populations in both US and Mexican waters (Rayburn and Vehrs, 1984), assessment and management of the shrimp populations in the region have been conducted by each nation

independently. In effect, populations on both sides of the boundary have been treated as separate entities for purposes of fishery management and assessment of stock status since the early 1980s.

The shrimp fishery in US Federal waters of the Gulf of Mexico is managed under the Gulf of Mexico Shrimp Fishery Management Plan which was implemented in 1981. Atlantic coast shrimp fisheries for the same species are managed separately. Brown, white, and pink shrimp are all assessed and managed as unit stocks in the US Gulf of Mexico. Each species is widely distributed around the Gulf and, although there are characteristic centres of abundance, there are no distinct spawning grounds nor any separation of sexes. The white shrimp stock is most abundant from the Florida panhandle to the coastal bend of Texas. The brown shrimp stock is primarily distributed from west of the Mississippi River through Tamaulipas, Mexico. The pink shrimp stock is distributed primarily in south and west Florida, north and west of the Yucatan Peninsula, with a less abundant group off south Texas (Nance *et al.*, 1989; and references therein).

Mark-recapture studies have indicated that each species is capable of moving several hundred miles while remaining at large several hundred days, thus giving these shrimp the capability for traversing State and international boundaries (Nance *et al.*, 1989). Results of a modelling study of pink shrimp larval transport from spawning locations off south Florida to settlement in nursery areas of Florida Bay indicate much more effective transport across the SWF shelf during summer than in winter as a result of tidal and subtidal currents combined with ontogenetic behaviors associated with diel vertical migration and selective tidal stream transport (Criales and Cherubin, 2015) which also suggests that larval stages originating in localised offshore spawning areas are dispersed over widespread nursery areas for postlarval settlement. The foregoing indicates that populations of these shrimp mix quite extensively across the northern Gulf of Mexico.

As stated in Nance *et al.* (1989), no genetic differences had been detected for any of these penaeid species throughout their distribution in the Gulf of Mexico (Lester, 1979). Similarly, in a later study of white shrimp, only weak but significant genetic differentiation was evident between pooled western Atlantic and pooled Gulf of Mexico samples. Within each region, however, large-scale genetic homogeneity was observed (Ball and Chapman, 2003).

Mcmillen-Jackson and Bert (2003) showed no significant phylogenetic structure and broad geographic dispersal of closely related haplotypes in the brown shrimp. In contrast, white shrimp had a complex haplotype phylogeny consisting of two distinct lineages and two less well-defined sublineages, with the haplotypes and lineages being geographically structured. These disparate patterns may have developed as a result of species-specific differences in physiological tolerances and habitat preferences that caused greater fluctuations in white shrimp population sizes and reductions in long-term effective population size relative to that of the brown shrimp, thereby increased the susceptibility of the white shrimp populations to genetic change. The same authors (Mcmillen-Jackson and Bert, 2004) observed genetic homogeneity in pink shrimp inhabiting the Atlantic Ocean and the Gulf of Mexico which they attributed to continuous distribution, long-term dispersal and gene flow.

Nevertheless, recent genetic modelling of two spawning-to-nursery grounds migration routes for pink shrimp (Criales and Cherubin, 2015) – one crossing the SWF shelf in a fairly direct east-northeast path; the other involving downstream transport along the Florida Current, bringing larvae east-northeast with the Current and then breaking with the Florida Current to move west-northwest toward Florida Bay through the passes in the Middle and Lower Florida Keys – indicate the two routes have the potential to sustain population differentiation within the species. In fact, independent analysis of next-generation sequencing data revealed some population differentiation associated with the Dry Tortugas (Timm *et al.*, 2021).

Taking the above into account, potential fishing pressure from outside the US, specifically from Mexico, is not likely to have any significance on any shrimp stock status in the U.S (e.g., brown shrimp). This is because the highest determinants of population abundance are considered to be environmental drivers, rather than fishing pressure. In fact, the statistically poor relationship between parents and recruits comes from the variable effects of the environment on the survival of the young shrimp stages from spawning until entrance into the fishery. This variability in survival of young shrimp stages clouds the stock - recruitment relationship and makes it difficult to quantify the underlying association between parents and recruits (Nance, 1993)¹¹. Furthermore, the US fishery for these shrimp species is very much larger than the Mexican fishery, with 2021 landings in the US being approximately 8 times greater.

Of recent, Trifonova *et al.* (2019)¹² demonstrated significant interactions between ecosystem components (e.g. increase in shrimp abundance) and their environment (i.e., specifically temperature, SST, zooplankton abundance) for the GOM and show how sensitive these relationships are to climate perturbations. Furthermore, Tsai *et al.* (2023)¹³ showed that GOM shrimp high variability in abundance is mostly attributed to environmental processes (especially bottom temperature) underlying recruitment. This has been recognised for GOM shrimp stocks from the earliest stages of their management.

These points are further underlined by the new stock assessment model being developed for these shrimp species, which uses Empirical dynamic models (EDMs), that essentially predict shrimp abundance based on a previous year index and show that stock dynamics are characterized by nonlinear density-dependent interaction and vary by and large with temperature. A peer review of these models is ongoing as part of the SEDAR 87¹⁴ research track (see subsection on recent stock assessment history below).

Recent stock assessment history

From 2012, stock synthesis-based models were used to estimate F and SSB as a basis for overfished and overfishing determinations in these shrimp stocks. The last such assessments were in 2017-2018 (Hart, 2018a¹⁵, b¹⁶, and c¹⁷) and they concluded that the stocks were not overfished, and overfishing was not occurring. At a site visit meeting with Gulf Council (GMFMC) (July 2023), confidence was expressed that these determinations remain valid despite issues with the model described below and the absence of stock assessments in recent years.

In the case of pink shrimp, spawning biomass over the 1984-2017 time series was quite high in relation to B_{lim} and F was relatively low over the recent past compared to during the mid-1990s and well below F_{MSY} over the time series (Hart, 2018a).

¹¹ Nance, J.M. 1993. Gulf of Mexico Shrimp Fishery Recruitment Overfishing Definition; Workshop 2. NOAA Technical Memorandum, NMFS-SEFSC-323, 12p.

¹² Trifonova, N., Karnauskas, M. and Kelble, C. 2019. Predicting ecosystem components in the Gulf of Mexico and their responses to climate variability with a dynamic Bayesian network model. PLoS ONE 14(1): e0209257. <https://doi.org/10.1371/journal.pone.0209257>

¹³ Tsai, C-H., Munch, S.B., Masi, M.D., and Pollack, A.G. 2023. Predicting nonlinear dynamics of short-lived penaeid shrimp species in the Gulf of Mexico. Can. J. Fish. Aquat. Sci. 80: 57–68. [dx.doi.org/10.1139/cjfas-2022-0029](https://doi.org/10.1139/cjfas-2022-0029)

¹⁴ SEDAR. 2023. SEDAR 87 Gulf of Mexico White, Pink, and Brown Shrimp. Southeast Data, Assessment, and Review <https://sedarweb.org/assessments/sedar-87-gulf-of-mexico-white-pink-and-brown-shrimp/>

¹⁵ Hart, R.A. 2018a. Stock Assessment Update for Pink Shrimp (*Farfantepenaeus duorarum*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551. https://gulfcouncil.org/wp-content/uploads/D-4c-Pink-Assess_Rpt-2018_CPT.pdf

¹⁶ Hart, R. A. 2018b. Stock Assessment Update for Brown Shrimp (*Farfantepenaeus aztecus*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551. https://gulfcouncil.org/wp-content/uploads/D-4b-Brown-Assess_Rpt_2018-CPT.pdf

¹⁷ Hart, R. A. 2018c. Stock Assessment Update for White Shrimp (*Litopenaeus setiferus*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551. https://gulfcouncil.org/wp-content/uploads/D-4d-White-Assess_Rpt_2018_CPT.pdf

In the case of brown shrimp, spawning biomass was very high during ~ 2007-2012, dropped sharply from 2013 to 2016, but was well above B_{lim} over the time series. F was well below F_{MSY} over the time series, but increased from ~2011 to 2016, coincident with declining recruitment over that period (Hart, 2018b).

In the case of white shrimp, spawning biomass was around B_{lim} from the late-1980s to 2003, but increased rapidly to a high peak in 2011, after which it declined but remained above B_{lim} . F was well below F_{MSY} over the time series. F was low during 2008-2011, compared to the earlier part of the time series, but increased subsequently as spawning biomass declined (Hart, 2018c).

In 2019, an assessment model review found several technical concerns among these three penaeid shrimp SS models (e.g., conflicting indices, convergence issues, and residual patterns), prompting the GMFMC to initiate a Southeast Data, Assessment, and Review (SEDAR) research track process for all three stocks. In the interim, Masi (2020a)¹⁸ presented assessments for these stocks using a continuity model (also applicable for short-lived species) with 2018 as the terminal year. These utilised the same data time series inputs as in the SS model and represent the last assessments for these three shrimp stocks for which results have been made available. They illustrate patterns in F and SSB (Figure 9, Figure 10, Figure 11, Figure 12, Figure 13, Figure 14) described in the Hart assessments. Masi’s (2020) assessments also include graphics of the historical time series of fishery data (landings and CPUE) which had not been included in the Hart assessment papers. These are presented below in the section on Historic Biomass and Removals in the Fishery.

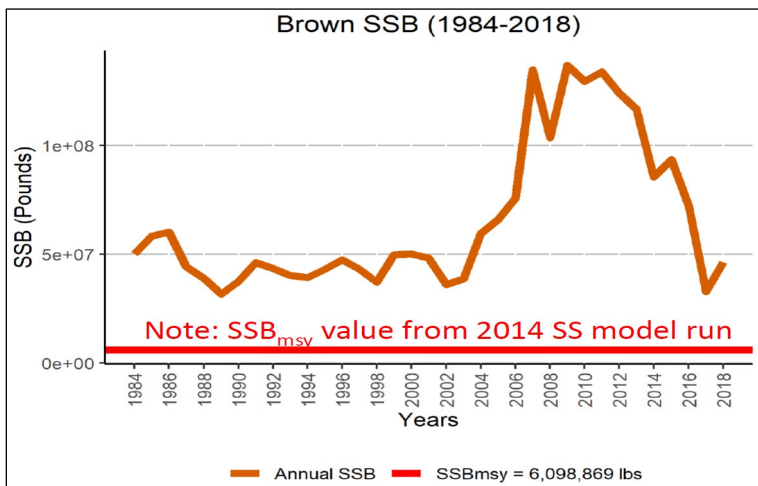


Figure 9. Brown shrimp SSB (1984-2018) from Masi (2020a).

¹⁸ Masi, M. 2020a. 2019 Gulf of Mexico Penaeid Shrimp Stock Assessments (2018 Terminal Year). Presentation to GMFMC SSC. In Meetings Materials folder for March 11, 2020, available at: <https://gulfcouncil.org/meetings/meetingsarchive/Scientific&StatisticalMeetingsArchive>

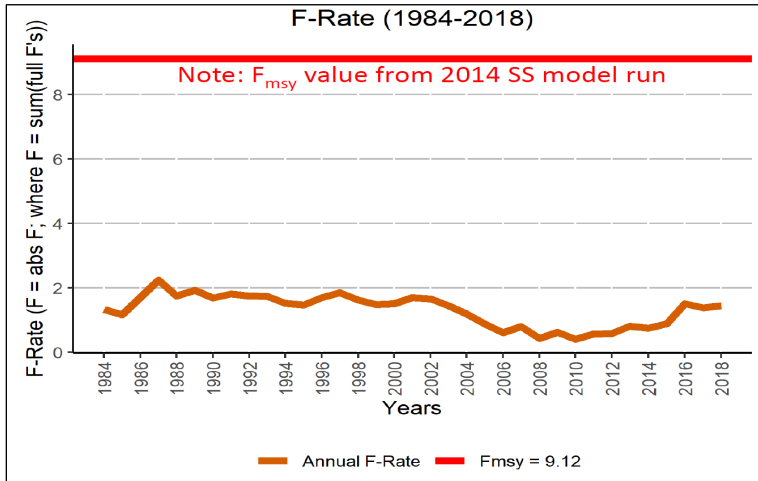


Figure 10. Brown shrimp F (1984-2018) from Masi (2020a).

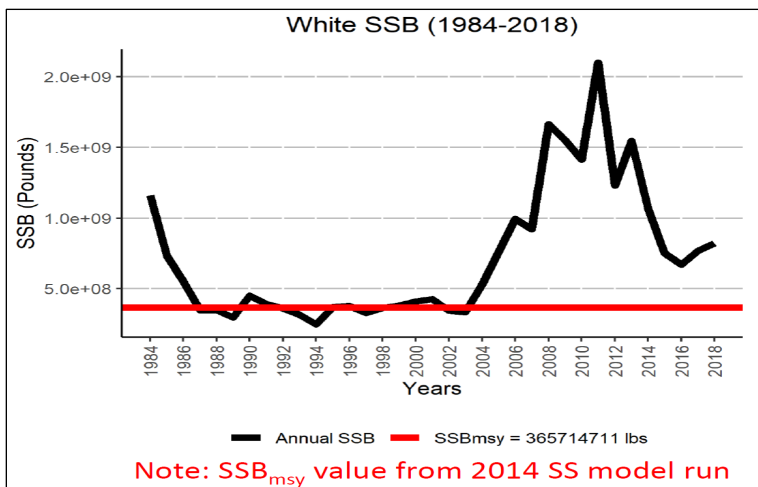


Figure 11. White shrimp SSB (1984-2018) from Masi (2020a).

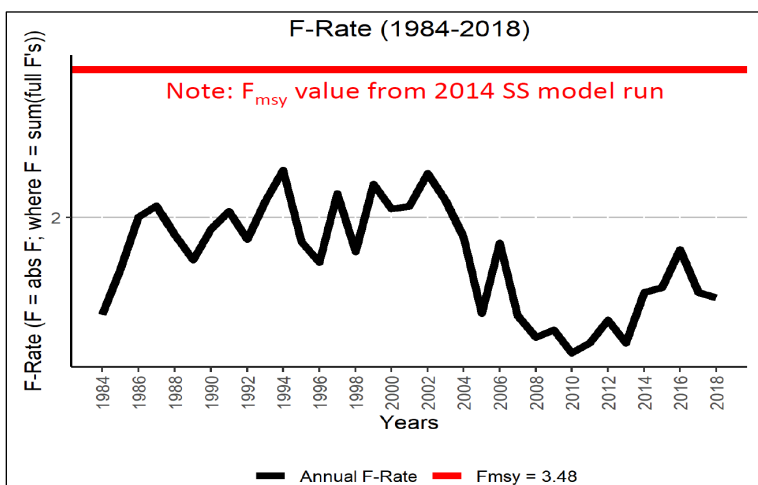


Figure 12. White shrimp F (1984-2018) from Masi (2020a).

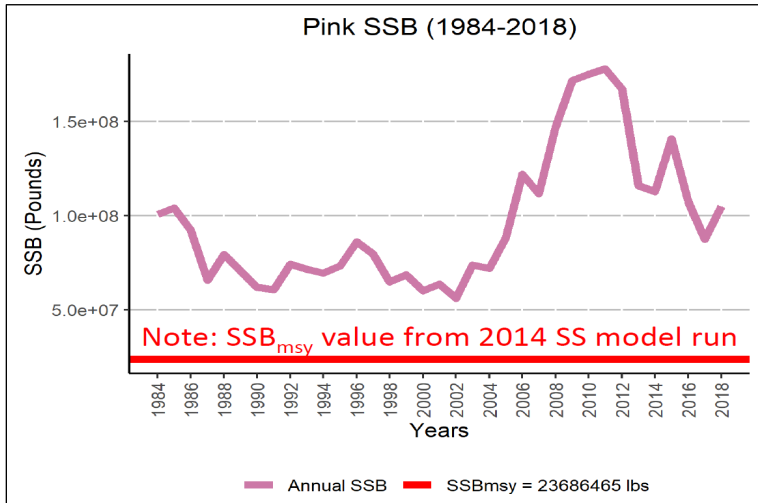


Figure 13. Pink shrimp SSB (1984-2018) from Masi (2020a).

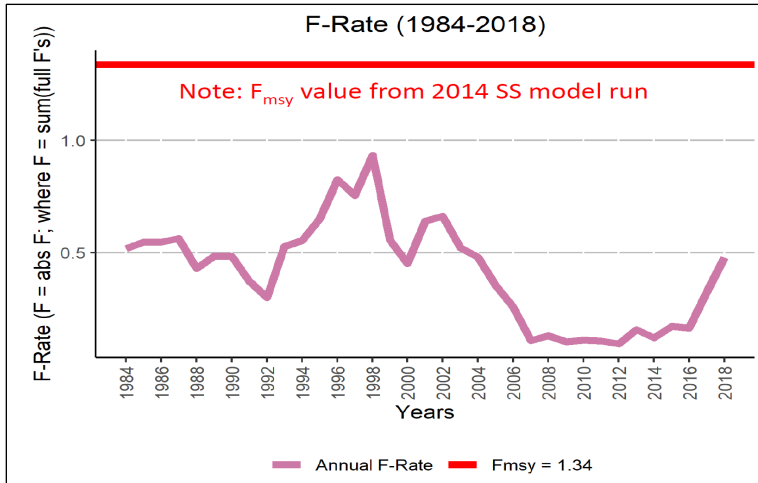


Figure 14. Pink shrimp F (1984-2018) from Masi (2020a).

The model review, which has been ongoing since 2019, has focused on empirical dynamic models (EDMs) as a new candidate model for GOM penaeid shrimp stock assessments. Their background and concept are detailed in Tsai *et al.* (2023). Peer review of these models is underway as part of the SEDAR¹⁹ research track. A workgroup has been convened following a request to the Southeast Fishery Science Center from the Gulf Council following their April 2022 Meeting. Terms of reference for SEDAR 87²⁰ were submitted to GMFMC for consideration in February 2023. A workgroup meeting in March 2023²¹ reviewed EDM theory/examples in fisheries and laid plans for moving forward. Work has been underway on conceptual model development along with review of data requirements/scoping. A data workshop is planned for September 2023.

¹⁹ SEDAR. 2023. SEDAR 87 Gulf of Mexico White, Pink, and Brown Shrimp. Southeast Data, Assessment, and Review <https://sedarweb.org/assessments/sedar-87-gulf-of-mexico-white-pink-and-brown-shrimp/>

²⁰ https://gulfcouncil.org/wp-content/uploads/08a.-S87_ToR_memo.pdf

²¹ Gulf of Mexico Shrimp Empirical Dynamic Modeling Workgroup Summary. Presentation to GMFMC SSC: https://gulfcouncil.org/wp-content/uploads/06a.-StevensMunch_GulfShrimpEDM_SSCMarch2023.pdf

6.5 Historic Biomass and Removals in the Fishery

Brown Shrimp

Almost all of the brown shrimp harvested in the United States comes from the Gulf of Mexico, mainly from Texas and Louisiana. Annual harvests of brown shrimp vary considerably from year to year, primarily due to environmental conditions affecting population size. From 2004-2014, landings of brown shrimp averaged 48,233 t. Over the 1990-2018 period, landings ranged from a high in excess of 72,575 t (1990) to a low around 27,215 t (2010). During 2010-2018, landings fluctuated between 54,431 t and 36,287 t. Landings and CPUE over the 1984-2018 period are shown in Figure 15 and Figure 16. In 2021, landings of brown shrimp totalled 30,084 t. Figure 9 and Figure 10 in the preceding section illustrate historic biomass and fishing mortality in the brown shrimp stock.

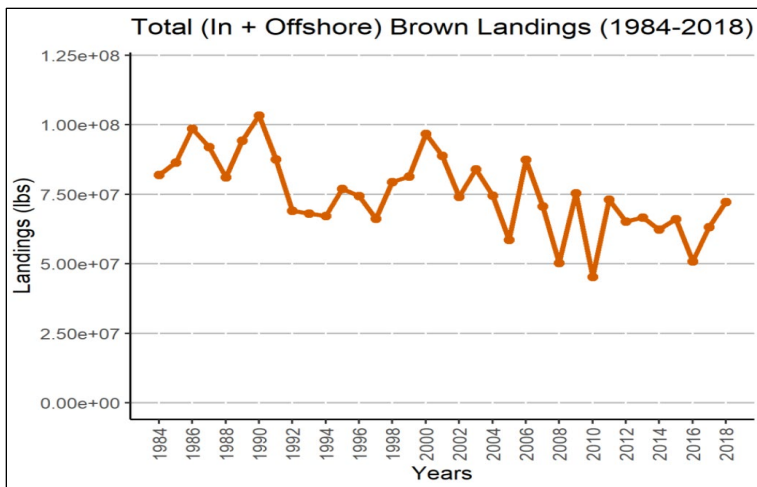


Figure 15. US brown shrimp landings (1984-2018) from (Masi 2020a).

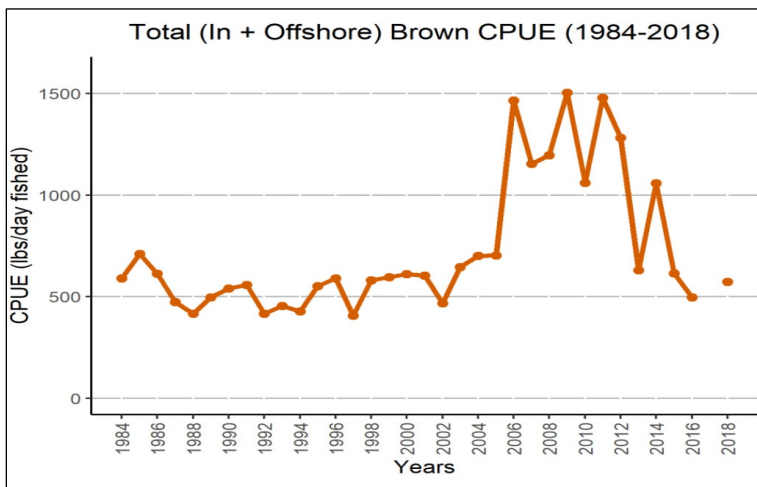


Figure 16. CPUE in the US brown shrimp fishery (1984-2018) from Masi (2020a).

White Shrimp

Almost all the white shrimp harvested in the United States comes from the Gulf of Mexico, mainly from Louisiana and Texas. Annual harvests of white shrimp vary considerably from year to year, primarily due to environmental conditions affecting population size. From 2004-2014, landings of white shrimp averaged 46,272 t. Over the 1990-2018 period, landings ranged from a high around 61,235 t (2006) to a low around 36,000 t (2018). Landings and CPUE over the 1984-2018 period are shown in Figure 17 and Figure 18. In 2021, landings of white shrimp totalled

44,577 t. Figure 11 and Figure 12 in the preceding section illustrate historic biomass and fishing mortality in the white shrimp stock.

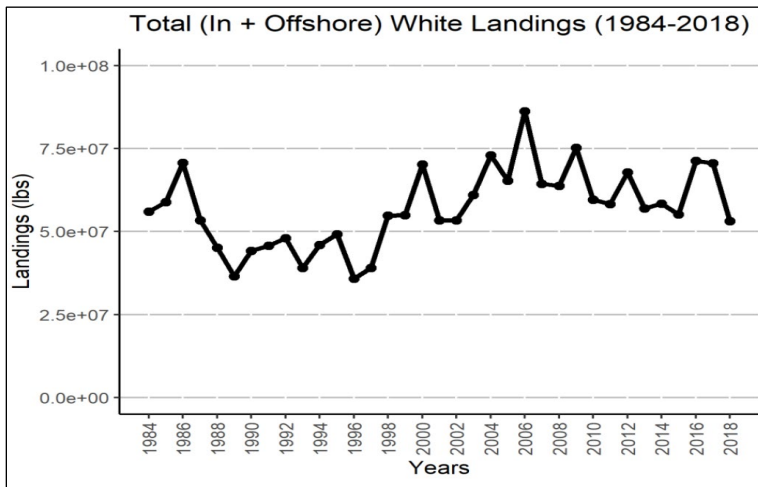


Figure 17. Landings in the US white shrimp fishery (1984-2018) from Masi (2020a).

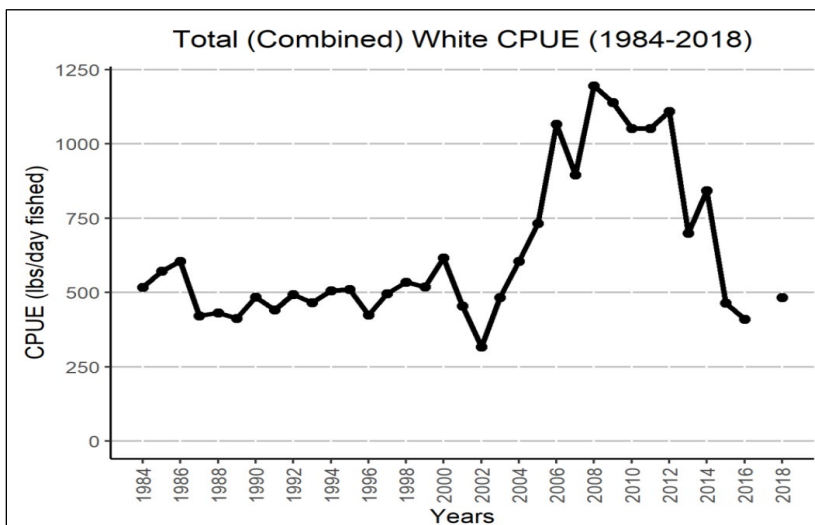


Figure 18. CPUE in the US white shrimp fishery (1984-2018) from Masi (2020a).

Pink Shrimp

Over 75 % of the pink shrimp harvested in the United States comes from the west coast of Florida. Annual harvests of pink shrimp vary considerably from year to year, primarily due to environmental conditions affecting population size. From 2004-2014, landings of pink shrimp averaged 3,955 t. Over the 1990-2018 period, landings ranged from a high around 16,000 t (1996) to a low well below 4,500 t (2007) and recovered to around 9,000 t in 2018. Landings and CPUE over the 1984-2018 period are shown in Figure 19 and Figure 20. In 2021, landings totalled 5,507 t. Figure 13 and Figure 14 in the preceding section illustrate historic biomass and fishing mortality in the pink shrimp stock.

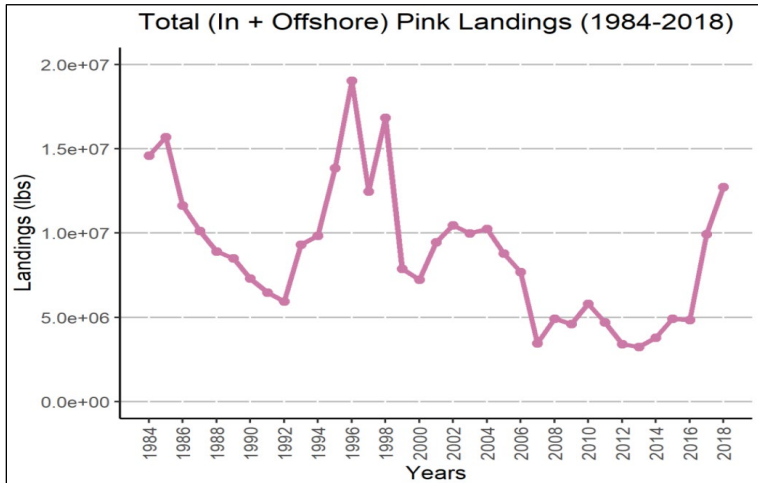


Figure 19. US pink shrimp landings (1984-2018) from (Masi 2020a).

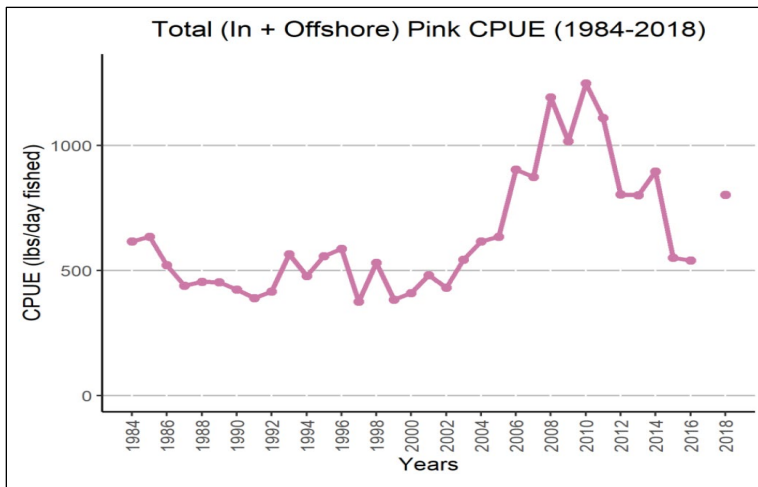


Figure 20. CPUE in the US pink shrimp fishery (1984-2018) from Masi (2020a).

Overall Gulf of Mexico Offshore

Trends in landings, effort and CPUE in offshore waters (1984-2018) for all penaeid shrimps are shown in Figure 21 and Figure 22. These indicate a gradual decline in landings over the post-2000 period and a very dramatic drop in effort during the early part of that period to a very low level compared to the pre-2000 period. This resulted in an equally dramatic increase in catch rates.

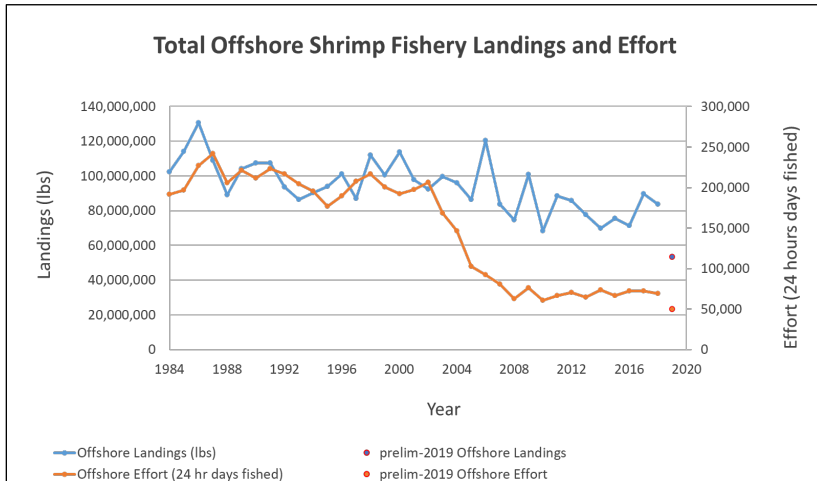


Figure 21. Total offshore shrimp landings and effort (1984-2018). From Masi (2020b)²².

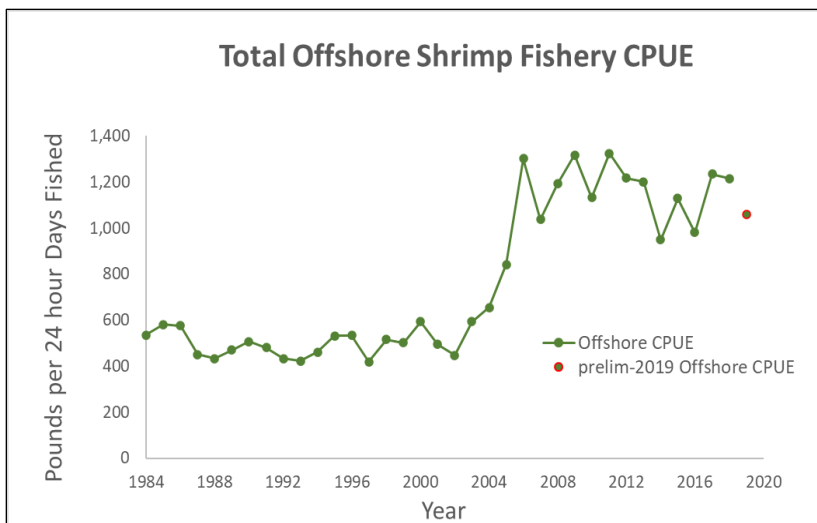


Figure 22. Total offshore shrimp CPUE (1984-2018). From Masi (2020b).

6.6 Economic Value of the Fishery²³

The information and data presented here are from the document titled *Fisheries Economics of the United States 2020 – Economics and Sociocultural Status and Trend Series* as published by the US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, NOAA Technical Memorandum NMFS-F/SPO-236 February 2023. The report provides a detailed look at the economic performance of commercial and recreational fisheries and other marine-related sectors on a state, regional, and national basis. The economic impact of commercial and recreational fishing activities in the United States is also reported in terms of employment, sales, and value-added impacts. The report provides management highlights for each region that include a summary of stock status, updates on catch share programs, and other selected management issues.

²² Masi, M. 2020b. 2018 and preliminary 2019 Gulf of Mexico Shrimp Effort Estimates. Presentation to GMFMC SSC. In Meetings Materials folder for March 11, 2020. Available at: <https://gulfcouncil.org/meetings/meetingsarchive/Scientific&StatisticalMeetingsArchive>

²³ National Marine Fisheries Service. 2023. Fisheries Economics of the United States, 2020. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-236, 231 p. Available at <https://www.fisheries.noaa.gov/resource/document/fisheries-economics-united-states-2020-report>

The Gulf of Mexico Region includes Alabama, Louisiana, Mississippi, Texas, and West Florida. Federal fisheries in this region are managed by the Gulf of Mexico Fishery Management Council (GMFMC) and NOAA Fisheries under seven fishery management plans (FMPs), including Gulf shrimp. The commercial fisheries section reports on economic impacts, landings revenue, landings, and ex-vessel prices of key species/species groups. It excludes subsistence fishermen or saltwater anglers who fish for sport as well as the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers.

Four different measures are commonly used to show how commercial fisheries landings affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as commercial fishing. The category includes both the direct sales of fish landed and sales made between businesses and households resulting from the original sale. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the sales of seafood or purchases of inputs to commercial fishing.

Total economic impacts for each state and the nation represent the sum of direct impacts; indirect impacts (in this case, the impact from suppliers to the seafood industry); and induced impacts (spending by employees on personal and household expenditures, where employees of both the seafood industry and its full supply chain are included). That is, the total economic impact estimates reported here measure jobs, sales, value-added, and income impacts from the seafood industry as well as the economic activity generated throughout each region's broader economy from this industry.²⁴

In presenting the Gulf states' ten-year socio-economic data for their fisheries sectors, the assessors have not made inferences or drawn conclusions about the significance of the data and trends.

Landings Revenue

In 2020, landings revenue in the Gulf of Mexico Region totaled \$732.5 million, a 9% decrease from 2011 (a 21% decrease in real terms after adjusting for inflation) and a 10% decrease from 2019. Landings revenue was highest in Louisiana (\$263 million), followed by Texas (\$195.6 million). In 2020, **shrimp (\$341.4 million)**, menhaden (\$105.1 million), and blue crab (\$69.7 million) had the highest landings revenue in the region. Together, these top three species accounted for 70% of total landings revenue (Table 5).

Table 5. Total landings revenue and landings revenue of key species/species groups (thousands of dollars).

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	805,149	781,200	930,359	1,057,002	853,585	888,975	872,931	890,435	816,050	732,461
Finfish	193,664	189,959	200,596	206,767	246,370	258,415	181,177	219,414	205,976	194,196
Shellfish and Other	611,485	591,241	729,762	850,235	607,215	630,560	691,753	671,021	610,075	538,265
Key Species										
Blue crab	48,943	52,538	62,042	79,679	74,567	65,569	69,146	76,392	69,605	69,730
Crawfish	9,887	8,291	16,457	16,144	6,852	12,373	12,105	12,550	13,169	10,995
Groupers	19,932	24,672	24,910	30,435	27,693	28,746	22,287	19,692	21,044	20,582
Menhaden	103,523	87,377	90,706	93,267	138,628	143,342	72,202	116,530	102,448	105,097
Mulletts	10,395	8,753	13,552	11,715	7,654	8,560	6,668	5,879	5,229	4,169
Oysters	64,908	76,025	75,552	90,240	96,093	86,217	110,900	104,074	87,929	59,026

²⁴ Commercial economic impacts data were not available for West Florida specifically; data for the entire state of Florida are reported here.

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Red snapper	11,109	13,319	20,253	22,527	26,792	25,843	28,374	28,675	32,161	30,837
Shrimp	421,762	401,797	497,398	577,479	345,569	390,430	434,005	398,359	371,027	341,418
Spiny lobster	35,568	22,249	47,116	53,416	44,059	41,311	31,944	43,629	30,045	22,144
Tunas	5,518	10,726	7,345	5,153	4,585	5,699	5,153	3,711	2,466	1,760

Landings

In 2020, Gulf of Mexico Region commercial fishermen landed over 1.2 billion pounds of finfish and shellfish. This represents a 32% decrease from 2011 and a 14% decrease from 2019. Menhaden contributed the highest landings volume in the region, accounting for 75% of total landing weight; **shrimp ranked a distant second in landings volume** (Table 6).

Table 6. Total landings and landings of key species/species groups (thousands of pounds)²⁵

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	1,768,543	1,668,976	1,351,768	1,243,777	1,553,491	1,737,033	1,401,776	1,543,219	1,407,081	1,208,955
Finfish	1,442,564	1,350,463	1,041,144	920,611	1,252,979	1,434,021	1,082,782	1,226,477	1,133,853	955,909
Shellfish and Other	325,979	318,513	310,625	323,166	300,512	303,012	318,994	316,743	273,228	253,046
Key Species										
Blue crab	55,688	53,747	47,119	51,643	52,623	51,991	54,468	53,191	49,422	43,703
Crawfish	9,582	6,834	19,641	13,055	5,461	13,573	8,575	11,178	9,406	7,971
Groupers	7,026	8,329	7,701	8,991	7,824	7,951	5,871	4,679	4,509	4,637
Menhaden	1,374,285	1,275,789	971,306	848,599	1,188,941	1,364,034	1,016,831	1,166,097	1,074,438	908,750
Mulletts	14,256	12,210	13,899	15,163	10,858	11,430	9,317	8,237	7,057	5,568
Oysters	19,092	21,200	19,526	17,513	16,633	15,272	17,705	15,329	12,956	9,070
Red snapper	3,482	3,942	5,198	5,548	6,559	6,284	6,903	6,692	7,501	7,543
Shrimp	216,852	217,589	204,215	217,012	203,613	204,478	223,240	221,546	187,321	175,250
Spiny lobster	5,295	3,770	5,645	5,039	5,451	5,016	3,622	5,821	3,835	3,137
Tunas	1,590	3,084	2,113	1,717	1,342	1,633	1,509	973	666	574

Prices

In 2020, spiny lobster (\$7.06 / lb.) received the highest ex-vessel price in the region. Landings of menhaden (\$0.12 / lb.) had the lowest ex-vessel price. **Shrimp accounted for the sixth highest ex-vessel price** (Table 7).

Table 7. Average annual ex-vessel price of key species/species groups (dollars per pound).

Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Blue crab	0.88	0.98	1.32	1.54	1.42	1.26	1.27	1.44	1.41	1.60
Crawfish	1.03	1.21	0.84	1.24	1.25	0.91	1.41	1.12	1.40	1.38
Groupers	2.84	2.96	3.23	3.39	3.54	3.62	3.80	4.21	4.67	4.44
Menhaden	0.08	0.07	0.09	0.11	0.12	0.11	0.07	0.10	0.10	0.12
Mulletts	0.73	0.72	0.98	0.77	0.70	0.75	0.72	0.71	0.74	0.75
Oysters	3.40	3.59	3.87	5.15	5.78	5.65	6.26	6.79	6.79	6.51
Red snapper	3.19	3.38	3.90	4.06	4.08	4.11	4.11	4.29	4.29	4.09
Shrimp	1.94	1.85	2.44	2.66	1.70	1.91	1.94	1.80	1.98	1.95
Spiny lobster	6.72	5.90	8.35	10.60	8.08	8.24	8.82	7.49	7.83	7.06
Tunas	3.47	3.48	3.48	3.00	3.42	3.49	3.41	3.81	3.70	3.06

²⁵ The information for Florida in this Economic Impacts table is for the entire state. Data for the remaining commercial tables pertain only to West Florida.

6.6.1 Value of the fishery – Texas

Table 8. 2020 Economic impacts of the Texas seafood industry (thousands of dollars; number of jobs)²⁶

Sector	With Imports				Without Imports			
	Jobs	Sales	Income	Value Added	Jobs	Sales	Income	Value Added
Total Impacts	35,517	4,900,200	1,201,802	1,897,752	15,296	1,078,693	398,152	555,106
Commercial Harvesters	4,260	407,824	125,040	195,515	4,260	407,824	125,040	195,515
Seafood Processors and Dealers	3,083	303,630	114,223	150,435	1,430	140,856	52,989	69,788
Importers	9,038	2,992,621	479,625	912,282	NA	NA	NA	NA
Seafood Wholesalers and Distributors	1,990	316,349	105,553	146,171	412	65,499	21,854	30,264
Retail	17,146	879,776	377,361	493,349	9,194	464,514	198,268	259,538

Table 9. Texas total landings revenue and landings revenue of key species/species groups (thousands of dollars).

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	225,141	205,760	258,124	263,614	180,421	205,129	230,633	211,848	209,279	195,628
Finfish	8,261	9,955	12,787	13,572	15,947	17,411	16,147	16,023	18,954	16,845
Shellfish and Other	216,881	195,805	245,337	250,043	164,474	187,718	214,486	195,824	190,325	178,783
Key Species										
Atlantic croaker	621	743	819	690	725	856	767	1,276	1,320	1,343
Black drum	1,443	1,492	1,706	1,981	2,074	2,341	2,458	1,840	2,288	1,471
Blue crab	2,838	2,878	2,331	3,057	5,539	6,789	5,423	4,886	5,529	5,022
Flounders	204	175	73	99	187	239	164	73	107	112
Groupers	560	760	1,149	1,154	1,481	1,593	1,154	755	1,302	559
Oysters	12,796	21,306	23,471	19,222	8,254	17,129	20,404	23,999	33,496	30,626
Red snapper	3,274	4,448	7,329	7,617	9,387	10,573	9,881	10,838	12,548	12,176
Shrimp	200,992	171,379	219,396	227,588	150,466	163,564	188,477	166,771	151,041	142,927
Tunas	2	5	7	27	3	3	1	1	1	NA
Vermilion snapper	1,274	1,434	659	604	920	584	443	333	323	276

Table 10. Texas total landings and landings of key species/species groups (thousands of pounds).

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	96,920	90,159	83,583	78,027	84,228	79,366	90,673	84,385	74,918	72,517
Finfish	4,106	4,101	4,691	4,795	5,370	5,683	5,201	4,643	5,379	4,565
Shellfish and Other	92,814	86,058	78,893	73,232	78,859	73,683	85,472	79,741	69,539	67,953
Key Species										
Atlantic croaker	79	89	96	79	88	101	88	131	129	123
Black drum	1,789	1,624	1,698	1,747	1,879	2,055	1,926	1,469	1,795	1,070
Blue crab	2,886	2,854	1,902	2,238	4,336	5,323	4,132	3,431	3,913	3,406
Flounders	75	60	21	25	51	64	40	18	26	25
Groupers	194	220	300	280	354	372	271	169	267	127
Oysters	4,342	5,818	6,126	4,129	1,587	3,127	3,504	3,859	5,288	5,331
Red snapper	952	1,123	1,807	1,797	2,152	2,390	2,213	2,353	2,603	2,755
Shrimp	85,485	77,304	70,818	66,815	72,871	65,171	77,795	72,415	60,281	59,171
Tunas	1	3	3	9	1	2	1	1	1	NA

²⁶ Confidential data are not included in the economic impacts, landings revenue totals, or landings total for the Gulf of Mexico Region table and all state tables in this region, with the exception of West Florida; NA = Indicates Not Applicable or these data are confidential and therefore not disclosable.

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Vermilion snapper	466	511	234	203	307	192	149	107	104	92

Table 11. Texas average annual ex-vessel price of key species/species groups (dollars per pound).

Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Atlantic croaker	7.84	8.31	8.55	8.68	8.20	8.51	8.73	9.78	10.23	10.88
Black drum	0.81	0.92	1.00	1.13	1.10	1.14	1.28	1.25	1.27	1.38
Blue crab	0.98	1.01	1.23	1.37	1.28	1.28	1.31	1.42	1.41	1.47
Flounders	2.74	2.94	3.55	3.91	3.65	3.72	4.10	3.98	4.15	4.59
Groupers	2.89	3.45	3.84	4.12	4.18	4.28	4.25	4.47	4.87	4.42
Oysters	2.95	3.66	3.83	4.66	5.20	5.48	5.82	6.22	6.33	5.74
Red snapper	3.44	3.96	4.06	4.24	4.36	4.42	4.47	4.61	4.82	4.42
Shrimp	2.35	2.22	3.10	3.41	2.06	2.51	2.42	2.30	2.51	2.42
Tunas	1.82	1.83	2.10	2.94	2.43	1.41	1.53	2.11	2.43	NA
Vermilion snapper	2.73	2.80	2.81	2.98	3.00	3.04	2.97	3.12	3.10	2.99

6.6.2 Value of the fishery – Louisiana

Table 12. 2020 Economic impacts of the Louisiana seafood industry (thousands of dollars; number of jobs)²⁷.

Sector	With Imports				Without Imports			
	Jobs	Sales	Income	Value Added	Jobs	Sales	Income	Value Added
Total Impacts	22,371	1,353,405	508,582	687,828	21,929	1,256,871	489,056	655,001
Commercial Harvesters	8,383	491,307	166,926	244,489	8,383	491,307	166,926	244,489
Seafood Processors and Dealers	1,892	191,043	74,101	94,519	1,815	183,303	71,100	90,690
Importers	238	78,813	12,631	24,026	NA	NA	NA	NA
Seafood Wholesalers and Distributors	677	88,383	30,109	38,975	631	82,396	28,070	36,335
Retail	11,181	503,860	224,814	285,819	11,099	499,865	222,961	283,487

Table 13. Louisiana total landings revenue and landings revenue of key species/species groups (thousands of dollars).

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	331,054	327,870	396,047	480,068	368,762	417,711	369,069	375,885	317,319	262,965
Finfish	111,468	89,747	102,938	96,566	108,039	157,254	84,623	114,225	81,012	81,562
Shellfish and Other	219,586	238,123	293,108	383,503	260,723	260,457	284,446	261,660	236,307	181,403
Key Species										
Blue crab	36,827	42,402	51,467	66,989	58,084	49,487	54,217	60,667	52,232	54,797
Crawfish	9,887	8,291	16,457	16,144	6,852	12,373	12,105	12,550	13,169	10,995
King mackerel	1,570	1,452	1,477	2,379	2,006	2,150	2,073	2,003	2,427	1,452
Menhaden	93,547	64,861	80,325	72,832	85,439	132,105	60,909	90,315	60,347	66,442
Mullets	775	976	626	916	418	720	757	389	132	2
Oysters	41,086	41,981	43,832	64,665	81,806	62,236	84,417	75,973	50,134	23,754
Red snapper	1,936	2,187	4,315	5,836	5,951	5,198	6,716	6,112	5,445	4,568

²⁷ Confidential data are not included in the economic impacts, landings revenue totals, or landings total for the Gulf of Mexico Region table and all state tables in this region, with the exception of West Florida; NA = Indicates Not Applicable or these data are confidential and therefore not disclosable.

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Shrimp	131,393	145,103	181,053	235,420	113,711	136,128	133,299	112,016	120,385	91,739
Tunas	3,369	7,906	4,594	3,418	2,837	4,290	2,583	2,324	1,813	1,216
Vermilion snapper	505	662	473	688	619	914	821	699	581	254

Table 14. Louisiana total landings and landings of key species/species groups (thousands of pounds).

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	1,284,246	1,213,719	991,060	870,175	1,067,089	1,252,400	897,823	1,031,962	898,851	739,194
Finfish	1,128,383	1,050,357	822,014	686,165	915,083	1,090,590	737,231	875,882	761,232	627,769
Shellfish and Other	155,864	163,362	169,046	184,010	152,006	161,811	160,592	156,080	137,619	111,424
Key Species										
Blue crab	43,891	44,323	39,064	43,219	41,308	40,099	43,874	42,742	37,404	34,332
Crawfish	9,582	6,834	19,641	13,055	5,461	13,573	8,575	11,178	9,406	7,971
King mackerel	986	954	759	1,144	1,047	994	1,052	1,021	1,108	649
Menhaden	1,106,931	1,026,240	800,101	663,693	893,789	1,068,690	716,056	855,216	741,233	611,966
Mulletts	1,385	1,385	609	1,186	692	1,005	1,093	630	258	6
Oysters	11,039	11,324	11,196	12,235	13,994	11,010	13,329	10,924	7,095	3,182
Red snapper	829	928	1,067	1,325	1,405	1,236	1,557	1,414	1,414	1,208
Shrimp	90,552	100,182	98,604	114,794	90,507	96,658	94,226	90,673	83,301	65,636
Tunas	932	2,152	1,241	1,104	664	1,139	679	570	431	298
Vermilion snapper	229	287	173	237	207	331	311	254	206	91

Table 15. Louisiana average annual ex-vessel price of key species/species groups (dollars per pound).

Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Blue crab	0.84	0.96	1.32	1.55	1.41	1.23	1.24	1.42	1.40	1.60
Crawfish	1.03	1.21	0.84	1.24	1.25	0.91	1.41	1.12	1.40	1.38
King mackerel	1.59	1.52	1.95	2.08	1.92	2.16	1.97	1.96	2.19	2.24
Menhaden	0.08	0.06	0.10	0.11	0.10	0.12	0.09	0.11	0.08	0.11
Mulletts	0.56	0.70	1.03	0.77	0.60	0.72	0.69	0.62	0.51	0.28
Oysters	3.72	3.71	3.91	5.29	5.85	5.65	6.33	6.95	7.07	7.47
Red snapper	2.33	2.36	4.04	4.40	4.23	4.20	4.31	4.32	3.85	3.78
Shrimp	1.45	1.45	1.84	2.05	1.26	1.41	1.41	1.24	1.45	1.40
Tunas	3.62	3.67	3.70	3.09	4.27	3.77	3.80	4.07	4.21	4.08
Vermilion snapper	2.20	2.30	2.73	2.90	3.00	2.76	2.64	2.75	2.83	2.79

6.6.3 Value of the fishery – Mississippi

Table 16. 2020 Economic impacts of the Mississippi seafood industry (thousands of dollars; number of jobs)²⁸

Sector	With Imports				Without Imports			
	Jobs	Sales	Income	Value Added	Jobs	Sales	Income	Value Added
Total Impacts	6,459	346,873	136,974	177,125	6,431	342,393	135,868	175,443
Commercial Harvesters	1,432	82,765	25,901	37,278	1,432	82,765	25,901	37,278
Seafood Processors and Dealers	1,201	107,813	42,653	53,445	1,184	106,269	42,042	52,680
Importers	9	2,846	456	868	NA	NA	NA	NA
Seafood Wholesalers and Distributors	127	14,060	4,961	6,251	127	14,042	4,955	6,243
Retail	3,691	139,390	63,003	79,283	3,689	139,317	62,970	79,242

Table 17. Mississippi total landings revenue and landings revenue of key species/species groups (thousands of dollars)²⁹.

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	30,163	49,142	34,600	38,394	64,713	28,994	31,073	44,431	58,661	51,988
Finfish	10,400	23,058	10,571	20,707	53,261	11,342	11,947	26,441	42,743	39,130
Shellfish and Other	19,763	26,084	24,029	17,686	11,452	17,652	19,126	17,990	15,918	12,858
Key Species										
Blue crab	321	724	416	931	1,209	913	793	806	692	899
Eastern oyster	928	1,596	1,544	1,742	969	1,088	344	19	NA	NA
Menhaden	9,871	22,394	10,230	20,234	52,962	10,973	11,086	25,992	41,992	38,527
Mulletts	56	63	61	14	12	22	39	72	18	12
Oysters	928	1,596	1,544	1,742	969	1,088	344	19	NA	NA
Red drum	58	69	75	93	155	150	140	116	155	132
Shrimp	18,515	23,765	22,069	14,969	9,197	15,576	17,956	17,117	15,128	11,940

Table 18. Mississippi total landings and landings of key species/species groups (thousands of pounds).

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	277,769	263,504	180,343	190,309	304,607	307,757	311,351	319,863	340,716	303,509
Finfish	267,107	249,291	170,745	184,213	294,413	294,381	300,080	309,426	332,753	296,667
Shellfish and Other	10,662	14,213	9,598	6,095	10,195	13,376	11,271	10,436	7,963	6,841
Key Species										
Blue crab	370	782	359	559	798	780	626	519	573	645
Eastern oyster	247	425	336	333	182	245	60	3	NA	NA
Menhaden	266,756	248,846	170,495	183,950	294,189	294,189	299,630	309,058	332,372	296,364
Mulletts	93	99	95	22	21	40	68	176	35	23
Oysters	247	425	336	333	182	245	60	3	NA	NA
Red drum	28	35	37	43	61	61	57	48	62	51
Shrimp	10,045	13,006	8,903	5,187	9,185	12,324	10,566	9,896	7,359	6,190

Table 19. Mississippi average annual ex-vessel price of key species/species groups (dollars per pound).

Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
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²⁸ Confidential data are not included in the economic impacts, landings revenue totals, or landings total for the Gulf of Mexico Region table and all state tables in this region, with the exception of West Florida; NA = Indicates Not Applicable or these data are confidential and therefore not disclosable.

²⁹ NA = Indicates Not Applicable or these data are confidential and therefore not disclosable.

Blue crab	0.87	0.93	1.16	1.66	1.51	1.17	1.27	1.55	1.21	1.39
Eastern oyster	3.75	3.75	4.59	5.23	5.32	4.44	5.78	7.46	NA	NA
Menhaden	0.04	0.09	0.06	0.11	0.18	0.04	0.04	0.08	0.13	0.13
Mulletts	0.61	0.64	0.64	0.63	0.56	0.55	0.58	0.41	0.50	0.50
Oysters	3.75	3.75	4.59	5.23	5.32	4.44	5.78	7.46	NA	NA
Red drum	2.04	1.99	2.04	2.15	2.53	2.48	2.47	2.42	2.51	2.57
Shrimp	1.84	1.83	2.48	2.89	1.00	1.26	1.70	1.73	2.06	1.93

6.6.4 Value of the fishery – Alabama

Table 20. 2020 Economic impacts of the Alabama seafood industry (thousands of dollars; number of jobs)³⁰.

Sector	With Imports				Without Imports			
	Jobs	Sales	Income	Value Added	Jobs	Sales	Income	Value Added
Total Impacts	11,475	560,378	222,965	291,716	11,402	549,999	220,398	287,796
Commercial Harvesters	1,901	109,963	32,576	48,539	1,901	109,963	32,576	48,539
Seafood Processors and Dealers	1,907	144,400	56,562	71,878	1,859	140,746	55,131	70,059
Importers	20	6,511	1,044	1,985	NA	NA	NA	NA
Seafood Wholesalers and Distributors	173	9,739	3,414	4,398	172	9,697	3,399	4,379
Retail	7,475	289,765	129,369	164,917	7,470	289,593	129,292	164,819

Table 21. Alabama total landings revenue and landings revenue of key species/species groups (thousands of dollars).

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	49,995	44,942	50,777	62,843	43,165	50,820	56,222	67,670	57,662	66,572
Finfish	3,883	4,821	4,433	4,376	4,046	4,437	3,978	4,431	4,645	3,147
Shellfish and Other	46,112	40,121	46,344	58,467	39,119	46,383	52,244	63,239	53,017	63,424
Key Species										
Blue crab	1,128	1,044	1,037	1,296	1,226	1,785	1,520	1,150	1,404	901
King mackerel	207	220	439	416	344	281	121	143	190	133
Menhaden	58	84	104	147	154	164	158	173	71	69
Mulletts	695	1,266	1,181	1,123	761	522	537	591	392	348
Oysters	1,322	1,255	786	433	341	601	557	914	1,543	2,426
Red snapper	314	316	401	697	1,443	1,423	1,852	1,559	2,024	1,511
Sharks	26	6	202	116	NA	0	71	122	NA	NA
Shrimp	43,608	37,720	44,427	56,712	37,533	43,973	50,138	61,038	50,020	59,802
Spanish mackerel	582	1,149	940	471	705	833	439	670	577	288
Vermilion snapper	622	393	88	385	247	242	267	277	482	248

Table 22. Alabama total landings and landings of key species/species groups (thousands of pounds).

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	25,621	25,553	21,648	23,718	22,773	24,579	26,737	35,353	26,021	29,803
Finfish	4,735	6,095	5,410	5,126	3,754	4,422	4,029	5,773	4,102	2,527
Shellfish and Other	20,886	19,458	16,238	18,592	19,018	20,157	22,709	29,579	21,919	27,276
Key Species										

³⁰ Confidential data are not included in the economic impacts, landings revenue totals, or landings total for the Gulf of Mexico Region table and all state tables in this region, with the exception of West Florida; NA = Indicates Not Applicable or these data are confidential and therefore not disclosable.

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Blue crab	1,617	1,325	1,027	1,161	1,301	1,918	1,425	1,034	1,516	915
King mackerel	119	117	175	184	146	112	53	59	79	51
Menhaden	364	521	496	700	695	804	1,052	1,713	745	332
Mulletts	1,270	2,002	1,795	1,907	1,385	952	990	1,250	829	715
Oysters	296	265	133	58	26	37	26	25	141	196
Red snapper	78	78	108	180	356	320	410	360	452	323
Sharks	75	18	312	193	NA	2	153	201	NA	NA
Shrimp	18,840	17,603	14,883	17,339	17,665	18,171	21,224	28,309	20,204	25,215
Spanish mackerel	839	1,377	972	431	617	859	440	948	742	309
Vermilion snapper	224	132	28	124	74	76	80	83	146	74

Table 23. Alabama average annual ex-vessel price of key species/species groups (dollars per pound).

Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Blue crab	0.70	0.79	1.01	1.12	0.94	0.93	1.07	1.11	0.93	0.98
King mackerel	1.74	1.89	2.51	2.26	2.35	2.50	2.29	2.44	2.42	2.60
Menhaden	0.16	0.16	0.21	0.21	0.22	0.20	0.15	0.10	0.09	0.21
Mulletts	0.55	0.63	0.66	0.59	0.55	0.55	0.54	0.47	0.47	0.49
Oysters	4.47	4.73	5.91	7.43	12.96	16.36	21.21	36.13	10.91	12.40
Red snapper	4.04	4.05	3.70	3.86	4.05	4.45	4.52	4.33	4.48	4.68
Sharks	0.35	0.33	0.65	0.60	NA	0.11	0.46	0.61	NA	NA
Shrimp	2.31	2.14	2.99	3.27	2.12	2.42	2.36	2.16	2.48	2.37
Spanish mackerel	0.69	0.83	0.97	1.09	1.14	0.97	1.00	0.71	0.78	0.93
Vermilion snapper	2.78	2.97	3.12	3.11	3.33	3.19	3.34	3.32	3.30	3.35

6.6.5 Value of the fishery – West Florida

Table 24. 2020 Economic impacts of the Florida seafood industry (thousands of dollars; number of jobs)³¹.

Sector	With Imports				Without Imports			
	Jobs	Sales	Income	Value Added	Jobs	Sales	Income	Value Added
Total Impacts	76,685	18,501,239	3,451,325	6,179,998	8,231	863,421	226,859	348,384
Commercial Harvesters	5,361	423,022	131,375	175,246	5,361	423,022	131,375	175,246
Seafood Processors and Dealers	4,466	860,979	166,625	327,569	440	91,060	17,623	34,645
Importers	40,872	13,532,605	2,168,858	4,125,331	NA	NA	NA	NA
Seafood Wholesalers and Distributors	9,853	1,350,774	530,309	659,774	362	49,672	19,501	24,262
Retail	16,134	2,333,859	454,157	892,078	2,067	299,668	58,359	114,231

Table 25. West Florida total landings revenue and landings revenue of key species/species groups (thousands of dollars).

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	168,796	153,486	190,811	212,082	196,525	186,321	185,933	190,602	173,129	155,309
Finfish	59,652	62,378	69,868	71,546	65,077	67,970	64,482	58,294	58,622	53,512
Shellfish and Other	109,143	91,107	120,943	140,537	131,448	118,351	121,452	132,307	114,508	101,797
Key Species										

³¹ Confidential data are not included in the economic impacts, landings revenue totals, or landings total for the Gulf of Mexico Region table and all state tables in this region, with the exception of West Florida; The information for Florida in this Economic Impacts table is for the entire state. Data for the remaining commercial tables pertain only to West Florida; NA = Indicates Not Applicable or these data are confidential and therefore not disclosable.

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Blue crab	7,829	5,490	6,791	7,406	8,508	6,596	7,194	8,884	9,748	8,110
Gag	1,439	2,445	2,846	2,889	2,783	4,671	2,556	2,763	3,205	2,817
Lobsters	35,575	22,257	47,125	53,420	44,062	41,316	31,947	43,632	30,053	22,149
Mullet	8,649	6,192	11,409	9,389	6,181	6,988	5,009	4,499	4,209	3,255
Oyster	8,776	9,887	5,920	4,179	4,722	5,163	5,179	3,169	2,756	2,219
Quahog clam	1,003	805	1,141	221	191	58	117	73	114	120
Red grouper	15,086	16,761	16,428	21,219	18,952	17,881	14,158	11,258	10,691	12,087
Red snapper	5,417	6,142	8,208	8,126	10,011	8,649	9,552	10,166	11,751	12,217
Shrimp	27,255	23,831	30,452	42,790	34,663	31,189	44,136	41,417	34,454	35,010
Stone crab	24,233	24,594	25,172	27,965	35,778	29,926	29,058	32,273	33,957	31,006

Table 26. West Florida total landings and landings of key species/species groups (thousands of pounds).

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	83,986	76,041	75,134	81,547	74,794	72,931	75,192	71,657	66,575	63,931
Finfish	38,234	40,620	38,284	40,311	34,359	38,946	36,241	30,752	30,386	24,381
Shellfish and Other	45,753	35,421	36,850	41,236	40,435	33,985	38,951	40,905	36,188	39,551
Key Species										
Blue crab	6,924	4,463	4,767	4,467	4,880	3,871	4,411	5,465	6,016	4,404
Gag	369	613	687	689	642	1,076	575	576	623	558
Lobsters	5,298	3,772	5,647	5,041	5,451	5,017	3,624	5,824	3,837	3,138
Mullet	11,428	8,632	11,294	11,945	8,647	9,321	7,042	6,054	5,782	4,670
Oyster	3,167	3,368	1,735	758	844	853	786	517	432	361
Quahog clam	154	132	199	36	23	7	13	9	16	9
Red grouper	5,635	6,151	5,479	6,630	5,672	5,304	3,921	2,801	2,386	2,809
Red snapper	1,538	1,699	2,216	2,107	2,646	2,338	2,532	2,565	2,837	3,078
Shrimp	11,930	9,493	11,007	12,877	13,386	12,153	19,429	20,252	16,177	19,037
Stone crab	2,727	2,667	1,946	1,948	2,760	3,006	2,510	2,114	2,195	2,147

Table 27. West Florida average annual ex-vessel price of key species/species groups (dollars per pound).

Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Blue crab	1.13	1.23	1.42	1.66	1.74	1.70	1.63	1.63	1.62	1.84
Gag	3.90	3.99	4.14	4.19	4.33	4.34	4.45	4.79	5.14	5.04
Lobsters	6.72	5.90	8.34	10.60	8.08	8.24	8.81	7.49	7.83	7.06
Mullet	0.76	0.72	1.01	0.79	0.71	0.75	0.71	0.74	0.73	0.70
Oyster	2.77	2.94	3.41	5.51	5.60	6.05	6.59	6.13	6.38	6.15
Quahog clam	6.51	6.08	5.74	6.20	8.17	7.82	8.65	7.67	7.14	13.01
Red grouper	2.68	2.73	3.00	3.20	3.34	3.37	3.61	4.02	4.48	4.30
Red snapper	3.52	3.62	3.70	3.86	3.78	3.70	3.77	3.96	4.14	3.97
Shrimp	2.28	2.51	2.77	3.32	2.59	2.57	2.27	2.05	2.13	1.84
Stone crab	8.89	9.22	12.94	14.36	12.97	9.96	11.58	15.27	15.47	14.44

GOM shrimp landings and ex-vessel prices - Update³²

³² NOAA/Southern Shrimp Alliance Release (September 2023): <https://shrimpalliance.com/unprecedented-collapse-in-dockside-prices-shown-in-may-landings-data-noaa-issues-revised-historical-data/>

The Fishery Monitoring Branch of NOAA's SEFSC released preliminary shrimp landings data from the Gulf of Mexico [and the South Atlantic] for May 2023. The following information was shared by the Southern Shrimp Alliance.

In addition to the preliminary data, NOAA has released revised monthly landings data for each of the states in the Gulf of Mexico [and South Atlantic] back to 2002, as well as ex-vessel pricing data for the Gulf of Mexico [and South Atlantic] over the same time period. The revisions made by the agency reflect the final landings and ex-vessel pricing data for the relevant time period and correct erroneous preliminary data initially reported.

The preliminary data released by NOAA for May did not include any landings data from Louisiana. Historically, Louisiana has accounted for the majority of the volume of shrimp landed in the Gulf of Mexico [and South Atlantic] during the month of May and without this information, the preliminary reporting for the month is substantially incomplete. Nevertheless, NOAA's reporting indicates that 2.9 million lb of shrimp were landed in Texas in May, the highest volume reported for that month in the state since 2018 and 8.3 % above the prior 21-year historic average of 2.6 million lb for the month. Another 1.3 million lb of shrimp was reported as landed in Alabama in May, 68.1 % above the prior historic 21-year average of 0.8 million lb for that month, while 0.5 million lb was landed in Mississippi, 6.5 % above the historic average of 456,857 lb. The 393,000 lb of shrimp landed on the west coast of Florida in May was 45.4 % below the previous 21-year average of 719,343 lb for the month.

Over the first five months of 2023, 6.8 million lb of shrimp have been landed in Texas – the lowest total over that time period since 2015 and 8.8 % below the prior 21-year average of 7.5 million lb. In Alabama, 4.7 million lb of shrimp have been landed in the first five months of this year, the highest total since 2018 and 89.5 % above the historic average of 2.5 million lb, while another 1.0 million lb of shrimp were landed in Mississippi, the highest total since 2017 and 47.5 % above the historic average of 0.7 million lb. Another 1.3 million lb of shrimp have been landed on the east coast of Florida, 18.1 % above the historic average of 1.1 million lb for the January to May period. At the same time, landings this year in South Carolina (88.2 %), the west coast of Florida (41.5 %), North Carolina (34.6 %), and Georgia (26.2 %) were all significantly below the prior 21-year historic average for the first five months of the year.

NOAA has revised its reporting of ex-vessel prices, such that the agency no longer reports ex-vessel prices for three different areas of the Gulf of Mexico (Western, Northern, and Eastern). Instead, NOAA now reports a single ex-vessel price for the entirety of Gulf of Mexico and, separately, [a single ex-vessel price for the South Atlantic]. As the result of the simplification of NOAA's reporting, the Southern Shrimp Alliance now tracks and summarizes prices for all count sizes used by the agency (U15, 15/20, 21/25, 26/30, 31/35, 36/40, and 41/50). The revisions recently issued by NOAA report ex-vessel prices for the Gulf of Mexico [and the South Atlantic] back to 2002 and the Southern Shrimp Alliance has now incorporated these data into its historical reporting.

For three of the count sizes reported by NOAA – 26/30 (\$2.59); 31/35 (\$2.31); and 41/50 (\$1.54) – the ex-vessel prices reported for this past May in the Gulf of Mexico were the lowest ever reported for any May going back to 2002. Ex-vessel prices for every count size reflected deep declines in May 2023 from May 2022 prices. These data, particularly the ex-vessel pricing information, confirm what fishermen have been seeing all season – a tremendous drop in the value of their catch that does not correspond to any appreciable increase in the volume of shrimp landed.”

Social Dimensions of the Gulf of Mexico Shrimp Fishery

The following information is sourced from a Working Paper prepared for the SEDAR 87 Shrimp Workshop on 31 August 2023. It was authored by David Griffith, East Carolina University, Department of Coastal Studies and member of the GMFMC’s Scientific and Statistical Committee.³³

When the original FMP for Shrimp in the Gulf of Mexico was developed in 1981, it was estimated that there were 4,585 vessels (displacing > 5 tons gross weight) and 5,475 boats (displacing < 5 tons gross weight) operating in the Gulf in 1980, with Texas making up around 40% of the vessels and Louisiana making up around 73% of the boats. Thirty years later, as part of an analysis of bycatch reduction in the fishery, Scott-Denton, et al. (2012) characterized the fleet comprised of large vessels (>70’) with freezer storage capacity (as opposed to ice holds) and steel construction instead of wood, although they did not estimate the number of vessels or boats in the Gulf at that time.

According to NOAA, there are 1,467 federally permitted vessels in the Gulf of Mexico. State data supplied to NOAA, however, show nearly three times that many licenses for shrimping across the Gulf states is based on 1984-2021 licensing data provided by NOAA, showing the distribution of licenses by state in the Gulf (Table 28)

Table 28. Distribution of Gulf shrimp licences by State 1984-2021 (Source: NOAA’s Gulf of Mexico Reef Fish and Shrimp Observer Program)

State	No. Licences (1984-2021)	Percent (1984-2021)	No. Licences (2021)	Percent (2021)
Alabama	13,078	5.5	232	5.6
W. Florida	21,622	9.1	197	4.8
Louisiana	120,951	51.1	2,640	63.8
Mississippi	13,434	5.7	186	4.5
Texas	67,790	28.6	889	21.4
Totals	236,875	100	4,141	100

According to Griffith, management and legislative efforts have been partially responsible for the reduction in the fleet. For example, to reduce inshore shrimping, Texas implemented limited entry and license buy-back programs in 1995, purchasing over 25% of the licenses at that time. Both Texas and Louisiana, the two states with the largest shrimping fleets, have added costs to shrimping over time in the form of increased costs of licenses, severance and excise taxes, fees, and via sales taxes on goods and services that shrimpers need to deploy and maintain their vessels (e.g., fuel, haul-out facilities, insurance). In Louisiana, further, since 2005, commercial shrimpers who routinely break laws regulating shrimping can have their licenses revoked.

As the table shows, the proportions of licences across the five states have shifted somewhat in the 2021 statistics, with the percentages of licenses decreasing in Florida, Texas, and Mississippi, and increasing slightly in Alabama and significantly in Louisiana. Somewhat more granular data from Florida’s west coast, broken down by whether fishers fished for white, pink, or brown shrimp in 2021 and 2022, shows that most fishers and vessels target pink shrimp and the fewest target white shrimp (Table 29).

³³ Griffith, D. 2023. Social Dimensions of the Gulf of Mexico Shrimp Fishery: Overview. SEDAR87-DW-02. SEDAR, North Charleston, SC.8 pp. <https://sedarweb.org/documents/sedar-87-dw-02-social-dimensions-of-the-gulf-of-mexico-shrimp-fishery-overview/>

Table 29. West Coast Florida Shrimp Vessels and Fishers, 2021-2022 (Source: Fish and Wildlife Research Institute, FFWCC)

Year	Species	No. Vessels	No. Fishers
2021	Brown shrimp	56	73
2021	Pink shrimp	149	156
2021	White shrimp	42	68
Totals		247	297
2022	Brown shrimp	48	58
2022	Pink shrimp	153	160
2022	White shrimp	50	77
Totals		251	295

Whether or not they make up a smaller part of the overall Gulf of Mexico shrimp fishery, inshore vessels are more restricted seasonally than offshore shrimping, depending on shrimp life cycles, and many inshore shrimpers engage in several economic activities—including fishing for species other than shrimp—to make ends meet. These include working in various branches of commercial fishing, as deck hands on commercial vessels or captains and crew on charter boats, as well as various branches of construction, shipping, off-shore oil work, and tourist-related jobs.

7 Assessment Process

This Assessment constitutes an evaluation of the applicant fisheries’ management systems against the conformance criteria outlined in the Responsible Fisheries Management Certification Program Fisheries Standard Version 2.1.

7.1 Scoring

Each clause of the RFM Fishery Standard is scored based on defined process which Certification Bodies are required to follow. The process is described in brief below and is also outlined in detail in the relevant scheme documents (See [Details of Applicable RFM Documents](#) for further details).

7.1.1 Evaluation Parameters

Evaluation Parameters (described below), which effectively break down each clause using defined performance related parameters, form the basis of scoring.

Process Evaluation Parameter

Requires that evidence is provided outlining the process or system used by a fishery management organization to implement or maintain key aspects of fishery management practices, such as systems for data collection, laws and regulations, stock assessments, and enforcement. If evidence on the current process/system of a given process-based requirement is scarce or non-existent, then this Evaluation Parameter is not satisfied.

Current Status/Appropriateness/Effectiveness Evaluation Parameter

Requires that the current status, appropriateness, or effectiveness of an element of fisheries management practices (depending on which one of these attributes is most relevant to a given clause) is demonstrated, such as data collected, results of stock assessment including stock status, and enforcement data. If evidence on the current status, appropriateness, or effectiveness of a given output-based requirement is scarce or non-existent, then this Evaluation Parameter is not satisfied.

Evidence Basis EP

Requires that the availability, quality, or adequacy of the evidence that is the base for scoring a given clause is assessed. If evidence availability (such as studies, reports, other data, and regulations) is scarce, low quality or non-existent, then this Evaluation Parameter is not satisfied.

7.1.2 Numerical Scoring based on Evaluation Parameters

Confidence Ratings and Conformance Levels for each Clause are determined based on the following process:

1. Numerical scoring is effectively a reverse process with each applicable Clause starting out with the maximum possible overall score of 10.
2. The Assessment Team is then required to subtract 3 from that total for each Evaluation Parameter not met to reach an overall numerical score for that Clause.
3. The Clause is then assigned both a Confidence Rating and an overall Conformance Level based on its overall numerical score as follows:

Overall Score	Confidence Rating	Conformance Level
10	High	Full Conformance
7	Medium	Minor Non-conformance
4	Medium	Major Non-conformance
1	Low	Critical Non-conformance

7.1.3 Confidence Ratings and Non-conformances

Based on the numerical scoring process described above, clauses of the fisheries standards are assigned Confidence Ratings and Conformance Levels—these are intended to reflect the below descriptions.

- **Critical Non-Conformance – Low Confidence Rating**
Information/evidence is completely absent or contradictory to demonstrate conformance to a clause. Absence of information/evidence results in a low confidence rating. In these cases, a critical non-conformance is assigned.
- **Major Non-Conformance – Medium Confidence Rating**
Information/evidence to demonstrate conformance to a clause is limited. In these cases, a major improvement is needed to achieve full conformance. A medium confidence rating with a major non-conformance is assigned.
- **Minor Non-Conformance – Medium Confidence Rating**
Information/evidence is broadly available to demonstrate conformance to a clause although there are limited gaps in information that, if available, could clarify aspects of conformance and allow the assessment team to assign a high confidence rating. In these cases, a minor improvement is needed to achieve full conformance. A medium confidence rating with a minor non-conformance is assigned.
- **Full Conformance – High Confidence Rating**
Sufficient information/evidence is available to demonstrate full conformance to a clause. In these cases, a high confidence rating is assigned. Sufficient evidence allows objective determination by the assessment team that a fishery fully complies with a given clause in the RFM Fishery Standard.

Where a non-conformance (regardless of type) is assigned, the assessment team requests further information/clarification from the Client to confirm the non-conformance. The non-conformance is then re-considered in light of any further evidence provided; this may result in a non-conformance being upgraded, downgraded, or closed.

7.1.4 Overall Assessment Scoring

RFM Fishery Standard clauses are categorized into four sections:

- A. The Fishery Management System**
- B. Science and Stock Assessment Activities, and the Precautionary Approach**
- C. Management Measures, Implementation, Monitoring and Control**
- D. Serious Impacts of the Fishery on the Ecosystem**

Any more than one (1) major non-conformance or three (3) minor non-conformances assigned to any Section will result in the assignment of a critical non-conformance at section level.

A critical non-conformance for any clause or section stops the assessment, unless/until the Client is able to provide additional information/evidence that demonstrates a higher level of conformity.

7.2 Consultation Meetings

Table 30. Summary of Validation Assessment meetings, July 10-July 18, 2023.

Meeting Date and Location	Personnel	Areas of discussion
<p>Date: Mon, July 10th, 2023</p> <p>Location: Texas Park and Wildlife</p>	<p><i>Texas Parks and Wildlife Department</i> Dakus Geeslin, Deputy Director, Coastal Fisheries Division; (remote) Les Casterline, Assistant Commander, Game Warden State of Texas; Kelley Kowal, Upper Coast Regional Director; Jessica Geiskopf, Natural resource specialist; Christine Jensen, Galveston Bay Ecosystem Leader; Fernando Martinez-Andrade, Data Analyst Coastal Fisheries Division; (remote) Mark Fisher, Science Director. (remote)</p> <p><i>Client Group representatives</i> Laura Picariello, Fisheries Specialist Texas Seagrant.</p> <p><i>Assessment Team Members:</i> Dr. Ivan Mateo, Lead Assessor Dr. Jerry Ennis, Assessor Mr. Bob Allain, Assessor Mr. Matthew Jew, Assessor Mr. Vito Romito MSC Lead auditor</p> <p><i>Assurance Services International (ASI)</i> Sergio Cansado, Lead Auditor.</p>	<ul style="list-style-type: none"> • Fishery recruitment is monitored before the fishery is opened • For re-opening, monitoring is done with shrimp trawl • Pre-season sampling process, memorandum then sent to managers • Nursery areas expanded several years ago, season and area closures are key management measures • Shrimp catch is recorded in Trip Ticket • Rec fishing/personal consumption, very small amounts • Butterfly net not used in TX • IUU not seen in any significant manner • Spotted seatrout has ref. points as well as southern flounder • Year round monitoring for seatrout and Atlantic croaker • Seemap data availability • Texas closure is 60 days every year • Limited entry started in 1995, buyback program has reduced 70% of fleet, total reduction has been 90% since 1995. • TED are effective at excluding turtles and any other large animals and fish, and verified as being very effective over the years • Turtle population have all increased since TED implementation • Federal law require to report any ESA/MMPA catches. TEDs are very effective hence very few records of turtles and marine mammals • Gulf Sturgeon does not occur in W GoM. • Several turtle monitoring efforts • Seagrass beds are to shallow and do not overlap with effort (also, seagrass would clog the net and is actively avoided. • Fishermen stay away from corals to avoid any contact • Live bottom areas encountered are mapped and uploaded on mapping program, and then shared with other fishermen • Federally permitted vessels have VMS requirements • Patrols used to enforce areas used by fleet, and coordinated with NOAA OLE • Gear loss not considered a major issue, fishermen have grapple to recover nets. • Native tribes, no exemptions are noted. • Texas FMP • Objectives can be found in Limited Entry, Buyback Program and in various Memos. • Factors driving objectives have been bycatch related, as well as others. • Joint enforcement agreement with NOAA. • Enforcement has trained officers, users and achieved high TED implementation success. • In enforcement records, contacts are total infractions, not enforcement effort. • State refers fine (level 3 and above) to federal waters. • Violations are submitted to appropriate county for fines
<p>Date: Tue, July 11th, 2023</p>	<p>Louisiana Department of Wildlife and Fisheries, Baton Rouge, LA</p>	<p>Topics Discussed:</p> <ul style="list-style-type: none"> • Stock status • Harvest Control rules/Harvest strategy

Meeting Date and Location	Personnel	Areas of discussion
<p>Location: Louisiana Department of Wildlife and Fisheries</p>	<p>Peyton Cagle, LDWF Crustacean Program Manager (remote);</p> <p>Chris Schieble, LDWF Director Marine Fisheries Division;</p> <p>Major Edward Skeena, LDWF Enforcement Division;</p> <p>George Barisch, Commercial fisherman, UCFA Acy Cooper, Commercial fisherman, LSA</p> <p>Julie Lively – Exec. Director at Louisiana Sea Grant and Associate</p> <p><i>Client Group representatives</i> Kristen Baumer President, Paul Piazza & Son Inc (Shrimp Processor, NOLA); John Fallon, Director of Conservation, Audubon Nature Institute</p> <p><i>Assessment Team Members:</i> Dr. Ivan Mateo, Lead Assessor Dr. Jerry Ennis, Assessor Mr. Bob Allain, Assessor Mr. Matthew Jew, Assessor Mr. Vito Romito MSC Lead auditor <i>Assurance Services International (ASI)</i> Sergio Cansado, Lead Auditor.</p> <p><i>Marine Stewardship Council (MSC)</i> Erin Murray – Fisheries Outreach Manager</p> <p>Responsible Fisheries Management (RFM) Jeff Regnard, RFM Program Manager</p>	<ul style="list-style-type: none"> • Shrimp discards considered very small/negligible. • Other fish species can be retained legally • Stock status information data is presented to the Commission • LDWF samples shrimp with trawl survey • Shrimp is protected in nursery areas then as soon as shrimp reach 100 count per pound (hence large size) fishery opens • Only brown and white shrimp are caught in Louisiana • Rec. harvest is not much at all, small fractions compared to commercial. • No IUU fishing issues. • 2022-2023 very small effort from operators • No special request from tribal communities, none federally recognised that use shrimp. • LDWF involved in federal process for stock assessment • SEAMAP survey keep track of croaker and seatrout abundance, noting historical decrease in shrimp effort. • Jellyfish are actively avoided as they may clog nets very easily. • Catfish also recorded in SEAMPA surveys • Fishermen concerned there is too much catfish in the water. • Long stretches of seasonal closures are in place. • Better Bycatch Reduction new process of review to decrease bycatch, aside from recent TED developments. • More than 90% of fishermen in LA state waters use BRDs although they are not formally mandated. • Skimmers limited to 55 minutes trawl time, turtles generally found alive due to reduced trawl time. • Turtle bycatch not consider an issue in state waters. • Reporting of ESA by fishermen, very few catches are recorded due to TEDs. • LDWF bycatch study and representativeness with federal observer data. • There are no coral reefs in LA state waters, not seagrass beds, and oyster reefs are not trawled. • Seagrass not considered a habitat the fishery overlaps with. • Butterfly nets may be used for recreational fishing. • Fishermen add their own waypoints to maps of historical obstructions and they exchange maps/cards among them. • Federally permitted skimmers are very few. • Inshore rigs are lighter. • AIS/VMS requirements are also required in inshore water as soon as a violation is recorded. • Gear loss not considered an issue as all gear will be recovered with grapple. • Title 56 and 76 explain management process • External review for shrimp and oyster very recently completed, part of FIP output. • Enforcement, common violations would be closed season. Enforcement officers go out at night to check for potential violators, and employ drones for night surveillance. • There is consistency on application of penalties, the schedule is forwarded to judges who sentence based on violation ranges. • There is more than 85% compliance with regulations.
Date:	ASPA Client Meeting	Topics Discussed:

Meeting Date and Location	Personnel	Areas of discussion
<p>Tue, July 12th, 2023</p> <p>Location: Audubon Aquarium</p>	<p><i>Client Group representatives</i> Kristen Baumer President, Paul Piazza & Son Inc (Shrimp Processor, NOLA); Bobby Samanie, VP Lafitte Frozen Foods; David Chauvin, VP Bluewater shrimp co.; Shep Baumer, President Bayou Shrimp Processors; Dominick Ficarino, President Dominick's Seafood; Derrick Nagle, VP Bigeye Foods; John Novak, Sales Big Easy; Alyssa Young, QA manager, Gulf Pride; Reese Antley, VP Operations Woods Fisheries</p> <p>Assessment Team Members: Dr. Ivan Mateo, Lead Assessor Dr. Jerry Ennis, Assessor Mr. Bob Allain, Assessor Mr. Matthew Jew, Assessor Mr. Vito Romito MSC Lead auditor</p>	<ul style="list-style-type: none"> • Electronic logbook tracks locations and speed • Boats typically sell to a dock who may consolidate catches and can track back to source vessel • Shrimp species are separated on board • Traceability systems applied in all processing plants, and can easily track product to individual vessels. • In case of some jurisdiction not being certified, the traceability systems in place can easily exclude specific group of vessels. Also, processors have knowledge of typical vessels and can decide to buy or not to buy from them, as needed. • There is no transshipment nor discards. • No catches of shrimp in menhaden nets • Rec fishing considered negligible. • Thumb drives about obstructions are shared among fishermen and they have radar systems to avoid encountering live bottoms and other potential obstructions. • It is in fishermen interest to avoid such bottoms as that could cause net rips and loss of shrimp.
<p>Date: Thu, July 13th, 2023</p> <p>Location: Mississippi Department of Marine Resources</p>	<p>Mississippi Department of Marine Resources Jason Saucier, Bureau Director; Traci Floyd, Office Director.</p> <p><i>Client Group representatives</i> John Fallon, Director of Conservation, Audubon Nature Institute.</p> <p>Assessment Team Members: Dr. Ivan Mateo, Lead Assessor Dr. Jerry Ennis, Assessor Mr. Bob Allain, Assessor Mr. Matthew Jew, Assessor Mr. Vito Romito MSC Lead auditor <i>Assurance Services International (ASI)</i> Sergio Cansado, Lead Auditor.</p> <p><i>Marine Stewardship Council (MSC)</i> Dan Averill - Senior Fishery Manager, USA</p>	<ul style="list-style-type: none"> • Shrimp monitoring activities and season opening/closing dynamics • There is a market for all shrimp sizes. • Presentation to ASPA • Recent TED rule change required on skimmers 40 foot and larger (majority of fleet) • There is a movement towards skimmer net operations, easier to target white shrimp • No butterfly nets used for commercial fishing. • Native rights. • Spotted seatrout has stock assessment. • Croaker and silver seatrout have no directed management measures. • Seasonal spring closures for shrimp • Fishery independent sampling. • Most unwanted catches are actually used and sold locally. • TEDS effective. Bycatch not considered significant. • Section 6 agreement • Brown pelican listing in MS state. Very unlikely to get caught in moving nets. • Recording of ETP species. • State coordinator collects information on ETP species interactions and send data to Federal managers. All ETP species mortality data ends up in federal hands. • Strandings data and cause (when known) is passed on to federal managers. • Gulf sturgeon very rare and would be excluded by TED. • Some nesting efforts occur around MS.

Meeting Date and Location	Personnel	Areas of discussion
		<ul style="list-style-type: none"> • Seagrass beds can be found right around barrier islands and a little bit inshore but outside closures there are no VMEs present. • There are no corals in MS waters, only muddy and sandy bottoms. • Fishermen know their bottoms and tend to fish in same areas, and share data on obstructions. • VMS required in federal waters. • Gear loss only occasional but readily recovered. • FMP. • Consultation opportunities. • Review mechanisms. <p>Compliance information is specific to deterrence of recurrent violators.</p>
<p>Date: Thu, July 14th, 2023</p> <p>Location: Alabama Department of Conservation and Natural Resources Fisheries department</p>	<p>Alabama Department of Conservation and Natural Resources Fisheries department</p> <p>Jason Downey, Chief of Enforcement; Kevin Ansen, Chief of Fisheries; Jessica Merchant, Shrimp biologist; Nicole Schaffer, Biologist.</p> <p><i>Client Group representatives</i> John Fallon, Director of Conservation, Audubon Nature Institute.</p> <p>Assessment Team Members: Dr. Ivan Mateo, Lead Assessor Dr. Jerry Ennis, Assessor Mr. Bob Allain, Assessor Mr. Matthew Jew, Assessor Mr. Vito Romito MSC Lead auditor <i>Assurance Services International (ASI)</i> Sergio Cansado, Lead Auditor.</p> <p><i>Marine Stewardship Council (MSC)</i> Dan Averill - Senior Fishery Manager, USA</p>	<ul style="list-style-type: none"> • Summary of biological information. • All inside waters closed for 1 month to protect juveniles (implemented in April 2016). Management was dynamic before this data and is now fixed re seasonal closures. • Fishing season plus nursery closures are permanent (because stable in the past). • Very small catches from recreational fishing, probably less than 5%. • No discards as everything can be sold. • No directed measures for croaker and seatrout • There is no trawling over reefs as that would damage nets. • Conservation Advisory Board is a channel for fishermen to speak to managers. • Big fish are excluded from TEDs. • Enforcement does not see marine mammals or sea turtle fatalities. • TED compliance is very high. • Gulf sturgeon is big and is excluded from TEDs. • State ETP species interactions would be a Federal State packet (part of federal monitoring). • NOAA observer monitoring data consistent with state but possibly for kemp turtle. • Only vessels with federal permit need to carry VMS. • In state waters there is no significant overlap with seagrass beds and there are no shallow coral areas. • Fishermen know their waters and habitats very well and stay away from live bottoms. This information is widely shared among fishers. • There is no gear loss. • No formal FMP • For objectives see mission statement. • There are ad-hoc processes for review as if requested. • There is no strategic plan for marine waters. • Violations and deterrence. • State patrols look for any sort of violations, while federal officers look for specific fishery categories (e.g. implementation of TEDs/BRDs).

Meeting Date and Location	Personnel	Areas of discussion
<p>Date: Mon, July 17th, 2023 Location :Held at Hyatt House Tampa Downtown, FL</p>	<p><i>Florida Fish and Wildlife Conservation Commission</i></p> <p>Dan Ellinor, Fisheries Division Manager FWC; (remote)</p> <p>Client Group representatives Reese Antley, VP Operations Woods Fisheries; Laura Picariello, Fisheries Specialist Texas Seagrant.</p> <p>Assessment Team Members: Dr. Ivan Mateo, Lead Assessor Dr. Jerry Ennis, Assessor Bob Allain, Assessor Mr. Matthew Jew Mr. Vito Romito MSC Lead auditor</p>	<ul style="list-style-type: none"> • Overall level of compliance quite high, especially from state fishers, although some violations may occur from fishermen from MS • Smaller shrimp tend to come out only from TX, LA and MS. • TX and LA tend to handle the training and research relevant to shrimp across the Gulf. • Total Seagrant inspections in 2022 were of 382 boats and 570 nets • 25% of nets checked by Seagrant have an additional BRDs. • There is no trawling on reefs as the net may cost over 60K • Effort in Florida is 99.9% otter trawl effort. Bait shrimp effort is minimal. • Res fishing and personal consumption effort is very small. • Anecdotal information on Smalltooth sawfish was that they were only very rarely encountered in SW Florida, if at all. • If fishermen snag their nets, very occasionally, it is because they encounter artificial reefs that reef fishermen with drop legally and sometime illegally. • Live bottoms are marked and there is an exchange of datapoints between reef fishermen. • The majority of fishing that happens in Florida happens in Federal waters. • There is no state management plan as the majority of effort and catches occurs in federal waters. The minority of live bait shrimping occurs inshore. • TEDs effective at excluding large bycatch. • Not aware of any Gulf sturgeon interactions. • Fleet is able to detect and avoid VMEs • Gear loss not considered an issue.
<p>Date: Mon, July 17th, 2023</p> <p>Location: Gulf of Mexico Fishery Management Council</p>	<p>Carrie Simmons, Executive Director; John Froeschke, Deputy Director; Matthew Freeman, Economist John Carlson, Research Fish Biologist, NOAA Fisheries Service-Southeast Fisheries Science Center (Remote)</p> <p><i>Client Group representatives</i> Reese Antley, VP Operations Woods Fisheries; Laura Picariello, Fisheries Specialist Texas Seagrant; Gary Graham, Boat owner and ex Texas Sea Grant's Marine Fisheries Specialist; Megan Westmeyer, Director of Supply Chain Roundtables North America.</p> <p>Assessment Team Members: Dr. Ivan Mateo, Lead Assessor Dr. Jerry Ennis, Assessor Bob Allain, Assessor Mr. Matthew Jew</p>	<ul style="list-style-type: none"> • Deliberations occurred relating to shrimp being annual crops, and the decision was to not have ACLs. • There is reference to annual crop in the MSA • In the absence of stock assessments for species, there are 3-4 Gulf meeting each year where the Science Center provides updates • Determinations of no overfishing occurring/no overfished status are still considered to be correct/valid. • Data available on the Gulf Council website though meetings material. • There are papers linking environmental conditions as main driver of successful recruitment. • The 47 shrimp per pound = 3.75 inches per shrimp. • Giant manta ray is a potential new species that the shrimp fishery affects • Smalltooth sawfish only affects the pink shrimp fishery. • Hurricane Ian decimated the pink shrimp fleet and less effort will occur in the future. • Update BioP timeline. • Shark International is a member of the advisory group and presented at the Shrimp AP meeting. • No recent sawfish information received from vessels. • Net ban helps with decreasing effects on the sawfish, and has been an asset to recovery.

Meeting Date and Location	Personnel	Areas of discussion
	Mr. Vito Romito MSC Lead auditor	<ul style="list-style-type: none"> • Spatial closures have been suggested but not yet implemented. • Gulf sturgeon not a species of concern for this fishery. • Coral amendment 10 is being progressed. • Fishermen are able to avoid live bottom through use of hang database. • MSA and FMP short and long term objectives. • FMP objectives are extended through amendments. • There is ongoing work to identify habitats. New EFH review includes recommendations and amendments.
<p>Date: Tue, July 18th, 2023</p> <p>Location: Hyatt House Tampa Downtown</p>	<p>RBF meeting in the morning (science/management/fishers stakeholders to agree scores on PSA for shrimp species and other P2 species) from MSC/RFM</p> <p>Attendants:</p> <p>Kristen Baumer President, Paul Piazza & Son Inc (Shrimp Processor, NOLA); Michael Stephens, CEO & General Counsel · Bama Sea Products, Inc; (remote)</p> <p>David Chauvin, VP Bluewater shrimp co.; (remote)</p> <p>Steve Bosarge, Vice-Chair Shrimp Advisory Panel (Gulf Council)/ Bosarge Boats (remote)</p> <p>Leanne Bosarge, Council Member / Bosarge Boats (remote)</p> <p>Gary Graham, Boat owner and ex Texas Sea Grant's Marine Fisheries Specialist; , President Dominick's Seafood;</p> <p>Reese Antley, VP Operations Woods Fisheries;</p> <p>Taylor Beyea, Senior Marine Ecologist LGL Ecological Research Associates;</p> <p>Nathan Putman, Senior Scientist LGL Ecological Research Associates;</p> <p>Laura Picariello, Fisheries Specialist Texas Seagrant;</p> <p>Megan Westmeyer, Director of Supply Chain Roundtables North America.</p> <p>Assessment Team Members: Dr. Ivan Mateo, Lead Assessor Dr. Jerry Ennis, Assessor Mr. Bob Allain, Assessor Mr. Matthew Jew, Assessor Mr. Vito Romito MSC Lead auditor <i>Assurance Services International (ASI)</i> Sergio Cansado, Lead Auditor.</p> <p><i>Marine Stewardship Council (MSC)</i></p>	

Meeting Date and Location	Personnel	Areas of discussion
	Marin Hawk, Senior Fisheries Program Manager.	
<p>Date: Tue, July 18th, 2023</p> <p>Location: Hyatt House Tampa Downtown</p>	<p>ASPA Client Closing meeting. <i>Client Group representatives</i> Kristen Baumer President, Paul Piazza & Son Inc (Shrimp Processor, NOLA); Nancy Matthews, VP sales Cox's Wholesale Seafood; Derrick Nagle, VP Bigeye Foods; Chris Sturcken, National Account Sales Manager at Big Easy Foods; Reese Antley, VP Operations Woods Fisheries; Gary Graham, Boat owner and ex Texas Sea Grant's Marine Fisheries Specialist; Laura Picariello, Fisheries Specialist Texas Seagrant; Megan Westmeyer, Director of Supply Chain Roundtables North America.</p> <p>Assessment Team Members: Dr. Ivan Mateo, Lead Assessor Dr. Jerry Ennis, Assessor Mr. Bob Allain, Assessor Mr. Matthew Jew, Assessor Mr. Vito Romito MSC Lead auditor <i>Assurance Services International (ASI)</i> Sergio Cansado, Lead Auditor.</p>	<p>Topics Discussed:</p> <ul style="list-style-type: none"> • Summary of findings from the various site visit meetings as it relates to MSC and RFM assessments. • Strengths and weaknesses. • Information gaps and where/how to source outstanding information/data. • Next steps in the assessment process (update report to Client and Peer Review Draft Report stage, scoring, potential conditions, etc.). • Timelines for corrective action plan, assessment timelines, etc. • Questions and answers about the assessment process. • Anything else not covered above that needs to be discussed.

8 Summary of Assessment Outcomes

8.1 Assessment Outcomes by Clause

Table 31. below presents Confidence Ratings and Conformance Levels for each applicable Clause resulting from this Assessment.

Table 31. Confidence ratings and conformance levels for each clause of the RFM Standard.

Section	Fundamental Clause	Supporting Clause	Applicable?	Numerical score	Confidence Rating	Conformance Level	NC No.	
A	The Fisheries Management System	1	1.1	Yes	10	High	Full Conformance	NA
			1.2	Yes	10	High	Full Conformance	NA
			1.2.1	Yes	10	High	Full Conformance	NA
			1.3	No				
			1.3.1	No				
			1.4	No				
			1.4.1	No				
			1.5	Yes	10	High	Full Conformance	NA
			1.6	Yes	10	High	Full Conformance	NA
			1.6.1	No				
			1.7	Yes	All except AL - 10	High	Full Conformance	NA
				Yes	AL - 7	Medium	Minor NC	1
			1.8	Yes	10	High	Full Conformance	NA
			1.9	No				
		2	2.1	Yes	10	High	Full Conformance	NA
			2.1.1	Yes	10	High	Full Conformance	NA
				Yes	10	High	Full Conformance	NA
				Yes	10	High	Full Conformance	NA
			2.2	Yes	10	High	Full Conformance	NA
			2.3	Yes	10	High	Full Conformance	NA
			2.4	Yes	10	High	Full Conformance	NA
			2.5	Yes	10	High	Full Conformance	NA
			2.6	Yes	10	High	Full Conformance	NA
2.7	Yes	10	High	Full Conformance	NA			
3	3.1	Yes	All except AL - 10	High	Full Conformance	NA		

Section	Fundamental Clause	Supporting Clause	Applicable?	Numerical score	Confidence Rating	Conformance Level	NC No.			
				AL - 7	Medium	Minor NC	2			
		3.1.1	Yes	10	High	Full Conformance	NA			
		3.1.2	Yes	10	High	Full Conformance	NA			
		3.1.3	Yes	10	High	Full Conformance	NA			
		3.2								
		3.2.1	Yes	10	High	Full Conformance	NA			
		3.2.2	Yes	10	High	Full Conformance	NA			
		3.2.3	Yes	10	High	Full Conformance	NA			
		3.2.4	Yes	10	High	Full Conformance	NA			
		B	Science, Stock Assessment Activities, and the Precautionary Approach	4	4.1	Yes	10	High	Full Conformance	NA
					4.1.1	Yes	10	High	Full Conformance	NA
4.1.2	No									
4.2	Yes				10	High	Full Conformance	NA		
4.2.1	Yes				10	High	Full Conformance	NA		
4.3	Yes				10	High	Full Conformance	NA		
4.4	No									
4.5	Yes				10	High	Full Conformance	NA		
4.6	Yes				10	High	Full Conformance	NA		
4.7	No									
4.8	No									
4.9	No									
4.10	No									
4.11	No									
5	5.1			Yes	10	High	Full Conformance	NA		
	5.1.1			No						
	5.1.2			Yes	10	High	Full Conformance	NA		
	5.2	Yes	10	High	Full Conformance	NA				
	5.3	No								
	5.4	No								
		5.5	Yes	10	High	Full Conformance	NA			

Section		Fundamental Clause	Supporting Clause	Applicable?	Numerical score	Confidence Rating	Conformance Level	NC No.		
		6	6.1	Yes	10	High	Full Conformance	NA		
			6.2	Yes	10	High	Full Conformance	NA		
			6.3	Yes	10	High	Full Conformance	NA		
			6.4	Yes	10	High	Full Conformance	NA		
			6.5	Yes	10	High	Full Conformance	NA		
		7	7.1	Yes	10	High	Full Conformance	NA		
			7.1.1	Yes	10	High	Full Conformance	NA		
			7.1.2	No						
			7.2	No						
		C	Management measures, implementation, monitoring, and control	8	8.1	Yes	10	High	Full Conformance	NA
					8.1.1	Yes	10	High	Full Conformance	NA
					8.1.2	Yes	10	High	Full Conformance	NA
					8.2	Yes	10	High	Full Conformance	NA
					8.3	Yes	10	High	Full Conformance	NA
8.4	Yes				10	High	Full Conformance	NA		
8.4.1	Yes				10	High	Full Conformance	NA		
8.5	Yes				10	High	Full Conformance	NA		
8.5.1	Yes				10	High	Full Conformance	NA		
8.6	No									
8.7	Yes				10	High	Full Conformance	NA		
8.8	No									
8.9	Yes				10	High	Full Conformance	NA		
8.10	No									
8.11	Yes				10	High	Full Conformance	NA		
8.12	Yes				10	High	Full Conformance	NA		
8.13	No									
9	9.1	Yes	10	High	Full Conformance	NA				

Section		Fundamental Clause	Supporting Clause	Applicable?	Numerical score	Confidence Rating	Conformance Level	NC No.		
			9.2	Yes	10	High	Full Conformance	NA		
			9.3	Yes	10	High	Full Conformance	NA		
			10	10.1	Yes	10	High	Full Conformance	NA	
		10.2		Yes	10	High	Full Conformance	NA		
		10.3		No						
		10.3.1		No						
		10.4		No						
		10.4.1		No						
		11		11.1	Yes	10	High	Full Conformance	NA	
			11.2	Yes	10	High	Full Conformance	NA		
			11.3	No						
			11.4	No						
		D	Serious Impacts of the Fishery on the Ecosystem	12	12.1	Yes	10	High	Full Conformance	NA
					12.2	Yes	10	High	Full Conformance	NA
					12.2.1	Yes	10	High	Full Conformance	NA
					12.2.2	Yes	10	High	Full Conformance	NA
12.2.3	Yes				10	High	Full Conformance	NA		
12.2.4	Yes				10	High	Full Conformance	NA		
12.2.5	Yes				All except elasmobranchs - 10 Sawfish and Manta - 7	High Medium	Full Conformance Minor NC	3		
12.2.6	Yes				10	High	Full Conformance	NA		
12.2.7	Yes				10	High	Full Conformance	NA		
12.2.8	Yes				10	High	Full Conformance	NA		
12.2.9	Yes				10	High	Full Conformance	NA		
12.2.10	Yes				10	High	Full Conformance	NA		
12.2.11	Yes				10	High	Full Conformance	NA		

Section	Fundamental Clause	Supporting Clause	Applicable?	Numerical score	Confidence Rating	Conformance Level	NC No.
		12.3	Yes	10	High	Full Conformance	NA
		12.4	Yes	10	High	Full Conformance	NA
		12.5	No				
		12.6	Yes	10	High	Full Conformance	NA
		12.7	Yes	10	High	Full Conformance	NA
	13	13.1	No				
		13.1.1	No				
		13.2	No				
		13.2.1	No				
		13.3	No				
		13.4	No				
		13.5	No				
		13.6	No				
		13.7	No				
		13.7.1	No				
		13.7.2	No				
		13.7.3	No				
		13.8	No				
		13.9	No				
		13.10	No				
13.11	No						
13.12	No						
13.13	No						

8.2 Certification Recommendation

The Assessment Team makes a Recommendation as to whether an applicant fishery should be certified.

Following this Assessment, the Assessment Team recommends that the applicant fishery.

- **US Gulf of Mexico Shrimp (Texas, Louisiana, Mississippi, Florida) be certified against RFM Certification Program Fisheries Standard Version 2.1.**

8.3 Certification Determination

Global Trust's internal Fishery Certification Committee, which is comprised of both internal and external fishery experts as well as certification experts, makes the ultimate determination as to whether an applicant fishery is granted certification.

Following a meeting on June 14th 2024, the Certification Committee has determined that the applicant fishery in this instance.

- **US Gulf of Mexico Gulf Shrimp**

be certified against RFM Certification Program Fisheries Standard Version 2.1.

9 Assessment Outcomes

9.1 Topics that will trigger immediate assessment failure

According to the RFM Standard Version 2.1, the following fisheries management issues will cause a fishery to immediately fail assessment:

- Dynamiting, poisoning, and other comparable destructive fishing practices.
- Significant illegal, unreported, and unregulated (IUU) fishing activities in the country jurisdiction.
- Shark finning (i.e., removal and retention of shark fins while the remainder of the shark is discarded in the ocean).
- Slavery and slave labor on board fishing vessels.
- Any significant lack of compliance with the requirements of an international fisheries agreement to which the US is signatory. A fishery will have to be formally cited by the International Governing body that has competence with the international Treaty in question, and that the US has been notified of that citation of non-compliance.

The Assessment Team has, as part of this Assessment, carried out a review of the available evidence with respect to these issues. The results of this review are presented below.

Topics that will trigger immediate assessment failure.						
Dynamiting, poisoning, and other comparable destructive fishing practices.						
Confidence that this is NOT occurring:	Low	<input type="checkbox"/>	Medium	<input type="checkbox"/>	High	<input checked="" type="checkbox"/>
SUPPORTING EVIDENCE:						
Significant illegal, unreported, and unregulated (IUU) fishing activities in the country jurisdiction.						
Confidence that this is NOT occurring:	Low	<input type="checkbox"/>	Medium	<input type="checkbox"/>	High	<input checked="" type="checkbox"/>
SUPPORTING EVIDENCE:						
Shark finning.						
Confidence that this is NOT occurring:	Low	<input type="checkbox"/>	Medium	<input type="checkbox"/>	High	<input checked="" type="checkbox"/>
SUPPORTING EVIDENCE:						
Slavery and slave labor on board fishing vessels.						
Confidence that this is NOT occurring:	Low	<input type="checkbox"/>	Medium	<input type="checkbox"/>	High	<input checked="" type="checkbox"/>
SUPPORTING EVIDENCE:						
Significant lack of compliance with the requirements of an international fisheries agreement.						
Confidence that this is NOT occurring:	Low	<input type="checkbox"/>	Medium	<input type="checkbox"/>	High	<input checked="" type="checkbox"/>
SUPPORTING EVIDENCE:						

9.2 Section A: The Fisheries Management System

9.2.1 Fundamental Clause 1. Structured and legally mandated management system

There shall be a structured and legally mandated management system based upon and respecting international, State, and local fishery laws, for the responsible utilization of the stock under consideration and conservation of the marine environment.

9.2.1.1 Supporting Clause 1.1.

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

Relevance: **Relevant.**

Evaluation Parameters	Met?
Process: <i>Management agencies are physically and legally established at international, State and local levels.</i>	<input checked="" type="checkbox"/>

EVIDENCE:

The jurisdictional profile of the GOM's commercial shrimp fishery management systems is best defined as a shared stock that is co-managed by federal and state implementing agencies with the collaboration of fishery business groups and owners, other stakeholders, and local civil society. The fishery management systems have evolved and matured over many years through collaborative partnership models and formal arrangements between GOM states and federal government agencies with the participation of stakeholder and industry groups.

Federal Agencies

A number of Federal agencies are involved, either directly or indirectly, in the management of the GOM shrimp fishery, including the National Park Service (NPS), the US Army Corps of Engineers (USACE), the US Fish and Wildlife Service (USFWS), the US Coast Guard (USCG), the **National Oceanic and Atmospheric Administration (NOAA)**, and the Environmental Protection Agency (EPA). These agencies along with various state agencies administer programs to regulate land and water use, pollution control, wetlands protection, maintenance and enhancement of habitat, preservation of water quality, and other activities that can impact shrimp populations.

NOAA - NMFS

NOAA's facilities include centers, offices, and laboratories with workforce concentrations around the Gulf. Among others, the region includes two National Marine Sanctuaries, the Fisheries Southeast Regional Office, the Southeast Fisheries Science Center, the Gulf of Mexico Disaster Response Center, the Atlantic Oceanographic and Meteorological Laboratory, National Centers for Environmental Information - Stennis, the National Water Center, the National Data Buoy Center, the National Hurricane Center, two River Forecast Centers, National Weather Service Southern Region Headquarters, and Weather Forecast Offices in each state. In addition, NOAA's Aircraft Operations Center is located in Lakeland, Florida, and three NOAA ships, the Gordon Gunter, the Oregon II, and the Pisces, home port in Pascagoula, MS.

Chief among these with direct fisheries management responsibilities in federally-managed waters is NOAA's **National Marine Fisheries Service (NMFS)**. The organization is responsible for the stewardship of the nation's ocean resources and their habitat, including productive and sustainable fisheries, safe sources of seafood, the recovery and conservation of protected resources, and healthy ecosystems. Specifically, the Southeast Region covers nearly 20,000 miles of tidal coastline throughout the South Atlantic, Gulf of Mexico, and Caribbean. This includes the eight coastal states of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas; the inland watershed states of Arkansas, Iowa, Kansas, Kentucky, Missouri, Nebraska, New Mexico, Oklahoma, and Tennessee; and the Commonwealth of Puerto Rico and the US Virgin Islands. The Southeast Region is headquartered in St. Petersburg, Florida with field offices in Texas, Louisiana, Mississippi, Florida, South Carolina, and North Carolina (Figure 23).

GMFMC

The Region's Gulf of Mexico Branch (Gulf Branch) works with the **Gulf of Mexico Fisheries Management Council (GMFMC)** to manage fisheries in the GOM by (i) preparing the resulting regulations to support the Council's management measures through FMPs for key

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marine species, (ii) providing guidance on fisheries management, (iii) assessing the environmental impacts of proposed management measures, (iv) educating the public on fishery management issues, (v) providing technical assistance and advice in preparing FMPs, (vi) coordinating public review and comments during regulations development, and (vii) issuing fishing closures to prevent overfishing if landings approach annual catch limits.³⁴ The Council is headquartered in Tampa, Florida.

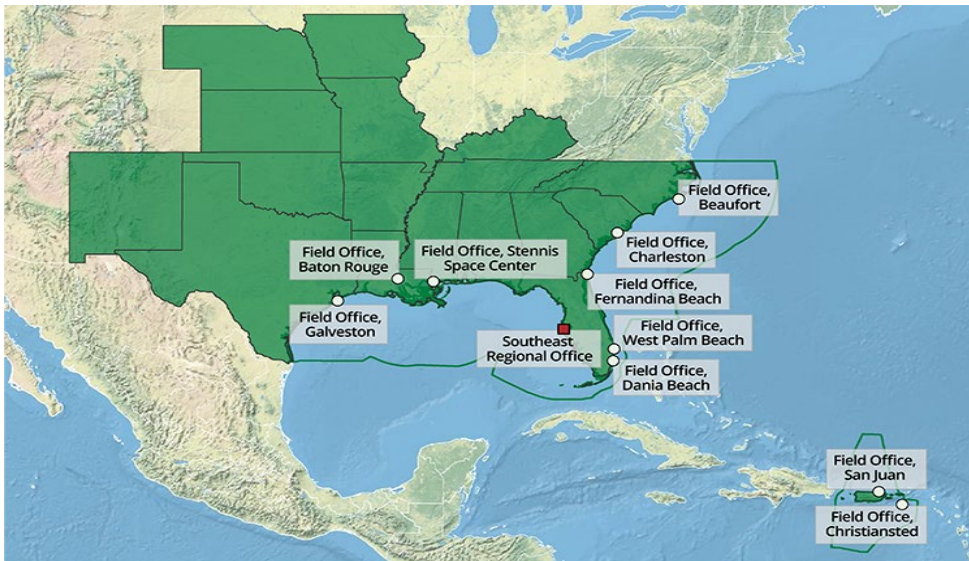


Figure 23. Location of NMFS's Regional and Field Offices for the Southeast Region (Source: <https://www.fisheries.noaa.gov/about/southeast-regional-office>).

The Council itself is one of eight [US Regional Fishery Management Councils](#) established by the Magnusen-Stevens Fishery Conservation and Management Act of 1976 (16 USC 1852, MSA §302). Headquartered in Tampa, Florida, the Council through its committees (scientific, technical and statistical), advisory panels and groups (i) manages fishery resources in the federal waters of the Gulf of Mexico, (ii) prepares fishery management plans (FMPs) and makes recommendations by balancing competing interests, (iii) uses scientific advice from [NOAA Fisheries](#) and public opinion to inform FMP recommendations, (iv) aims to achieve the greatest overall benefit to the nation by sustaining and maintaining responsible fisheries management, (v) stays consistent with the [ten national standards](#) laid out by the [Magnuson Stevens Act](#), and (vi) specifically manages reef fish, shrimp, spiny lobster, coastal migratory pelagics, corals, essential fish habitat, red drum, and aquaculture.

Federal Legislation

A. Magnuson-Stevens Fishery Conservation and Management Act (MSA)³⁵

This statute is the primary law governing marine fisheries management in US federal waters. First passed in 1976, the *Magnuson-Stevens Act* fosters long-term biological and economic sustainability of the country's marine fisheries out to 200 nautical miles from shore. Key objectives of the Act are to: (i) prevent overfishing, (ii) rebuild overfished stocks, (iii) increase long-term economic and social benefits, and (iv) ensure a safe and sustainable supply of seafood.

Congress has twice made significant revisions to the *Magnuson-Stevens Act*, first in 1996 with the passage of the *Sustainable Fisheries Act*³⁶, and in 2007 with the *Magnuson-Stevens Fishery Conservation and Management Reauthorization Act*.³⁷ The latter includes a

³⁴ <https://www.fisheries.noaa.gov/southeast/sustainable-fisheries-gulf-mexico>

³⁵ http://www.nmfs.noaa.gov/sfa/laws_policies/msa/

³⁶ http://www.nmfs.noaa.gov/sfa/laws_policies/msa/documents/sustainable_fisheries_act.pdf

³⁷ http://www.nmfs.noaa.gov/sfa/management/catch_shares/legislation_history/documents/msa_amended_2007.pdf

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number of important principles and regulatory provisions of relevance to the national governance regime for fishery management in US waters, including the Gulf of Mexico. Chief among these are:

- Establishing national standards for fishery and habitat conservation and management.
- Creating regional fishery management councils.
- Defining fishery management plan standards.
- Recognizing State jurisdiction.
- Specifying criminal offenses, civil forfeitures, and enforcement.
- Enabling fishery monitoring and research.

B. Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA), Titles I and III³⁸

Also known as the *Ocean Dumping Act*, the MPRSA prohibits the dumping of material into the ocean that would unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities (33 U.S.C 1401 et seq.).

C. Marine Mammal Protection Act of 1972 (MMPA), as amended³⁹

The MMPA establishes a national policy to prevent marine mammal species and population stocks from declining beyond the point where they ceased to be significant functioning elements of the ecosystems of which they are a part. This was the first legislation to mandate an ecosystem-based approach to marine resource management. The Act also established the concept of “optimum sustainable populations” to ensure healthy ecosystems. Prior to the MMPA, the management of marine species was aimed at producing a “maximum sustainable yield” to ensure the species replenished itself for an adequate harvest in subsequent years. The Act was amended in 1992 to include Title IV (the Marine Mammal Health and Stranding Response Program) which mandates emergency responses to marine mammals in distress, monitoring health and health trends in marine mammal populations, and investigating marine mammal unusual mortality events. Substantial amendments to the Act in 1994 included a statutory definition to the term “harassment”, a program to authorize and reduce the taking of marine mammals’ incidental to commercial fishing operations, and a requirement to prepare stock assessments for all marine mammal stocks in waters under US jurisdiction.

D. Shore Protection Act of 1988 (SPA)⁴⁰

The SPA regulates ocean transportation and dumping of dredged materials, sewage sludge, and other materials. Criteria for the issuance of permits include consideration of the effects of dumping on the marine environment, ecological systems, and fisheries resources.

E. Sustainable Fisheries Act of 1996 (SFA)⁴¹

The SFA is an amendment to modernize the *Magnuson-Stevens Fishery Conservation and Management Act*. It strengthened requirements to prevent overfishing and rebuild overfished fisheries; set national standards for fishery management plans to specify objective and measurable criteria for determining stock status, fishing vessel safety, impacts on fishing communities and bycatch, and recognized fish habitat as a key component in fisheries management. Specifically, the Act:

- Prohibited fisheries managers from using social, economic, or any other justifications to allow catch targets to exceed a calculated “maximum sustainable yield”.
- Mandated that for each managed species, fisheries managers quantitatively define “overfishing” (certain specified maximum allowed rates of fishing mortality) and “overfished” (depletion below a certain population level).
- Mandated regular assessment of which fish populations that are overfished, and creating an official list of overfished species in US waters.

³⁸<https://www.epa.gov/enforcement/marine-protection-research-and-sanctuaries-act-mprsa-and-federal-facilities#Summary>

³⁹<https://www.fisheries.noaa.gov/topic/laws-policies#marine-mammal-protection-act>

⁴⁰<https://www.epa.gov/laws-regulations/summary-shore-protection-act>

⁴¹https://en.wikipedia.org/wiki/Sustainable_Fisheries_Act_of_1996

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- Mandated that for overfished species, plans must be enacted allowing them to recover to quantitatively specified target population levels (usually about one-third of the estimated pre-fishing population) within ten years (with certain exceptions).
- Added that catches of unintended species or unmarketable fish be reduced to the extent practicable.
- Added the promotion of protection of "Essential Fish Habitat".
- Added the promotion of catch and release programs to conservation and management principles.

F. Coastal Zone Management Act of 1972 (CZMA)⁴², as amended

The CZMA encourages coastal states to develop and implement coastal zone management plans, thereby allowing states and the federal government to work together for the protection of US coastal zones from the overdevelopment of the environment. States receive federal assistance grants to maintain federally-approved planning programs for enhancing, protecting, and utilizing coastal resources. These are state programs, but the act requires that federal activities must be consistent with the respective states' CZM programs. Depending upon the individual state's program, the act provides the opportunity for considerable protection and enhancement of fishery resources by regulation of activities and by planning for future development in the least environmentally damaging manner.

G. Endangered Species Act of 1973 (ESA)⁴³, as amended

The ESA provides for the listing of plant and animal species that are threatened or endangered. Once listed as threatened or endangered, a species may not be taken, possessed, harassed, or otherwise molested. It also provides for a review process to ensure that projects authorized, funded, or carried out by federal agencies do not jeopardize the existence of these species or result in destruction or modification of habitats that are determined to be critical.

H. National Environmental Policy Act (NEPA)⁴⁴ of 1970, as amended

The NEPA requires that all branches of government give proper consideration to the environment in the course of their decision-making prior to undertaking any major federal action that significantly affects the environment. Environmental Assessments (EAs) and Environmental Impact Statements (EISs), which are assessments of the likelihood of impacts from alternative courses of action, are required from all Federal agencies.

I. Fish and Wildlife Coordination Act (FWCA)⁴⁵ of 1934, as amended

The Act requires that all federal agencies consult with NOAA Fisheries, US Fish and Wildlife Service, and state wildlife agencies when proposed actions might result in modification of a natural stream or body of water. Federal agencies must consider effects that these projects would have on fish and wildlife development and provide for improvement of these resources. The Act authorizes the Secretaries of Agriculture and Commerce to provide assistance to Federal and State agencies in order to protect and increase the supply of wildlife and wildlife resources, as well as to study the effects of domestic sewage, trade wastes, and other pollution on wildlife.

J. Lacey Act (LA)⁴⁶ of 1900, as amended.

The Lacey Act reinforces other federal, state, and foreign wildlife protection laws by making it an offense to take, possess, transport, or sell wildlife that has been taken in violation of any law. The law covers all fish and wildlife and their parts or products, plants protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and those protected by State law. The act also prohibits the falsification of documents for most shipments of wildlife (a criminal penalty) and makes the failure to properly mark wildlife shipments an offense (civil penalty).

⁴² <https://definitions.uslegal.com/c/coastal-zone-management-act-of-1972/>

⁴³ <http://www.nmfs.noaa.gov/pr/laws/esa/>

⁴⁴ <https://www.epa.gov/laws-regulations/summary-national-environmental-policy-act>

⁴⁵ https://en.wikipedia.org/wiki/Fish_and_Wildlife_Coordination_Act

⁴⁶ <https://www.fws.gov/international/laws-treaties-agreements/us-conservation-laws/lacey-act.html>

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K. National Marine Sanctuaries Act (NMSA)⁴⁷ of 1972, as amended

The primary objective of the Act is to protect marine resources, such as coral reefs, sunken historical vessels, or unique habitats. The act authorizes the US Secretary of Commerce to designate and protect areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archaeological, educational, or aesthetic qualities as national marine sanctuaries. NOAA's Office of National Marine Sanctuaries is mandated to oversee the day-to-day management of national marine sanctuaries.

Federal - State Interjurisdictional Cooperation

L. Interjurisdictional Fisheries Act (IJFA)⁴⁸

Interjurisdictional fishery resource means (i) a fishery resource for which a fishery occurs in waters under the jurisdiction of one or more states and the exclusive economic zone; (ii) a fishery resource for which there exists an interstate fishery management plan; or (iii) a fishery resource which migrates between the waters under the jurisdiction of two or more States bordering on the Great Lakes.

The purposes of this statute are to: (i) promote and encourage State activities in support of the management of interjurisdictional fishery resources; (ii) promote and encourage management of interjurisdictional fishery resources throughout their range; and (iii) promote and encourage research in preparation for the implementation of the use of ecosystems and interspecies approaches to the conservation and management of interjurisdictional fishery resources throughout their range.

State Action in Federal Waters

Sec. 306 of the *Magnuson-Stevens Fishery Conservation and Management Reauthorization Act* lays the legal foundation for State management of the GOM shrimp fishery in federal waters. Specifically, State Jurisdiction 16 U.S.C 1856 97-453, 98-623 (a) In General— A State may regulate a fishing vessel outside the boundaries of the State in the following circumstances:

- The fishing vessel is registered under the law of that State, and (i) there is no fishery management plan or other applicable Federal fishing regulations for the fishery in which the vessel is operating; or (ii) the State's laws and regulations are consistent with the fishery management plan and applicable Federal fishing regulations for the fishery in which the vessel is operating.
- The fishery management plan for the fishery in which the fishing vessel is operating delegates management of the fishery to a State and the State's laws and regulations are consistent with such fishery management plan. If at any time the Secretary determines that a State law or regulation applicable to a fishing vessel under this circumstance is not consistent with the fishery management plan, the Secretary shall promptly notify the State and the appropriate Council of such determination and provide an opportunity for the State to correct any inconsistencies identified in the notification. If, after notice and opportunity for corrective action, the State does not correct the inconsistencies identified by the Secretary, the authority granted to the State under this subparagraph shall not apply until the Secretary and the appropriate Council find that the State has corrected the inconsistencies.

State Agencies

A. Texas Parks and Wildlife Department (TPWD) and Commission

The Department is headquartered in Austin, Texas. In 1963, the Department was formed through merger of the State Parks Board and the Game and Fish Commission. In 1983, the Texas legislature passed the *Wildlife Conservation Act*, giving the department the authority for managing fish and wildlife resources in all Texas counties.

Title 2, Chapter 11 of the *Parks and Wildlife Code*⁴⁹ establishes TPWD and provides for its make-up and appointment. Other provisions include:

- Chapter 12 establishes the Department's powers and duties concerning wildlife.

⁴⁷[https://sanctuaries.noaa.gov/about/legislation/#:~:text=The%20National%20Marine%20Sanctuaries%20Act%20\(NMSA\)%20authorizes%20the%20Secretary%20of%20the%20Department%20of%20Commerce%20to%20designate%20and%20protect%20areas%20of%20the%20marine%20environment%20with%20special%20national%20significance%20due%20to%20their%20conservation%20recreational%20ecological%20historical%20scientific%20cultural%20archaeological%20educational%20or%20aesthetic%20qualities%20as%20national%20marine%20sanctuaries.](https://sanctuaries.noaa.gov/about/legislation/#:~:text=The%20National%20Marine%20Sanctuaries%20Act%20(NMSA)%20authorizes%20the%20Secretary%20of%20the%20Department%20of%20Commerce%20to%20designate%20and%20protect%20areas%20of%20the%20marine%20environment%20with%20special%20national%20significance%20due%20to%20their%20conservation%20recreational%20ecological%20historical%20scientific%20cultural%20archaeological%20educational%20or%20aesthetic%20qualities%20as%20national%20marine%20sanctuaries.)

⁴⁸<https://legcounsel.house.gov/Comps/Interjurisdictional%20Fisheries%20Act%20OF%201986.pdf>

⁴⁹<https://codes.findlaw.com/tx/parks-and-wildlife-code/#!tid=N07492D9B8C1842F194A872883A302BA5>

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- Chapter 61 provides responsibility for marine fishery management and authority to promulgate regulations.
- Chapter 47 provides for the authority to create commercial licenses required to catch, sell, and transport finfish commercially.
- Chapter 66 provides for the sale, purchase, and transportation of protected fish.

Title 5, Subtitle D, Chapter 77 specifically refers to the Shrimp fishery and provides for the setting of licence fees and licensing requirements; the regulation of catching, possession, purchasing, and sale of shrimp; the prohibition on retention of certain species; shrimping in outside waters; seasonal closures; vessels limitations; licence suspension and revocation; management review board; licence buyback program; Gulf shrimp licence moratorium; and penalties.

Title 31 of the *Texas Administrative Code*⁵⁰ pertains to Natural Resources and Conservation and consists of 11 Parts of which Part 2 establishes the TPWD. Within this Part, there are several Chapters of relevance to the State’s legal framework for fisheries, including:

- Chapter 51 - Executive (e.g., Advisory Committees)
- Chapter 55 - Law Enforcement
- Chapter 57 - Fisheries (e.g., Fishery Management Plans, Coastal Management Areas)

The **Commission's** chief responsibility is the adoption of policies and rules to carry out all programs of TPWD. It approves the annual operating budget and the biennial appropriations request for submission to the Legislature, sets TPWD policy as required by statute, and appoints an Executive Director charged with the implementation of the daily administration and operations of TPWD. Duties of the Commission directed by the Legislature are contained in *Parks and Wildlife Code*, Chapter 11. Regulations prescribing additional duties and requirements approved by previous actions of the Commission are found in the *Texas Administrative Code* (TAC).

B. Louisiana Department of Wildlife and Fisheries (LDWF) and Commission

The Department and Commission are headquartered in Baton Rouge, LA. The Department is the state agency responsible for management of the state’s renewable natural resources including all wildlife and all aquatic life. The control and supervision of these resources are assigned in the *Constitution of the State of Louisiana (1974)*, Article IX, Section 7⁵¹ and in revised statutes under Title 36 and Title 56.⁵²

Title 56 (Wildlife and Fisheries) further defines the authorities of the agency’s **Commission** which is charged with the control and supervision of the wildlife of the state, including all aquatic life. For example

- 56.1: Wildlife and Fisheries Commission
- 56.5: General powers and authority
- 56.6: Special powers and duties, rules and regulations, reports
- 56.6.2: Advisory committees
- 56.9: Report of violations, criminal prosecution, schedule of fines, citations
- 56.22: Rules and regulations for protection and preservation of fish
- 56.23: Penalties for violations
- 56.30: Department of Wildlife and Fisheries powers, duties, functions
- 56.30.1: Department of Wildlife and Fisheries issuance of licences and permits
- 56.31-39: Violation classes, revocations, forfeitures
- 56.40: Civil penalties
- 56.52: Issuance of search warrant
- 56.56: Seizure or surrender of things illegally used or possessed
- 56.60: Confiscation of things seized
- 56.75: Powers of commission, legislation

⁵⁰ <https://www.sos.texas.gov/tac/index.shtml>

⁵¹ <https://senate.la.gov/Documents/LAConstitution.pdf>

⁵² https://www.legis.la.gov/legis/Laws_Toc.aspx?folder=75&level=Parent

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

- 56.76: Officers, rules and regulations, meetings
- 56.77: Action taken by commission, requirements
- 56.493-499.4: Control of shrimp fishery, industry, shrimp task force, vessel and gear definitions

The Commission operates as a policy-making and budgetary control board, with no administrative function. It receives and reviews biological, socioeconomic, and other technical data and management recommendations from LDWF, gathers public input, and ultimately votes on which actions will best achieve long-term management goals. In general, the Commission is charged with setting seasons, times, places, size limits, quotas, daily take, and possession limits based upon biological data and setting fees for non-resident recreational fishing licenses, among other authorities.

C. Mississippi Marine Resources Department (MMRD) and Commission

The Department is headquartered in Biloxi, Mississippi. Created in 1994 by the Legislature, the Department operates as a separate government agency to enhance, protect and conserve marine interests of the state. Staff manage all marine life, public trust wetlands, adjacent uplands and waterfront areas, and provide for the balanced commercial, recreational, educational and economic uses of these resources consistent with environmental concerns and social changes. It consists of six offices: (i) Marine Fisheries, (ii) Coastal Ecology, (iii) Tidelands Trust Fund, (iv) Administrative Services, (v) Marine Patrol, and (vi) Coastal Management and Planning.

The legislature’s *Mississippi Code*⁵³ assigns to the Department the authority to manage, control, supervise, enforce and direct any matters pertaining to saltwater aquatic life and marine resources under the jurisdiction of the commission (§ 49-15-11). The following duties and powers are assigned in accordance with Title 49, Chapter 15, Article 5, § 49-15-307. Examples include:

- Implement the policy of the commission regarding marine resources within the jurisdiction of the department.
- Commission or conduct studies designed to determine alternative methods of managing and conserving the marine resources of this state in a manner to insure efficiency and sustained productivity.
- Issue permits and licenses authorized by law or regulation.
- Develop programs to enhance the marketing of the state's recreational and commercial marine resources.
- Discharge any other duties, responsibilities and powers as are necessary to implement this chapter.

The Department’s Office of Marine Fisheries manages the state’s commercial (and recreational) marine fisheries, including oysters, shrimp, crabs and finfish. It includes conservation and overall management of marine resources through research and data collection as modified by relevant social, economic and biological factors. Marine Fisheries uses the most appropriate methods for management, including but not limited to, regulating harvesting, habitat enhancement, water quality monitoring for molluscan shellfish harvesting, setting of catch limits and seasons and seafood safety inspections of processing and distribution facilities.

The Department’s Shrimp (and Crab) Bureau is responsible for conserving and revitalizing the state’s shrimp (and crab) resource and supporting habitat to ensure balanced and sustained utilization and maintaining stewardship of living marine resources for commercial and recreational fisheries at optimal levels as modified by social, economic and biological factors.⁵⁴

Title 22 of the *Mississippi Administrative Code*⁵⁵ includes several parts of relevant to the management of the state’s commercial fisheries. For example,

- Part 2: Rules and regulations for shrimping in state waters⁵⁶
- Part 5: Rules and regulations governing the use of nets, fish traps and pots and establishing certain catch limitations and quotas
- Part 7: Regulations to provide size limits and bag limits of certain fish species
- Part 8: Rules and regulations for official standards of measure and definitions of marine fisheries
- Part 9: Statistical reporting and confidentiality of statistical data for marine fisheries

⁵³ <https://law.iustia.com/codes/mississippi/2020/>

⁵⁴ <https://dmr.ms.gov/shrimp-crab/>

⁵⁵ <https://www.sos.ms.gov/adminsearch/default.aspx>

⁵⁶ <https://dmr.ms.gov/wp-content/uploads/2022/05/Title-22-Part-02-20220501.pdf>

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

- Part 11: Rules and regulations establishing procedures for the disposition of equipment and/or nets seized by the Mississippi Commission on Marine Resources
- Part 15: Administrative rules as required by Mississippi Administrative Procedures Law
- Part 20: Administrative penalty procedures
- Part 22: General Administrative Rules of the Mississippi Advisory Commission on Marine Resources

The powers and duties of the state's **Advisory Commission on Marine Resources**⁵⁷ in respect of the regulation of seafood are detailed in Title 49, Chapter 15, Article 5 § 49-15-303. Examples include to:

- Exercise full jurisdiction and authority over all marine aquatic life and to regulate any matters pertaining to seafood, including cultivated seafood.
- Adopt, promulgate, amend or repeal, after due notice and public hearing, in accordance with the Mississippi *Administrative Procedures Law* and subject to the limitations in subsection (2) of this section, rules and regulations authorized under this chapter, including, but not limited to, rules and regulations necessary for the protection, conservation or propagation of all seafood in the waters under the territorial jurisdiction of the State of Mississippi and for the regulation of gill net and purse seine fishermen.
- Regulate all seafood sanitation and processing programs.
- Set standards of measure.
- Destroy or dispose of equipment or nets which have been lawfully seized by the commission and which are not sold under Section 49-15-201 *et seq.*
- Open, close and regulate fishing seasons for the taking of shrimp, oysters, fish taken for commercial purposes and crabs and set size, catching and taking regulations for all types of seafood and culling regulations for oysters, except as otherwise specifically provided by law.
- Prescribe types and forms of scientific permits for public educational or scientific institutions, federal and state agencies and consultants performing marine resource studies.
- Suspend the issuance of licenses when necessary to impose a moratorium to conserve a fishery resource.
- Promote, construct, monitor and maintain artificial fishing reefs in the marine waters of the State of Mississippi and in adjacent federal waters.

Other authorities included in Article 5 of the Code include:

- § 49-15-301. Mississippi Commission on Marine Resources; powers and duties; membership; chairman; rules and regulations; marine resources technical advisory council; definition
- § 49-15-304. Promulgation of regulations regarding marine resources
- § 49-15-305. Executive director; nomination; powers and duties
- § 49-15-307. Powers and duties of department
- § 49-15-323. Commission to have jurisdiction over certain violations of marine resources law or regulations committed in the Gulf of Mexico outside state's territorial waters
- § 49-15-325. Suspension or revocation of license

D. Alabama Department of Conservation and Natural Resources (ADCNR)⁵⁸ and Commission

The Department is headquartered in Montgomery, Alabama. The organization consists of four operational divisions and eight support sections. The operational divisions are (i) Marine Resources, (ii) State Lands, (iii) State Parks, and (iv) Wildlife and Freshwater Fisheries. Support sections include (i) Accounting, (ii) Engineering, (iii) Communications and Marketing, (iv) Information Technology, (v) Legal, (vi) Personnel and Payroll, (vii) Property Inventory, and (viii) Deepwater Horizon Oil Spill Restoration.

⁵⁷ <https://dmr.ms.gov/cmnr/>

⁵⁸ <https://alabama-department-of-conservation-natural-resources-geoportal.hub.arcgis.com/>

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

Title 9 (Conservation and Natural Resources), Chapter 2 (Department of Conservation and Natural Resources), Article 1 (General Provisions) of the *Alabama Code*⁵⁹ is the primary operative legislation governing the state's fisheries management system. Specifically, Chapter 2 includes:

- Article 1 § 9-2-2: Powers and Duties
- Article 1 § 9-2-4: Powers and Duties as to Seafoods, Etc.
- Article 1 § 9-2-6: Commissioner of Conservation and Natural Resources - Powers and Duties Generally.
- Article 1 § 9-2-7: Commissioner of Conservation and Natural Resources - Powers and Duties as to Game, Fish and Seafood Generally.
- Article 1 § 9-2-8: Commissioner of Conservation and Natural Resources - Promulgation of Rules and Regulations as to Game, Fish and Seafood; Publication and Distribution of Laws, Etc.
- Article 1 § 9-2-12: Commissioner of Conservation and Natural Resources - Promulgation of Rules and Regulations for Department.
- Article 1 § 9-2-15: Advisory Board of Conservation and Natural Resources - Powers and Duties.
- Article 4 § 9-2-81: Powers and Duties Generally (Division of Marine Resources)

The Department's powers and duties as they pertain to the marine environment are detailed in §9-2-2 of the *Code*. They are to:

- Protect, conserve, and increase the wildlife of the state and to administer all laws relating to wildlife and protection, conservation, and increase thereof.
- Make exploration, surveys, studies, and reports concerning the wildlife, state parks and monuments and historical sites in the state and to publish such thereof as will be of general interest.
- Carry on a program of education and public enlightenment with respect to the wildlife and other natural resources, state parks and the monuments and historical sites of Alabama.
- Make an annual report to the Governor concerning the activities and accomplishments of the department for the preceding fiscal year.
- Recommend to the Legislature such legislation as may be needed further to protect, conserve, increase, or to make available or useful the wildlife and other natural resources, state parks and the monuments and historical sites of Alabama.

The **Commission** includes an Advisory Board that is empowered to perform all functions and duties as provided in § 9-2-15 of the *Code* and is comprised of 10 members appointed by the Governor for alternating terms of six years. The **Board's functions and duties** are to:

- Assist in formulating the policies of the Department of Conservation and Natural Resources in the performance of its functions and duties.
- Examine all rules and regulations made or promulgated by the Commissioner of Conservation and Natural Resources, to recommend amendments or repeals thereof or additional rules or regulations and by a two-thirds vote of those present at any meeting and with the approval of the Governor to amend or repeal such rules and regulations or to make and promulgate additional rules or regulations.
- Advise with the Commissioner of Conservation and Natural Resources concerning any matter relating to the functions and duties of the Department of Conservation and Natural Resources; and
- Assist in giving publicity to the wildlife and other natural resources, the state parks and monuments and historical sites of the state and the work of the Department of Conservation and Natural Resources in connection therewith.

E. Florida Fish and Wildlife Conservation (FFWC) Commission

Article XII (Schedule), Section 23(b) of the state's Constitution transferred the jurisdiction of the Marine Fisheries Commission in effect on March 1, 1998, to the Fish and Wildlife Conservation Commission effective July 1, 1999.

⁵⁹ <https://law.justia.com/codes/alabama/2022/title-9/chapter-2/>

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

The headquarters of the FFWC is located in Tallahassee, FL. The commission consists of six divisions, including: (i) Fish and Wildlife Research Institute, (ii) Hunting and Game Management, (iii) Freshwater Fisheries Management, (iv) Law Enforcement, (v) Habitat and Species Conservation, and (vi) Marine Fisheries Management. The Marine Fisheries Management Division develops regulatory and management recommendations for consideration by FWC Commissioners designed to ensure the long-term conservation of Florida's marine fisheries resources.

The Commission's responsibilities are set out, in part, in the *Florida Statutes (2023)*⁶⁰ particularly in Title XXVIII (Natural Resources, Conservation, Reclamation, Use), Chapter 379 (Fish and Wildlife Conservation) Part II (Marine Life), Sections 379.2401 - 379.26. Regulations of the state's shrimp fishery are set out in 379.247 as well as in Chapter 68B-31 of the *Florida Administrative Code*.⁶¹

Federal Management System

Federal management of various commercial (and recreational) fisheries is applied within the US EEZ across a maritime area that is contiguous to the territorial sea and whose inner boundary is the outer boundary of each coastal state. For the GOM region, federal waters are delineated from the coast to 3 miles seaward off Mississippi, Louisiana, and Alabama, and from the coast to 9 miles seaward off Texas and Florida (Figure 24). The length of the Gulf coastline is approximately 1,631 miles. Florida has the longest coastline extending 770 miles along its Gulf coast, followed by Louisiana (397 miles), Texas (361 miles), Alabama (53 miles), and Mississippi (44 miles).

The **US Code of Federal Regulations** (CFR) is the codification of the general and permanent rules published in the Federal Register by the departments and agencies of the Federal Government. It is divided into 50 titles that represent broad areas subject to Federal regulations. Titles are updated once each calendar year on a staggered basis. Each title is divided into chapters which usually bear the name of the issuing agency; each chapter is further subdivided into parts that cover specific regulatory areas.

An electronic version of the CFRs is available online.⁶² The information is reportedly updated daily and is current within two business days. The information provided includes the amendatory instruction, the text of the amendment (if any), the effective date(s), the Federal Register publication date and page citation, and a link to the Register's page (PDF format) where the amendment was published.

The CFRs (*16 U.S.C 1801 et seq.*) of application for the fisheries of the GOM are represented in Title 50: Wildlife and Fisheries (Table 32).

⁶⁰ http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Index&Title_Request=XXVIII#TitleXXVIII

⁶¹ <https://casetext.com/regulation/florida-administrative-code>

⁶² <https://www.ecfr.gov/>



Figure 24. Illustration of Federal and State Water Boundaries in the Gulf of Mexico (Source: <https://gulfcouncil.org/fishing-regulations/federal/#1567024726348-197a283c-476c>).

Table 32. Components of the CFR of application to the Commercial Fisheries of the Gulf of Mexico (Source: Title 50, 16 USC, 1801 et seq.).

Chapter	Part	Subpart	Regulatory Provisions
VI	622	A. General Provisions	622.1 Purpose and scope 622.2 Definitions and acronyms 622.4 Permits and fees 622.5 Recordkeeping and reporting 622.6 Vessel identification 622.8 Quotas 622.9 Prohibited gear and methods 622.13 Prohibitions 622.15 Area closures to protect corals 622.17 Seasonal/area closures to protect Gulf reef fish
		C. Shrimp Fishery in the Gulf of Mexico	622.50 Permits, permit moratorium, and endorsements 622.51 Recordkeeping and reporting 622.52 At-sea observer coverage 622.53 Bycatch reduction device (BRD) requirements 622.54 Prohibited gear and methods 622.55 Closed areas 622.56 Size limits 622.58 Annual catch limits, annual catch targets, and accountability measures 622.59 Prevention of gear conflicts 622.60 Adjustment of management measures

In July 1989, the NMFS published revised guidelines for FMPs that interpretatively addressed the MSA’s National Standards (50 CFR Part 602). These guidelines required each FMP to include a scientifically measurable definition of overfishing and an action plan to arrest overfishing should it occur. Since 2004, the Federal Gulf Shrimp Management Plan has been amended seventeen (17) times, including one (1) Framework Action. The most recent amendment (Amendment 18) was adopted in March 2020. Those that were introduced and adopted between 2004 and 2018 are highlighted at Table 33.

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Table 33. Summary of Amendments and Actions - GOM Commercial Shrimp Management Plan (2004-2018) (Source: <https://gulfcouncil.org/fishery-management/implemented-plans/shrimp/>).

Amendment	Subject	Purpose
18	Target reduction goal for juvenile red snapper mortality, and revise the Shrimp Framework Procedure	The purpose of this amendment is to reduce the red snapper bycatch reduction target in the federal Gulf shrimp fishery in response to the latest Gulf red snapper stock assessment and adjust the framework procedure. The need for this action is to promote economic stability and achievement of optimum yield in the federal Gulf shrimp fishery by reducing effort constraints and to equitably distribute the benefits from rebuilding, while continuing to protect, the Gulf red snapper stock. Final rule effective March 9, 2020.
17B	Yield, Threshold Number of Permits, and Transit Provisions	This amendment defined and aggregated maximum sustainable yield of 112,531,374 lb of tails and an aggregate optimum yield of 85,761,596 lb of tails. It allowed for the creation of a Federal Gulf shrimp reserve pool permit when certain conditions are met. It also set minimum threshold number of active shrimp permits at 1,072 and mandated that the Council convene a review panel to review the details of a permit pool if the number of permits reached 1,175. It also allowed vessels possessing shrimp to transit through federal waters without a federal permit if their trawl doors and nets are out of the water and the bag straps are removed. Final rule effective January 22, 2018.
17A	Expiration of Permit Moratorium and Royal Red Shrimp Endorsement	This amendment extended the current Gulf commercial shrimp permit moratorium for 10 more years. The intent is to protect federally managed Gulf shrimp stocks while promoting catch efficiency, economic efficiency, and stability in the fishery. Final rule effective August 22, 2016.
16	Annual Catch Limits and Accountability Measures for Royal Red Shrimp	This amendment revised the annual catch limit (ACL) for royal red shrimp, removed the royal red shrimp quota, and revised the accountability measures (AMs) for royal red shrimp to remove an inconsistency in the regulations. The purpose of the rule is to prevent overfishing of the royal red shrimp resource while helping to achieve optimum yield and reconcile conflicting Federal regulations. Final rule effective April 24, 2015.
15	Status Determination Criteria for the Penaeid Shrimp and Adjustments to the Shrimp Framework Procedure	This amendment adjusted stock status determination criteria to be consistent with the new population metrics for penaeid shrimp. It also modified the framework procedure for the Shrimp fishery management plan (FMP) to include changes to accountability measures (AM) for the royal red shrimp fishery through the standard documentation process for open framework actions and make editorial changes to the framework procedure to reflect changes to the Council advisory committees and panels. Final rule effective December 30, 2015.
Framework Action	Establish Funding for the Electronic Logbook Program in the Shrimp Fishery of the Gulf of Mexico	This action maintained the NMFS's ability to monitor and document offshore effort for the Gulf shrimp fleet through an electronic logbook (ELB) program. The need is to base conservation and management measures on the best scientific information available and to minimize bycatch to the extent practicable, as required by the <i>Magnuson-Stevens Fishery Conservation and Management Act</i> . Final rule effective January 27, 2014.
14	Red snapper and shrimp fisheries	This amendment established a target reduction goal for juvenile red snapper mortality; addressed overfishing and bycatch issues in the red snapper and shrimp directed fisheries; and instituted a seasonal closure in the shrimp fishery as necessary.

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		Final rule effective February 28, 2008.
Regulatory Amendment (2006)	Red snapper bycatch reduction from shrimp trawling	This amendment changed the bycatch reduction certification criterion for red snapper from penaeid shrimp trawling in the EEZ by revising the bycatch reduction device (BRD) certification criterion to address shrimp trawl bycatch more comprehensively and realistically; it is expected to increase flexibility, promote innovation, and allow for the certification of a wider variety of BRDs. Final rule effective March 14, 2008.
13	Various measures to better manage the Shrimp fisheries in the EEZ	This amendment established an endorsement to the existing federal shrimp vessel permit for vessels harvesting royal red shrimp; defined maximum sustainable yield (MSY), optimum yield (OY), the overfishing threshold, and the overfished condition for royal red and penaeid shrimp stocks in the Gulf for stocks that currently lack such definitions; established bycatch reporting methodologies and improved collection of shrimping effort data in the EEZ; required completion of a Gulf Shrimp Vessel and Gear Characterization Form; establishes a moratorium on the issuance of commercial shrimp vessel permits; and required reporting and certification of landings during a moratorium. Final rule effective October 26, 2006.
11	Permit requirement and gear prohibition	This amendment required all vessels harvesting shrimp from the EEZ to obtain a commercial shrimp vessel permit from the NMFS; prohibited the use of traps to harvest of royal red shrimp from the EEZ; and prohibited the transfer of royal red shrimp at sea. Final rule effective December 5, 2002.

The Council currently has three different regulatory instruments for addressing fishery management issues. First, it may develop a fishery management plan or plan amendment to establish management measures. The amendment process can take one to three years depending on the analysis needed to support the amendment actions. Second, it may vote to request an interim or emergency rule that could remain effective for 180 days with the option to extend it for an additional 186 days. Interim and emergency rules are only meant as short-term management tools while permanent regulations are developed through an amendment. Third, it may prepare a framework action based on a pre-determined procedure that allows changes to specific management measures and parameters. Typically, framework actions take less than a year to implement and, like plan amendments, are effective until amended.⁶³

US marine fisheries are scientifically monitored, regionally managed, and legally enforced under a number of requirements, including ten **national standards**.⁶⁴ The National Standards are principles that must be followed in any fishery management plan to ensure sustainable and responsible fishery management. As mandated by the *Magnuson-Stevens Fishery Conservation and Management Act*, NOAA Fisheries has developed guidelines for each National Standard. When reviewing fishery management plans, plan amendments, and regulations, the Secretary of Commerce must ensure that they are consistent with the National Standard guidelines.

National Standard 1 – Optimum Yield

Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

National Standard 2 – Scientific Information

Conservation and management measures shall be based upon the best scientific information available.

National Standard 3 – Management Units

⁶³ <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.643.5154&rep=rep1&type=pdf>

⁶⁴ <https://www.fisheries.noaa.gov/national/laws-and-policies/national-standard-guidelines>

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

National Standard 4 – Allocations

Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (a) fair and equitable to all such fishermen; (b) reasonably calculated to promote conservation; and (c) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privilege.

National Standard 5 – Efficiency

Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

National Standard 6 – Variations and Contingencies

Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

National Standard 7 – Costs and Benefits

Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

National Standard 8 – Communities

Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirement of paragraph (2) [i.e., National Standard 2], in order to (a) provide for the sustained participation of such communities, and (b) to the extent practicable, minimize adverse economic impacts on such communities.

National Standard 9 – Bycatch

Conservation and management measures shall, to the extent practicable, (a) minimize bycatch and (b) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

National Standard 10 – Safety of Life at Sea

Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Federal Commercial Licensing Requirements - GOM Shrimp Fisheries⁶⁵

NOAA Fisheries' Southeast Region administers the commercial licensing program for vessels that participate in the GOM shrimp fishery in federally-managed waters. A web-based application – the Southeast Fisheries Permit System – is available for this purpose, as is a paper application. The system includes two portals: (i) a limited access for the GOM's brown, white and pink shrimp species, and (ii) an open access for the GOM's red royal shrimp species. Both permit types have logbook and reporting requirements.

For both access types, the permit's expiration date if the vessel owner is an individual is the last day of the permit holder's birth month; for multiple owners, the expiration date is the birth date of the managing owner; if the vessel owner is a business, the expiration date is the last day of the month the company was formed; and, if the vessel is leased, the expiration date is the last day of the last full month of the lease term.

The **open access permit** type also requires that licensees hold a valid GOM Shrimp Moratorium (SPGM) permit on the vessel. Permit renewals may be processed by either the online or paper applications; however, requests for a new permit can only be requested by the paper application process, and permits are non-transferable. A similar process exists for the **limited access permit** type with the exception that permit transfers are available but only through the paper application process.

Further commercial licensing requirements are outlined in a document titled: *Commercial Fishing Regulations for Gulf of Mexico Federal Waters* under the authority of the Gulf of Mexico Fishery Management Council.⁶⁶ These include:

⁶⁵ https://www.fisheries.noaa.gov/fishing-and-seafood/permits?title=shrimp&management_area%5BGulf+of+Mexico%5D=Gulf+of+Mexico&fishing_permits%5B100006511%5D=100006511&sort_by=title

⁶⁶ <http://gulfcouncil.org/wp-content/uploads/commercial-regulations.pdf>

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- Permit required for all vessels that intend to fish for shrimp in EEZ waters of the Gulf of Mexico.
- Permit moratorium in effect.
- Endorsement required for royal red shrimp.
- Shrimp trawlers must have a bycatch reduction device (BRD) and an approved turtle excluder device (TED) installed in each net that is rigged for fishing.
- State licensed shrimpers may transit from state waters through federal waters to return to state waters and port without a federal permit when gear is appropriately stowed.

Currently, there are no prescribed minimum size, trip limits and annual catch limits when fishing most shrimp species in federally-managed waters. However, there is an annual catch limit of 337,000 lbs tail weight for Royal red shrimp in federal waters, and vessels landing shrimp in Louisiana must comply with the state's minimum size. Vessels with shrimp trawls or entangling net gear onboard may not exceed the recreational reef fish bag limits. A state may regulate vessels that are registered in that state and that are fishing in federal waters for species for which there are no federal fishery management plans or applicable federal regulations.

State Management Systems

A. Texas

The TPWD's Coastal Fisheries Division⁶⁷ manages the marine fishery resources of Texas' four million acres of saltwater, including the bays and estuaries and out to 9 nm in the Gulf of Mexico. Management strategies are designed to sustain fisheries harvest at levels necessary to ensure replenishable stocks of important species and provide balanced food webs within the marine ecosystems. The Division conducts monitoring programs year-round to gather technical data to assess population levels and develop fishing regulations. The Division also represents Texas as sitting members of the GSMFC and GMFMC and represents Texas as the state representative to NMFS.

The Department's Strategic Plan 2019-2023⁶⁸ lists its mission as "to manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations." The elements of the agency's philosophy include, *inter alia*, to (i) rely on the best available science to guide conservation and management decisions, and (ii) be a recognized national leader in implementing effective natural and cultural resources conservation and outdoor recreational programs.

Commercial shrimp fishery management measures

The Department publishes an annual summary of the state's regulations in respect of the commercial fisheries it manages. The *Texas Register*⁶⁹ serves as the journal of state agency rulemaking for Texas. Information published in the *Register* includes proposed, adopted, withdrawn and emergency rule actions, notices of state agency review of agency rules, governor's appointments, attorney general opinions, and miscellaneous documents such as requests for proposals. After adoption, these rulemaking actions are codified into the *Texas Administrative Code*.

Shrimp Commercial Licensing Requirements⁷⁰

A moratorium on the sale of commercial licences has been in effect for the Texas bay and bait shrimp fishery since 1996, and the Gulf shrimp fishery since 2005. To retain eligibility in these fisheries, purchase of the previous year's license is required. A license buyback provision is in place for the bay and bait shrimp boat commercial licenses, but not for Gulf shrimp boat licenses. The following license provisions apply for individuals and businesses who are engaged in the commercial shrimp fishery in state waters. A **General Commercial Fisherman's Licence** is not required for a person who holds a commercial shrimp boat captain's license or the crew of a licensed commercial shrimp boat.

⁶⁷ <http://www.lib.utexas.edu/taro/tslac/20165/tsl-20165.html>

⁶⁸ https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_a0900_0622_07_18.pdf

⁶⁹ <https://www.sos.texas.gov/texreg/index.shtml>

⁷⁰ https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_v3400_0074.pdf

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- A **Commercial Shrimp Boat Captain’s License** is required of any person who operates a commercial shrimp boat catching or attempting to catch shrimp and other aquatic products from the public waters of this state or unloading or attempting to unload in this state shrimp and other aquatic products taken from waters outside this state.
- A **Bait-Shrimp Boat License** is required for each boat that must be registered under federal or state laws and is used in the “inside” waters of the state for taking bait shrimp for pay, barter, sale, or exchange.
- A **Bay-Shrimp Boat License** is required for each boat that must be registered under federal or state laws and is used in the “inside” major bay waters of the state for taking shrimp for pay, barter, sale, or exchange.
- A **Gulf - Shrimp Boat License** is required for each boat that must be registered under federal or state laws and is used in the Gulf of Mexico or “outside” waters of the state for taking shrimp for pay, barter, sale or exchange or for boats unloading within the state such other products taken outside the state’s waters.
- A **Commercial Gulf Shrimp Boat Offloading License** is required for a vessel to unload shrimp or other aquatic products, taken incidental to lawful shrimping activities, caught, or taken from saltwater outside of the state without having been previously unloaded in another state or foreign country.
- A person who holds a commercial shrimp boat captain’s license or the crew of a licensed commercial shrimp boat is not required to obtain a commercial finfish fisherman’s license when catching finfish incidental to legal shrimp trawling operations.
- A Bait Dealer who catches, transports or sells his own catch of shrimp for bait is not required to hold an individual bait dealer’s license; however, all bait dealers who purchase aquatic products from anyone except other dealers, and all bait dealers who harvest aquatic products themselves are required to report these landings under the Trip Ticket Program.
- A **Bait-Shrimp Dealer - Place of Business or Building License** is required for any person who operates an established place of business engaged in selling shrimp for fish bait in non-coastal counties.
- A **Wholesale Fish Dealer License** is required for any person who operates a place of business for the purpose of selling, offering for sale, canning, preserving, processing, or handling for shipments or sale aquatic products to retail or wholesale fish dealers, hotels, restaurants, cafes, or consumers.
- A **Retail Fish Dealer License** is required for any person who operates a place of business and sells aquatic products to consumers.

Catch reporting is a mandatory requirement for vessels engaged in any of the state’s commercial shrimp fisheries. These transactions may be recorded electronically using software provided by TPWD or on paper using forms also provided by TPWD. All commercial fishermen who sell their catch to individuals other than to a wholesale fish dealer, retail fish dealer, wholesale truck dealer, retail truck dealer, bait dealer, or bait-shrimp dealer, must report their sales by filing a monthly report with the TPWD on or before the 10th day of each month following the month in which reportable activity occurred.

All commercial shrimp boats are required to exhibit the vessel’s documentation or registration number on the port and starboard sides of the deckhouse or hull and on an appropriate weather deck. The number in block Arabic numerals in contrasting color to the background must be at least 18 inches in height on vessels over 65 ft and 10 inches in height for all other vessels and be permanently attached.

General state regulations of specific relevance to the commercial shrimp fishery include the following. It is unlawful to:

- Take or attempt to take shrimp within the boundaries of any natural or man-made pass leading from the inside waters to the outside waters (GOM) of the state.
- Use a trawl or fail to have the spreading devices on deck and the trawl bag untied at a time when shrimping is prohibited.
- Possess a trawl that is too wide or has small mesh in an area where the trawl is prohibited. Such trawls may be possessed on vessels in port or in a marked channel going directly to or from an area in this state where the use of the trawl is permitted.
- Head shrimp aboard a boat in inside waters; possess a device designed to catch fish or other aquatic life, including a shrimp trawl, in or on the public waters of the state where the use of the device is prohibited.
- Catch and retain fish species prohibited from sale on a licensed commercial shrimp boat while the commercial plates are on board.

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- Retain a red drum, spotted sea trout or lightning whelk on board a licensed commercial shrimp boat if there is a trawl on board the boat.

It is unlawful for any person aboard a vessel:

- Licensed as a commercial bay shrimp boat to off-load, transfer, sell, or barter any amount of live or dead shrimp to a person aboard another vessel.
- To off-load, transfer, purchase, or barter from a person aboard a vessel licensed as a commercial bay shrimp boat any amount of live or dead shrimp.
- Licensed as a commercial bait shrimp boat to off-load, transfer, sell, or barter any amount of live or dead shrimp, except an amount of live or dead shrimp not to exceed two quarts per sport fisherman or one gallon (by volume) for two or more sport fishermen may be off-loaded, transferred, sold, or bartered to a person aboard a sport fishing vessel.
- To off-load, transfer, purchase, or barter from a person aboard a vessel licensed as a commercial bait shrimp boat any amount of live or dead shrimp, except a person aboard a recreational fishing vessel may off-load, transfer, purchase, or barter an amount of shrimp not to exceed two quarts per sport fisherman or one gallon (by volume) for two or more recreational fishermen.
- To shrimp during a closed season outside waters, trawls outside the confines of the hull is prima facie evidence of violation.
- Nongame fish and other **aquatic products taken incidental** to legal shrimp trawling operations may be retained provided each person that retains a lawful limit of fish has a current shrimp boat captain's license, or is the licensed owner of the shrimp boat, and:
 - the total weight of aquatic products retained, in any combination, do not exceed 50% by weight of shrimp on a shrimping vessel; or
 - from May 1 to Sept. 30 up to 1,500 live nongame fish not regulated by bag or size limit and/or 300 dozen ribbonfish may be retained daily for bait purposes only on board a vessel licensed for commercial bait shrimp fishing.

The taking of **aquatic products of illegal size** on board a licensed commercial shrimp boat engaged in the lawful taking of shrimp is not a violation if the aquatic products of unlawful size are returned to the waters from which taken in a manner to ensure their best chance of survival.

Mesh sizes specified for commercial trawls apply to the trawl, bag and trawl liner and are measured in inches of length between the two most widely separated knots in any consecutive series of five stretched meshes after the trawl has been placed in use.

Texas Shrimp Closure⁷¹

Trawling is prohibited from 30 minutes after official sunset on or about May 15 to 30 minutes after official sunset on or about July 15 (Figure 25).

⁷¹ <https://www.fisheries.noaa.gov/bulletin/federal-waters-texas-close-shrimping-may-15-2019>

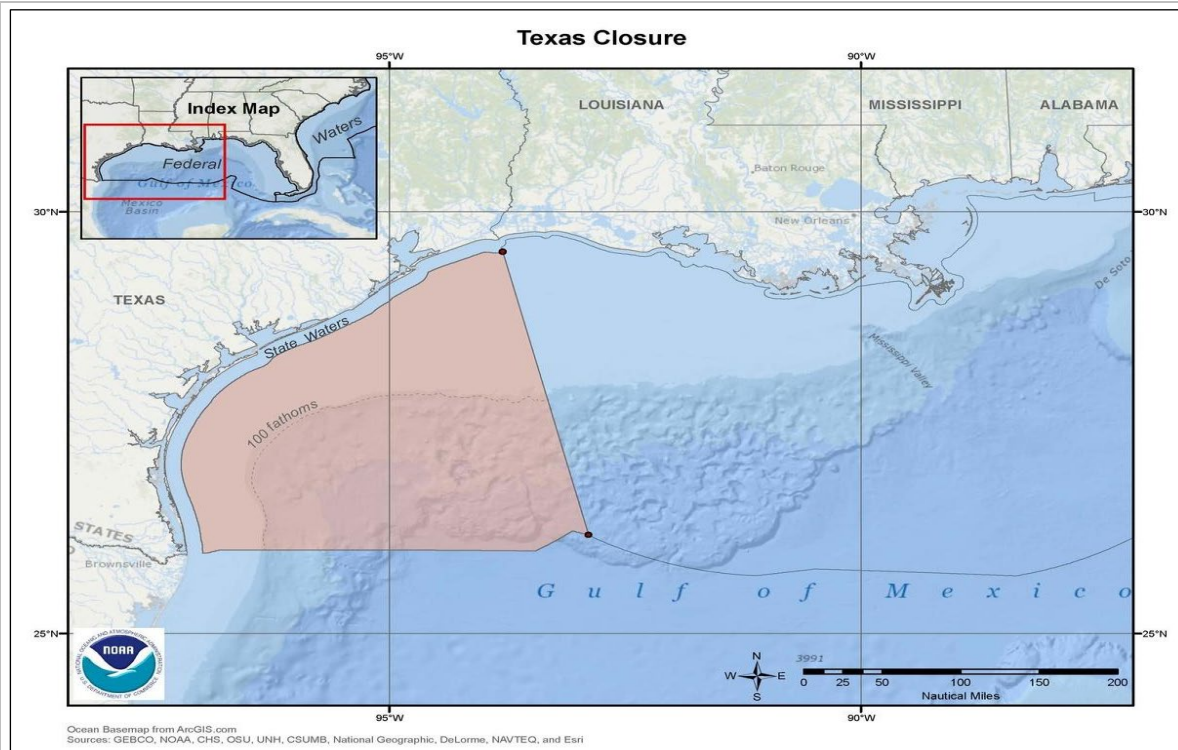


Figure 25. Texas Shrimp Closure (Source: <https://www.fisheries.noaa.gov/resource/map/texas-closure-shrimp-fishery-management-area-map-gis-data>).

The Texas shrimp closure is to allow brown shrimp to reach a larger and more valuable size prior to harvest, and to prevent waste of brown shrimp that might otherwise be discarded due to their small size. The closing and re-opening dates of the closure are based on the results of biological sampling by the TPWD. This sampling is used to project the closure, which coincides with brown shrimp in Texas bays and estuaries reaching a mean size of 90 mm and beginning strong emigrations out of the bays and estuaries during maximum duration ebb tides.

Texas re-opens state waters to shrimp trawling based on sampling projections of when brown shrimp reach a mean size of 112 mm, and when maximum duration ebb tides occur. NOAA Fisheries re-opens federal waters off Texas when Texas re-opens its state waters. If there is a need to adjust the 15th of July date for the re-opening, notification of the revised date is published in the *Federal Register* and announced in a subsequent fishery bulletin.

B. Louisiana

The Department is organized along four Offices - Secretary, Management and Finance, Wildlife, and Fisheries. Each Office consists of a various Divisions or Sections, some of which are described here.

- A. Office of Secretary (Enforcement, Public Information, Legal Section)
- B. Office of Management and Finance (Licensing, Property Management, Fiscal, Human Resources)
- C. Office of Wildlife (Wildlife, Coastal and Nongame Resources, Restoration Program)
- D. Office of Fisheries (Fisheries Management, Fisheries Research and Development)

Fisheries Research and Assessment

The Section is responsible for conducting research on the state's estuarine, marine and inland fishery resources. The section includes the Fisheries Development Group and the Fisheries Research Laboratory on Grand Isle, which, in addition to research, also conducts monitoring of offshore fishery stocks through cooperative sampling programs. The section also includes the Fisheries Stock Assessment Program, responsible for developing modern measures of the health of fish stocks statewide to ensure sustainable populations and estimate effects of regulatory changes, and the Fisheries Habitat/Permitting Group which interacts with all LDWF sections and divisions and state and federal entities in planning and implementation of restoration initiatives for fulfillment of resource recovery agreements from oil spill settlements, reviewing and commenting on regulatory and consistency permit

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

applications, and efforts to conserve and restore fish and wildlife habitat. In addition, the section conducts aquatic nuisance species monitoring and outreach.

The state's **Shrimp Task Force** is responsible for studying and monitoring the shrimp industry and for making recommendations to LDWF, the Commission, and other state agencies on improving production and the economic sustainability of the industry. Specifically, the Task Force is charged in part to:

- Coordinate efforts to increase shrimp production and marketability.
- Provide for the study of the decline in shrimp marketability and market price, provide for the study of the impacts of imported shrimp on the domestic market, assist in the development of a state shrimp inspection program, and assist in the development of a Louisiana shrimp certification and branding program.
- Develop markets and marketing strategies for the development and expansion of markets for shrimp harvested from Louisiana waters.
- Represent the interests of the Louisiana shrimp industry before federal and state administrative and legislative bodies on issues of importance to the Louisiana shrimp industry.

The Task Force's membership, governance structure, and decision-making process are set out in state legislation.⁷²

Shrimp Commercial Regulatory Requirements⁷³

Louisiana's state waters are divided into inside and outside waters for management purposes. The inside/outside shrimp line separates these waters. The line generally follows the coastline from the Louisiana/Texas state line to the Louisiana/Mississippi state line. Waters landward of the shrimp line are inside waters; waters seaward of the shrimp line out to the three-mile line are outside waters. Inside waters are further divided into seven major estuarine basins.

In March 2018, the Commission adopted a rule to amend the current line due to land loss and erosion caused by storm surge, tidal movements, and other natural causes. Approximately, 61,000 acres were added to the state's outside waters. The inside/outside shrimp line was formally changed as of September 1, 2018.

The state requires that harvesters and vessels be registered annually when participating in the commercial shrimp fishery in state waters. Fees are also associated with gear types (trawl, butterfly net, skimmer net, cast net). Seafood wholesale and retail dealers are also required to be permitted annually. A Gulf Seafood Traversing and Offloading Licence is required when harvesting commercially in federal waters for travel through state waters with harvested catch and/or commercial gear.

There is no size limit for any shrimp harvested during the spring open season nor for brown or seabob shrimp harvested during any open season. White shrimp is legal size when a pound of white shrimp equals 100 whole shrimp or less. Sub-legal white shrimp can only be harvested from October 15 through the third Monday in December. When more than half of the catch is seabob or brown shrimp, no more than 10% (by weight) of the catch can be sub-legal size white shrimp.

Bycatch reduction devices (BRDs) are required to be installed in each trawl when fishing federal waters. State and federal law require that all shrimpers fishing with powered or mechanically-retrieved otter trawls (except test nets with headrope lengths of 12 ft or less) be equipped with turtle excluder devices (TEDs) to allow incidentally captured turtles to escape the nets. Of note, however, the requirement for skimmer vessels under 40 ft to be equipped with TEDs is currently the subject of a legal dispute initiated by the state against NOAA/NMFS.

Detailed gear specifications and restrictions, species bycatch limits, and the non-retention of protected species are set out in the LDWF's publication titled: *2023 Louisiana Commercial and For-Hire Fisheries Rules & Regulations*.⁷⁴

⁷² <https://legis.la.gov/Legis/Law.aspx?p=y&d=105348>

⁷³ <https://www.wlf.louisiana.gov/assets/Resources/Publications/Regulations/2023-Commercial-Fishing.pdf>

⁷⁴ <https://www.wlf.louisiana.gov/assets/Resources/Publications/Regulations/2023-Commercial-Fishing.pdf>

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

C. Mississippi

According to § 49-15-2 of the *Mississippi Code*, any fishery management plan, and any regulation promulgated to implement that plan or promulgated under the state seafood laws, shall be consistent with the following standards for fishery conservation and management:

- Conservation and management measures shall be based upon the best scientific information available.
- If it becomes necessary to allocate or assign fishing privileges among various fishermen, that allocation shall be (i) fair and equitable to those fishermen, (ii) reasonably calculated to promote conservation, and (iii) carried out in a manner that no particular individual, corporation or other entity acquires an excessive share of the privileges.
- Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, but no measure shall have economic allocation as its sole purpose.
- Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.
- Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.
- Conservation and management measures shall, consistent with the conservation requirements of this state (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (i) provide for the sustained participation of the communities, and (ii) to the extent practicable, minimize adverse economic impacts on those communities.
- Conservation and management measures shall, to the extent practicable, (i) minimize bycatch, and (ii) to the extent bycatch cannot be avoided, minimize the mortality of that bycatch.
- Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

The state’s commercial shrimp fishery regulations⁷⁵ are detailed in Title 22 of Part 2. The chapters are delineated as follows:

- Chapter 1: Introduction
- Chapter 2: Definitions
- Chapter 3: Closure Areas
- Chapter 4: Gear Regulations
- Chapter 5: Determining Legal Shrimp Size
- Chapter 6: Penalties
- Chapter 7: Chapters and Subchapters Declared Separable

Shrimp Commercial Regulatory Requirements

Commercial Methods of Take⁷⁶

During open seasons and in open areas, saltwater shrimp may only be taken with shrimp trawls, butterfly nets, skimmer nets, push trawls, beach seines and cast nets. North of the barrier islands, within the Mississippi Sound, shrimp may only be taken with a single net, no longer than 50 ft along the headrope and 60 ft along the footrope, or not more than two nets, each no longer than 25 ft on the headrope and 32 ft on the footrope. A test (or try) trawl no longer than 12 ft along the headrope and 15 ft along the footrope with boards no more than 30 inches in length is permitted in open areas during open seasons. Trawl doors shall not exceed 8 ft by 43 inches.

Licensed shrimp trawlers may keep up to 25 lb in total of White Trout, Croaker, Black Drum, Ground Mullet, Gafftopsail Catfish and Flounder and three dozen Blue Crabs for personal consumption but must meet minimum size and creel limits. Non-resident licensed shrimp trawlers may only keep this allowance if their respective state has a reciprocal agreement with Mississippi.

All commercial boats, whether resident or non-resident, fishing for shrimp (with gill net, trammel net or similar approved nets) within the territorial waters of the state of Mississippi are required to be licensed. All commercial (and recreational) shrimp vessels with a mechanical assisted retrieval system must have an approved Turtle Excluder Device (TED).

⁷⁵ <https://dmr.ms.gov/wp-content/uploads/2022/05/Title-22-Part-02-20220501.pdf>

⁷⁶ <https://www.eregulations.com/mississippi/fishing/saltwater/shrimp#:~:text=North%20of%20the%20barrier%20islands,32%20feet%20on%20the%20footrope.>

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

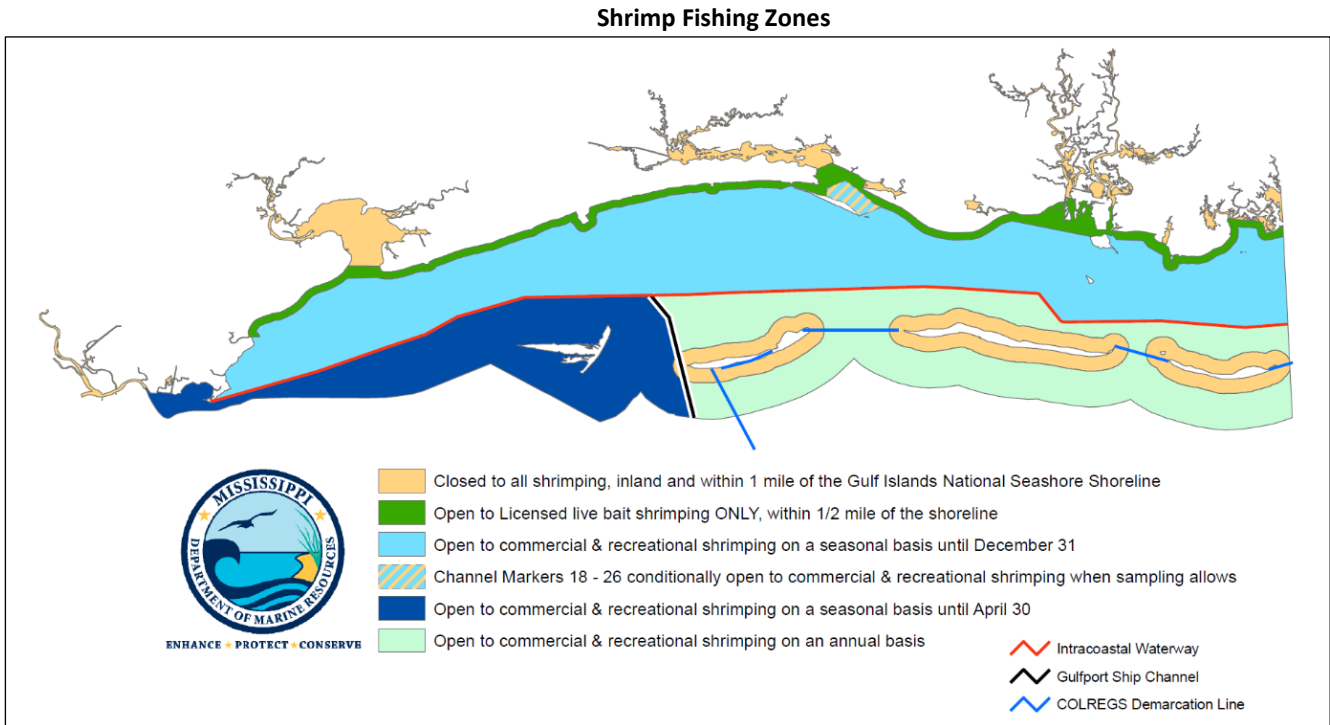


Figure 26. Mississippi Shrimp Fishing Zones (Source: <https://dmr.ms.gov/shrimp-crab/>).

The Department’s **Trip Ticket Program** is a system to collect commercial landings and associated information by trip. The collection of landings is one way to monitor the health of Mississippi’s fisheries and the seafood industry. This demonstrates the economic importance of marine resources and provides information on the amount of seafood caught or landed in Mississippi for use in fisheries management. Seafood dealers or processors buying directly from harvesters must complete trip tickets. Commercial fishermen must complete a trip ticket when they are not transferring their catch to a licensed dealer or processor unless otherwise specified by regulation (i.e., selling catch directly to the public). Fishermen not selling to a dealer must be in possession of a Fresh Product Permit. Trip tickets are due by the 10th of the current month for landings for the preceding month. Dealers or fishermen can send trip tickets as often as they like if all the trip tickets generated in a month are turned in to the MDMR by the 10th of the following month.

D. Alabama

The **DCNR’s duties** as they pertain to the marine environment are detailed in § 9-2-2 of the *Alabama Code*. They are to:

- Protect, conserve, and increase the wildlife of the state and to administer all laws relating to wildlife and protection, conservation, and increase thereof;
- Make exploration, surveys, studies, and reports concerning the wildlife, state parks and monuments and historical sites in the state and to publish such thereof as will be of general interest.
- Carry on a program of education and public enlightenment with respect to the wildlife and other natural resources, state parks and the monuments and historical sites of Alabama.
- Make an annual report to the Governor concerning the activities and accomplishments of the department for the preceding fiscal year.
- Recommend to the Legislature such legislation as may be needed further to protect, conserve, increase, or to make available or useful the wildlife and other natural resources, state parks and the monuments and historical sites of Alabama.

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

Shrimp Commercial Regulatory Requirements

The DCNR manages shrimp primarily by protecting young shrimp in two ways:

- The most-productive nursery grounds, such as Weeks Bay, are permanently closed to all shrimping activities. This allows juveniles to grow to harvestable size and reduces damage to the fragile marsh from fishing activities.
- Various areas of state waters may be closed for short periods when DCNR personnel observe that migratory shrimp are below harvestable size. When sampling in these areas indicates that shrimp have grown large enough, the areas are reopened for shrimping.

These measures are taken to ensure that shrimp are of legal size and that enough adults escape to spawn offshore and provide the following year's harvest.

The measures of application to the commercial shrimp fishery in state waters are annotated in § 220-3-.01 of the *Administrative Code*, namely

- The taking, catching or attempting to take or catch shrimp by trawl, seine, cast net or by any means whatsoever, or the taking, catching or attempting to take or catch any other seafoods by use of a trawl, for any purpose is prohibited in defined Nursery Areas.
- The use of any trawl or trawls, or the taking of shrimp by any means, in any area closed to commercial shrimping is hereby expressly prohibited, except as otherwise provided by law.
- Commercial shrimp trawls - It shall be illegal for any person, firm or corporation to take or attempt to take shrimp or other seafoods in or from the inside waters of the State of Alabama by trawl or trawls used together the total width of which exceeds fifty (50) ft as measured in a straight distance along the cork line, which is the main top line containing corks. The use of more than two trawls is prohibited in the inside waters; provided however, that one "try trawl" not to exceed ten (10) ft as measured across the cork line may be used for sampling in addition to the above. In addition, wings shall be cut and tied to the wing line only on points and it shall be illegal to use a trawl or trawls on which the length of the top leg line exceeds the length of the bottom leg line, the length of the leg line being defined as the distance from the rear of the trawl door to the beginning of the wing.
- Commercial shrimp trawls - It shall be unlawful to hang, tie or otherwise connect any webbing or netting between the rear of the trawl board or door and the adjacent wing line or between the top leg line and bottom leg line of any trawl so as to extend the width of any trawl or trawls.
- Pursuant to Section 9-12-46 of the *Alabama Code*, all inside waters of the State of Alabama, as defined by rule 220-3-.04, shall be closed to all commercial (and recreational) shrimping at 6:00 a.m. on May 1 of each year and all inside waters not permanently closed shall be opened to commercial (and recreational) shrimping at 6:00 a.m. on June 1 of each year (Figure 5).
- It shall be unlawful to take, catch, molest or have in possession marine (saltwater) turtles whether on land or in any of the waters of Alabama, or to take or disturb or have in possession the eggs of such turtles. The term marine (saltwater) turtles shall include, but is not limited to, the following species: Atlantic Loggerhead, Atlantic Green Turtle, Atlantic Ridley, Atlantic Hawksbill and the Atlantic Leatherback.
- It shall be unlawful to take or attempt to take, catch, or attempt to catch, possess, molest, injure, kill, feed, harass, or do any other activity, including any act of pursuit, torment, or interaction, that causes disruption of behavioral patterns or otherwise interferes with the normal activity or well-being of, any marine turtles, mammalian dolphins (porpoises), and manatees, except as may be authorized by a valid permit.

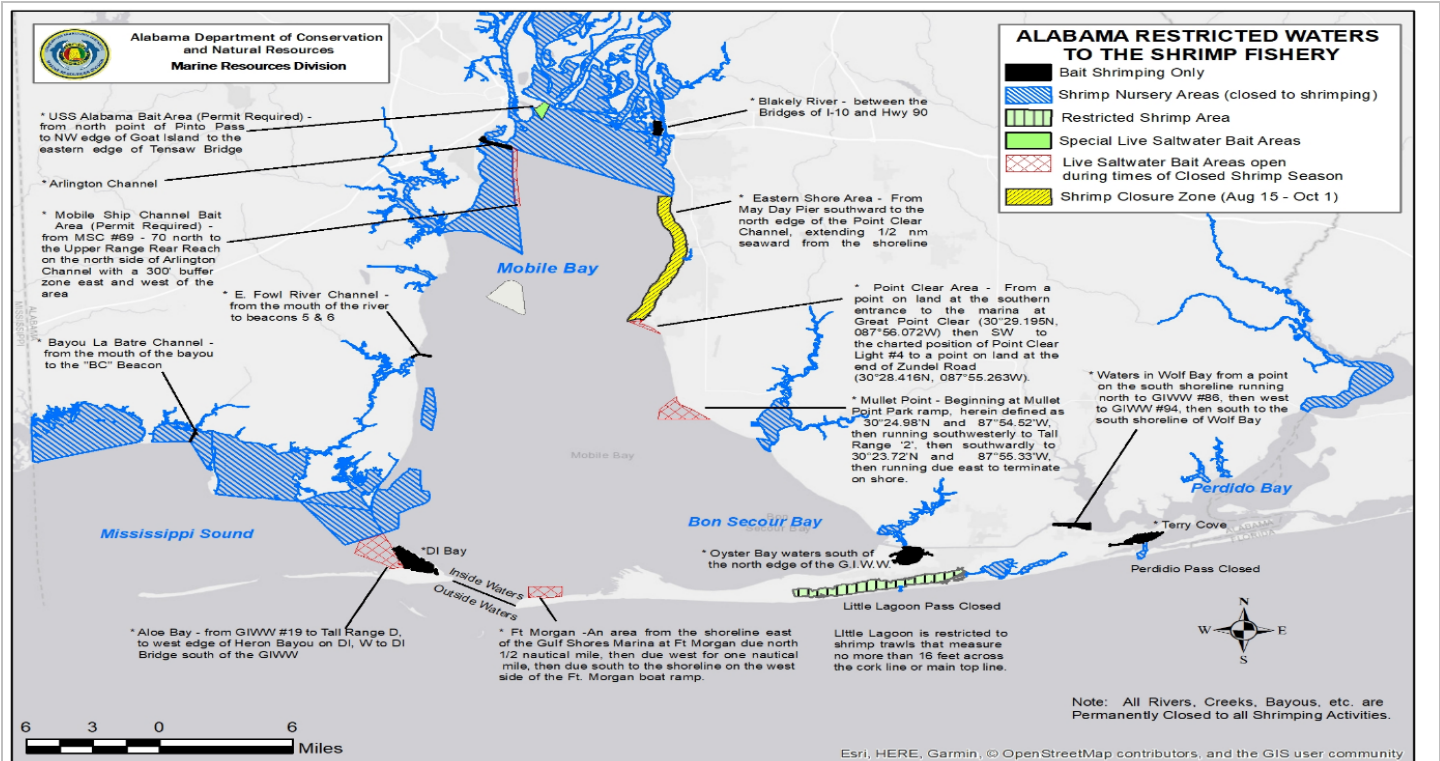


Figure 27. Alabama state restricted waters to shrimping (Source: <https://www.outdooralabama.com/saltwater-regulations-and-enforcement/commercial-shrimping-regulations>).

D. Florida

The state’s policy and standards in respect of the management of marine fisheries is enshrined in Chapter 379 of the *Florida Statutes (ss.379.2401)*.⁷⁷ It reads:

1. The Legislature hereby declares the policy of the state to be management and preservation of its renewable marine fishery resources, based upon the best available information, emphasizing protection and enhancement of the marine and estuarine environment in such a manner as to provide for optimum sustained benefits and use to all the people of this state for present and future generations.
2. The commission is instructed to make recommendations annually to the Governor and the Legislature regarding marine fisheries research priorities and funding. All administrative and enforcement responsibilities which are unaffected by the specific provisions of this act are the responsibility of the commission.
3. All rules relating to saltwater fisheries adopted by the commission shall be consistent with the following standards:
 - The paramount concern of conservation and management measures shall be the continuing health and abundance of the marine fisheries resources of this state.
 - Conservation and management measures shall be based upon the best information available, including biological, sociological, economic, and other information deemed relevant by the commission.
 - Conservation and management measures shall permit reasonable means and quantities of annual harvest, consistent with maximum practicable sustainable stock abundance on a continuing basis.
 - When possible and practicable, stocks of fish shall be managed as a biological unit.
 - Conservation and management measures shall assure proper quality control of marine resources that enter commerce.
 - State marine fishery management plans shall be developed to implement management of important marine fishery resources.
 - Conservation and management decisions shall be fair and equitable to all the people of this state and carried out in such a manner that no individual, corporation, or entity acquires an excessive share of such privileges.
 - Federal fishery management plans and fishery management plans of other states or interstate commissions should be considered when developing state marine fishery management plans. Inconsistencies should be avoided unless it is determined that it is in the best interest of the fisheries or residents of this state to be inconsistent.

- 1.1. **There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.**

Florida FWC Multi-year Project - Shrimp Regulations

Beginning in 2018, the FWC has been revising regulations in an effort to update and clarify the shrimp rule. At its December 2021 meeting, the Commission approved proposed rule changes to modify shrimp regulations as the final phase of this effort. The rule changes relate to increasing recreational access, allowing commercial shrimpers to produce the highest quality frozen shrimp (e.g., allowing the possession and use of high-salinity freezer tanks), and clarifying or updating regulations (e.g., adding a definition of “inland waters”, and clarifying the boundary for the closed area in Santa Rosa Sound.

Shrimp Commercial Regulatory Requirements

The State’s commercial licensing regulations are detailed in Rule Chapter 68B-31 of the *Florida Administrative Code*. A summary of the licensing regulations for food shrimp producers and live bait shrimp producers are included here; some have application state-wide while others are unique to the western regions bordering the Gulf of Mexico. The author has taken some editing liberties in organizing the various regulatory provisions to facilitate readability.

General Provisions - Northwest and Southwest Regions

Size Limit

- Each person harvesting shrimp in or on state waters as a food shrimp producer shall possess shrimp that are of legal size. Shrimp shall be considered of legal size if all the shrimp in possession of the harvester (except seabob) are determined to have an average count not exceeding 47 shrimp per pound with the heads on or 70 shrimp per pound with the heads off.
- This provision does not apply in certain waters, including the waters of the Northwest Region east of the line formed by 85°13.50' West Longitude.

Closed Areas and Times⁷⁸

There are 3 seasonal shrimp trawl fishery closures in effect in west Florida as specified in the *Florida Administrative Code*. They include:

- Southwest Florida Seasonal Trawl Closure (including for live bait): from 1st January to 1 hour after official sunset on 20th May.
- Tortugas Shrimp Sanctuary Closure: closed to trawling except for designated sub-areas and dates.
- Stone Crab - Shrimp Closures: 5 sub-zones with specific closed times to separate shrimp trawling and stone crab trapping.

Handling and Transporting at Sea

- No person harvesting shrimp in or on state waters as a food shrimp producer shall use a brine box to separate shrimp from other species or possess a brine box aboard the vessel used for such harvest.
- Shrimp harvested for sale alive as food pursuant to this rule shall be constantly maintained in wet live storage condition to minimize mortality. All such shrimp harvested by a food shrimp producer shall be expeditiously transported from the harvesting vessel to onshore facilities on the premises of a licensed wholesale or retail saltwater products dealer with equipment functioning to maintain the quality of shrimp delivered in a live, healthy condition. Shrimp so delivered shall be placed in a tank of clean, continuously aerated saline water at that facility and shall be maintained alive throughout all handling and storage processes.
- No person harvesting shrimp in or on the waters of the state shall operate as a food shrimp producer and as a live bait shrimp producer or recreational harvester on the same trip.

Special Gear Devices

- No person shall operate or fish in any waters of the state any trawl that does not have a qualified **turtle excluder device** (TED) installed therein. No person shall possess, aboard any vessel in or on state waters, any trawl rigged for fishing that does not have a qualified turtle excluder device (TED) installed therein.

⁷⁷http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=Ch0379/SEC2401.HTM&Title=-%3E2008-%3ECh0379-%3ESection%202401#0379.2401

⁷⁸<https://gulfcouncil.org/fishing-regulations/shrimp/>

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- Where required on a regional basis by rule of this chapter, no person shall operate or fish any trawl, or possess any trawl that is rigged for fishing aboard any vessel, which trawl does not have a **bycatch reduction device (BRD)** installed therein meeting the requirements of this rule. No person shall rig or alter the BRD installed in any trawl in any manner so as to render the BRD nonfunctioning or ineffective in excluding species other than shrimp from the trawl.

A **Food shrimp producer** means a person who is not a live bait shrimp producer, but is harvesting shrimp with a gear authorized for the Northwest or Southwest Regions in accordance with the applicable Rules of the Code. Each such person shall also comply with the regional food shrimp production requirements of Rules 68B-31.010 through 68B-31.015, F.A.C., and the area or seasonal closures in the remainder of the chapter.

Gear Specifications - Northwest Region

- No person shall harvest shrimp in the nearshore and inshore Florida waters as a food shrimp producer with any type of gear other than:
 - (a) A roller frame trawl meeting the following specifications:
 - (i) Neither the upper nor lower horizontal beam on a roller frame trawl so used is greater than 16 ft in length.
 - (ii) The vertical bars shielding the trawl opening are spaced no further than 3 inches apart.
 - (iii) No more than two such trawls, unconnected, shall be towed by a single vessel at any time.
 - (iv) The netting of the trawl shall be no larger in mesh area than specified by subsection 68B-31.0035(2), F.A.C.
 - (b) No more than two unconnected otter trawls, each with a perimeter around the leading edge of the net not greater than 66 ft and a net no larger in mesh area than specified by subsection 68B-31.0035(2), F.A.C. The two otter trawls allowed in the nearshore and inshore Florida waters of this region shall include any try net being towed.
 - (c) No more than two unconnected skimmer trawls meeting the following specifications:
 - (i) The perimeter around the leading edge of any skimmer trawl shall not exceed 56 ft.
 - (ii) No more than two skimmer trawls, unconnected other than being attached to the same vessel, shall be deployed from a single vessel at any time.
 - (iii) The netting of a skimmer trawl shall be no larger in mesh area than specified by subsection 68B-31.0035(2), F.A.C.
- No trawl shall be used for food shrimp production in the inshore waters that has a mesh size less than 3/4 inch bar measurement in the body of the net and 5/8 inch bar measurement in the cod end. In any trawl with a rigid TED, the section of netting surrounding the device shall have a mesh size no smaller than 1/2 inch bar measurement and shall be no more than 50 meshes in total length.
- No otter or skimmer trawl shall be used for food shrimp production that is not in compliance with Rule 68B-31.004, F.A.C.
- No person harvesting shrimp as a food shrimp producer shall operate or fish any otter or skimmer trawl, or possess any otter or skimmer trawl that is rigged for fishing aboard any vessel, which trawl does not have a BRD installed therein meeting the requirements of Rule 68B-31.0045, F.A.C.

Gear Specifications - Southwest Region

- No person shall harvest shrimp in the region as a food shrimp producer with any type of gear other than a roller frame trawl meeting the following specifications:
 - (i) Neither the upper nor lower horizontal beam on a roller frame trawl so used is greater than 16 ft in length.
 - (ii) The vertical bars shielding the trawl opening are spaced no further than 3 inches apart.
 - (iii) No more than two such trawls, unconnected, shall be towed by a single vessel at any time.
 - (iv) The netting of the trawl shall be no larger in mesh area than specified by subsection 68B-31.0035(2), F.A.C.
- An otter trawl meeting any one of the following specifications:
 - (i) Except in Tampa Bay, in all waters of the region landward of the territorial sea base line, a single otter trawl with a perimeter around the leading edge of the net not greater than 66 ft and a mesh area no larger than specified by subsection 68B-31.0035(2), F.A.C.
 - (ii) In all waters of the region between the territorial sea base line and a line three miles seaward of and parallel to said line, no more than two unconnected otter trawls, each with a perimeter around the leading edge of the net not greater

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

than 66 ft and a mesh area no larger than specified by subsection 68B-31.0035(2), F.A.C. The two otter trawls allowed in these waters shall include any try net being towed.

(iii) In Tampa Bay, no more than two unconnected otter trawls, each with a perimeter around the leading edge of the net not greater than 66 ft and a mesh area no larger than specified by subsection 68B-31.0035(2), F.A.C. The two otter trawls allowed in Tampa Bay shall include any try net being towed.

- No trawl shall be used for food shrimp production in the inshore waters of the Southwest Region that has a mesh size less than 7/8-inch bar measurement in the body of the net and 3/4 inch bar measurement in the cod end. In any trawl with a rigid TED, the section of netting surrounding the device shall have a mesh size no smaller than 5/8 inch bar measurement and shall be no more than 50 meshes in total length.
- No person harvesting shrimp as a food shrimp producer shall operate or fish any otter trawl, or possess any otter trawl that is rigged for fishing aboard any vessel, which trawl does not have a BRD installed therein meeting the requirements of Rule 68B-31.0045, F.A.C.
- A person harvesting shrimp in or on nearshore and inshore Florida waters where the use of otter trawls is allowed may use a single try net with a headrope length not greater than 10 ft and a perimeter around the leading edge of the net not greater than 30 ft if such try net is pulled immediately in front of another trawl or is not connected to another trawl in any way. Such try net shall have a mesh size no smaller than that allowed in this chapter for trawls in the region where used.
- A person harvesting shrimp in or on the waters of the state other than nearshore and inshore Florida waters where the use of otter trawls is allowed may use a single try net with a headrope length not greater than 20 ft and a perimeter around the leading edge of the net greater than 60 ft if such try net is pulled immediately in front of another trawl or trawls or is not connected to another trawl in any way. Such try net shall have a mesh size no smaller than that allowed in this chapter for trawls in the region where used.

A **Live bait shrimp producer** means any person harvesting shrimp for the purpose of delivering and selling that shrimp alive for use as bait pursuant to a valid saltwater products license with a restricted species endorsement.

Gear Specifications - Statewide

- Except for the Northeast Region, no person shall harvest shrimp as a live bait shrimp producer with any type of gear other than a roller frame trawl meeting the following specifications:
 - (a) neither the upper nor lower horizontal beam on a roller frame trawl so used is greater than 16 ft in length,
 - (b) the vertical bars shielding the trawl opening are spaced no more than 3 inches apart,
 - (c) no more than two such trawls, unconnected, shall be towed by a single vessel at any time, and
 - (d) the netting of the trawl shall be no larger in mesh area than specified by subsection 68B-31.0035(2), F.A.C.
- In the Northeast Region, except as provided for Volusia County in paragraph 68B-3.008(3)(f), F.A.C., no person shall harvest shrimp as a live bait shrimp producer with any type of gear other than those specified herein:
 - (a) A roller frame trawl meeting the specifications prescribed in paragraph (a), of this subsection.
 - (b) An otter trawl meeting the specifications of Rule 68B-31.003, F.A.C.
- No trawl shall be used for live bait shrimp production that has a mesh size less than 5/8 inch bar measurement in the body of the net and less than 1/2 inch bar measurement in the cod end.
- No person shall operate or fish in nearshore and inshore Florida waters any trawl with a net or bag containing more than 500 square ft of mesh area.
- A person harvesting shrimp in or on nearshore and inshore Florida waters where the use of otter trawls is allowed may use a single try net with a headrope length not greater than 10 ft and a perimeter around the leading edge of the net not greater than 30 ft if such try net is pulled immediately in front of another trawl or is not connected to another trawl in any way. Such try net shall have a mesh size no smaller than that allowed in this chapter for trawls in the region where used. The try net shall be no larger in mesh area than specified by subsection 68B-31.0035(2), F.A.C., and shall be considered as one of the two unconnected trawls allowed in those regions where two trawls are allowed for food shrimp production.

1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

Other Provisions

- Each person harvesting shrimp in or on the waters of the state as a live bait shrimp producer shall land such shrimp from the harvesting vessel. The transfer of such shrimp to another vessel while in or on the waters of the state is prohibited.
- Each person harvesting shrimp in or on the waters of the state as a live bait shrimp producer shall possess a valid saltwater products license with a restricted species endorsement.

Current status:

The output of the management organization(s) is in line with fishery resource management needs. Examples may include rule making, scientific research, stock and ecosystem assessments, implementation of rules and regulations, and enforcement activities.



EVIDENCE:

As described above, the federal management system for the fishery under the primary direction of NOAA and the GMFMC is well established and informed by (national) conservation principles, regulatory rules, licensing policies, and enforcement activities. These inputs are in line with the resource management needs of the fishery in federal waters. The fishery management systems of all five Gulf states with respect to their commercial shrimp fishery in state-managed waters are similarly supported by a suite of measures that include regulatory provisions, access (licensing) requirements, agency responsibilities and authorities, and reporting obligations.

Appropriateness/Effectiveness:

The management framework is appropriate for managing the resource. For example, the larger the exploitation, vulnerability, or risks of a fish stock, the more work and precision (assessment of the resource ensuring the risks related to overfishing and equivalent negative effects) shall be focused in managing the resource. This shall be done in compliance with legislative and regulatory requirements at the local, national, and international level, including the requirements of any regional fisheries management agreement. The management system shall not be subject to continual unresolved or repeated disputes or political instability.



EVIDENCE:

The regulatory requirements for the fishery at the federal and states levels are well documented and easily accessible to all sectors of the fishery, external stakeholders, and the public. According to fishery management and scientific staff at the GMFMC (with Gulf states inputs), the fishery is not experiencing overfishing nor is overfishing occurring. There is no evidence that the fishery management system is subject to continual unresolved or repeated disputes or political instability.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that an effective legal and administrative framework established at the local and national level is appropriate for fishery resource conservation and management. In addition, the management system and the fishery operate in compliance with the requirements of local, national, and international laws and regulations, including the requirements of any regional fisheries management agreement. Examples may include fishery management plans or other relevant information.



EVIDENCE:

The availability and quality of evidence is sufficient to substantiate an effective legal and administrative framework is appropriate for fishery resource conservation and management across the UoAs. Please see supported evidence in the references.

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1.1. There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

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Numerical score:	Starting score	-	(Number of EPs NOT met	x 3)	=	Overall score
	All agencies - 10			All agencies - 0				All agencies - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								All agencies - High

1.1.	There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.	
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	All agencies - Full Conformance	
Non-conformance Number (if applicable):	NA	

9.2.1.2 Supporting Clause 1.2.

1.2. Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.	
Relevance:	<p>Relevant.</p> <p>Note: This clause is relevant because it refers to the broad distribution of the stock in the U.S. and Mexican EEZs. Although there is some movement of adult shrimp in both directions across the U.S.- Mexico boundary, since the early 1980s each country has assessed and managed populations within their respective EEZs independently and the broad scope of this supporting clause is not applicable to the U.S. GOM shrimp fishery.</p>
Evaluation Parameters	
Current status/Appropriateness:	Met?
<p><i>If a stock is subject to two or more jurisdictions (nations, states, etc.) (either by distribution or migration), then exploitation by all jurisdictions shall be considered when defining exploitation levels and determining stock status to avoid overfishing/depletion of the resource. The scoring of this parameter shall consider that significant migration may take a species outside the jurisdiction of the managing agency (e.g., for significant feeding or ontogenetic migration).</i></p>	<input checked="" type="checkbox"/>
<p>EVIDENCE:</p> <p>Federal waters</p> <p>NOAA's Southeast Fisheries Science Center (SEFSC)⁷⁹ has conducted shrimp research for decades. All aspects of the life cycle, movements, growth, survival and ecology of the various life-history stages of all three shrimp species are well known. Studies conducted in the 1960s showed the importance of mangrove estuaries as nursery habitats for shrimp. In the late 90s, research was done to better understand the ecology of shrimp and how their growth and survival is influenced by salinity and temperature. In recent years, information has been gathered on the behaviour and migration of larvae and juvenile shrimp.</p> <p>NOAA also conducts Shrimp/Groundfish Surveys in the summer and fall annually. The objectives of the summer survey are to monitor size and distribution of penaeid shrimp during or prior to migration of brown shrimp from bays to the open Gulf; aid in evaluating the "Texas Closure" management measure of the GMFMC's Shrimp FMP; and provide information on shrimp and groundfish stocks across the Gulf of Mexico from inshore waters to 60 fathoms.</p> <p>The objectives of the fall survey are to sample the northern Gulf of Mexico to determine abundance and distribution of demersal organisms from inshore waters to 60 fathoms; obtain length-frequency measurements for major finfish and shrimp species to determine population size structures; and collect environmental data to investigate potential relationships between abundance and distribution of organisms and environmental parameters. The design of the fall survey is similar to the Summer Shrimp/Groundfish Survey. All organisms that are caught in the trawls are treated in the same manner as the Summer Shrimp/Groundfish Survey.</p> <p>Information on catch, effort and fishing location are obtained from trip tickets that are mandatory for all harvesters. Electronic logbooks and observer coverage are mandatory for selected shrimpers. There is also a requirement for all shrimpers to report annually on gear characterization and annual landings as part of permit renewal.</p> <p>Biological and environmental data from all Gulf surveys are included in the SEAMAP Information System. Raw data are edited by the collecting agency and verified by the SEAMAP Data Manager prior to entry into the system. A major function of the SEAMAP Information System is the processing of catch data from the summer survey as near-real-time data. Plots of station locations and catch rates of <i>Penaeus</i> shrimp and total catch are prepared and processed by GSMFC for weekly distribution to management agencies, fishermen, processors and researchers.</p> <p>Penaeid shrimp in the Gulf of Mexico are not required to have annual catch limits (ACLs) or accountability measures (AMs) because their annual lifecycles exempt them from the <i>Magnuson-Stevens Act</i> requirement for these management measures. Nevertheless, there are other catch and effort control measures in place such as: (i) commercial fishing permits (currently no new permits being issued), (ii) electronic logbook requirements (for selected shrimpers), (iii) mandatory trip reports after each fishing trip for all shrimpers, (iv) mandatory observer coverage (if selected), (v) area and time closures (e.g., all Federal waters off Texas are closed</p>	

⁷⁹ <https://www.sefsc.noaa.gov>

1.2. Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.

from mid-May to mid-July to protect spawning brown shrimp and area closures to protect juvenile red snapper), and (vi) mandatory turtle extruder devices (TEDs), bycatch reduction devices (BRDs) and gear mesh size restrictions. **These management measures act collectively to control fishing mortality to ensure the sustainability of the fishery in Federal waters.** Under federal management, there is no recognized recreational fishery. Recreational fishermen catch shrimp seasonally and almost always in state waters. State regulations vary from state to state.

In the past, stock synthesis-based models were used to estimate F and SSB as a basis for overfished and overfishing determinations for the Gulf's pink, brown and white shrimp stocks. The last such assessments were in 2017-2018 (Hart 2018a, b, and c)⁸⁰ and they concluded that the stocks were not overfished, and overfishing was not occurring. However, the SS models were recently determined to have issues such that past assessments are no longer supported by NOAA (i.e., there are no available stock status reference points at the moment). Empirical dynamic models (EDMs) have been developed and are currently (as of 1st April 2023) undergoing testing as a new candidate model for Gulf-wide penaeid shrimp stock assessments. A peer review of these models will commence in 2023 as part of the SEDAR 87 research track.⁸¹

Texas waters

The TPWD's Coastal Fisheries Division staff utilize a suite of fishery-independent and fishery-dependent assessment tools to scientifically characterize the status of the commercial shrimp resource in state waters. The assessment tools may be supplemented by special studies and research to help formulate management decisions.

Fishery-independent sampling is conducted annually using gill nets, bag seines, bay and Gulf trawls, and oyster dredges. This sampling seeks to assess the fish community as a whole while providing statistically precise data on species of major interest. Each gear type has greater efficiency for certain species, though all sampled specimens are identified and enumerated. Sample sites are randomly determined each year within each ecosystem to achieve the desired goal of a coastwide assessment. Sampling frequency has been evaluated to give an efficient mix of acceptable precision requirements and available manpower. Sampling strategy is designed to produce precise coastwide estimates of a few economically important species.

Fishery-dependent data are collected through the Department's Trip Ticket Program that requires all dealers of aquatic products to report statistical harvest data on a trip basis. This system is equivalent to the reporting systems used across all Gulf states.

Louisiana waters

LDWF biologists conduct monthly surveys to monitor the growth, distribution and abundance of shrimp. They tow 6-foot trawls to sample shallow marsh habitats, 16-foot trawls to sample the open waters of coastal lakes and bays, and 20-foot trawls in open Gulf waters. Sample locations and procedures are standardized with 10-minute tow times. They identify and count all species captured and measure up to 50 randomly selected individuals of each species. They sample hundreds of locations, then compile all of the data and plug it into mathematical models to generate an abundance index. Scientists also collect data on hydrological conditions (conductivity, salinity and water temperature) at each sample site. LDWF monitors hydrological conditions, along with shrimp growth, distribution, and abundance, and use these data to develop appropriate management recommendations.

Analyses of data collected within Louisiana inshore waters provide indices representing very localized concentrations in the context of the broad distribution of each shrimp species. These are used primarily to make decisions regarding season openings for specific

⁸⁰ Hart, R.A. 2018a. Stock Assessment Update for Pink Shrimp (*Farfantepenaeus duorarum*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

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https://gulfcouncil.org/wp-content/uploads/D-4b-Brown-Assess_Rpt_2018-CPT.pdf

⁸¹ <https://sedarweb.org/assessments/sedar-87-gulf-of-mexico-white-pink-and-brown-shrimp/>

1.2. Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.

local areas. The seasons themselves are set by the LWFC according to scientific information about environmental and water conditions and the growth rates, distribution, and abundance of shrimp. This helps ensure that shrimp are harvested at a marketable size.

Mississippi waters

The Marine Fisheries Program of the Department of Marine Resources (MDMR) includes conservation and overall management of living marine organisms through research and data collection of relevant social, economic and biological factors. This is accomplished through both fishery-dependent and fishery-independent data collection, and biological and socioeconomic research. MDMR partners with several organizations and institutions to carry out such research. Mississippi's Fishery-Independent Sampling Program, a collaborative effort between MDMR and the Gulf Coast Research Lab (GCRL), was established to promote the study and knowledge of science including the natural resources of the State and to provide for the dissemination of research findings from the Gulf Coast area.

Fishery-independent sampling began in 1974 utilizing trawls, seines, and beam plankton nets for monthly surveys. Sampling occurs at fixed locations and all organisms collected are brought to the lab for processing. Data on temperature, salinity, and dissolved oxygen are also recorded for each sample. The MDMR implemented a Trip Ticket Program for fishery-dependent data collection in 2015. The mandatory reporting program for catch data at the trip level are reported by dealers on a monthly basis, and is similar to those in the other Gulf states.

Alabama waters

Fishery-independent sampling is conducted through the Fisheries Assessment and Monitoring Program (FAMP) by the Department of Conservation and Natural Resources (DCNR). In 2010, FAMP protocols were revised to match the current SEAMAP (Southeast Area Monitoring and Assessment Program) data collection methods in recognition of the need for Gulf-wide standardized data collection methods. Survey methods include monthly surveys using trawls (16' otter trawl), seines, gill nets and beam plankton trawls (BPLs) and utilize these data to assess stock abundance, trends, and fisheries impacts. FAMP sampling efforts increase during shrimp seasons for the specific purpose of shrimp sampling in order to determine when shrimp reach legal size for harvest (68 count or fewer per pound). This research forms the basis of ADCNR's management decisions. The Marine Fisheries Section of the Marine Resources Division is responsible for data collection and conducts projects that provide necessary and sound biological data to support various management decisions under consideration by marine fisheries administrators. To accomplish this goal, the Marine Fisheries Section maintains ongoing biological sampling, data analysis and basic research programs.

The DCNR implemented a Trip Ticket Program for fishery-dependent data collection in 2000. The mandatory reporting program for catch data at the trip level are reported by dealers on a monthly basis, and is similar to those in the other Gulf states.

Alabama participates in the GMFMC and manages the shrimp fishery in state waters consistent with federal regulations. DCNR also coordinates with and participates in research conducted by regional organizations including the GMFMC's and the GSMFC's scientific monitoring and review processes and incorporates recommendations by these regional bodies into management decisions.

Florida waters

The FWCC conducts both fishery-dependent and fishery-independent data collection, which is reviewed annually to determine trends and status of stocks. Management recommendations are based on this scientific evidence and protocols are reviewed annually to ensure that best methods are being utilized.

To provide information on trends in populations, the Fish and Wildlife Research Institute (FWRI)⁸² conducts a Fisheries-Independent Monitoring (FIM) program to survey fishery resources in Florida estuaries. FIM conducts stratified-random sampling (SRS) to estimate **fish abundance and population trends** in seven estuarine regions around Florida. The SRS design distributes sampling effort among habitat types and directs greater sampling effort into habitats with higher variability in catches to reduce variability in the data. A variety of sampling gears are used by the FIM program to ensure that the wide range of species, sizes, and ages necessary for stock

⁸² <https://myfwc.com/about/inside-fwcc/fwri>

1.2. Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.

management are sampled during each monthly survey. With each gear deployment, FIM scientists record data that describe the physical features, such as water quality and habitat types, of the sampling site and the fish community collected. Recorded physical features include measurements of the type and quantity of submerged and shoreline habitats at each sampling site. Measured water quality parameters include temperature, pH, salinity, and dissolved oxygen. All species of fish, shrimp and crabs collected in each gear deployment are identified and counted and representative subsamples are measured. Analyses of the FIM program data are also used by resource managers to assess abundance trends for resource species, define essential fish habitat, and describe life-history parameters such as age, growth and age of maturity.

Florida also utilizes the Trip Ticket Program to collect fishery-dependent information. These state programs are coordinated through the GSMFC's FIN program to provide consistency across the Gulf. The program is a mandatory reporting program for catch data at the trip level reported by dealers on a monthly basis.

Effectiveness:
Managers shall have an understanding of stock structure and composition as these relate to stock resilience over its entire distribution area. The underlying objective is to preserve genetic diversity between and within species and avoid localized depletions (overall affecting the stock contributing to its resilience and stability). This assessment shall consider, when appropriate, demographic independence of populations or stocks (i.e., if a component stock of a species is demographically independent from another because it is genetically different, has significant difference in age structure, or if there is insignificant exchange among groups due to distance, environmental barriers, or other reasons).



EVIDENCE:
 The three shrimp species under consideration are short-lived (18-24 months but most seldom live longer than one year), grow fast, mature early, and are highly fecund (spawning 215,000 to 1 million eggs multiple times during the spawning season) and disperse offspring widely. These biological traits make them highly productive and inherently resilient to fishing pressure. These three shrimp species are essentially an "annual crop". Abundance is driven primarily by environmental conditions and as long as these are favourable, populations can rebound from low abundance one year to high abundance the next. Salinity, water temperature, and dissolved oxygen can influence function, distribution, growth, survival, and movement of shrimp. Moreover, the hydrological conditions in shrimp nursery areas, particularly in early spring, play a large role in dictating the next shrimping season's potential harvest. Optimal conditions for growth and survival can vary between species and life-history stages.

The species are not targeted separately. Rather, they are fished at the same time with relative proportions of each varying widely spatially and temporally. Management of the three stocks to ensure long-term sustainability, as well as the MSY concept generally, must be viewed in the context of ongoing ecosystem shifts that control recruitment. MSY cannot be considered in the conventional, long-term, steady state (equilibrium) sense but rather as a series of short-term equilibria that continue to change as these populations respond to environmental conditions prevailing at any given time. The shrimp resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species.

Effectiveness:
The stock may spend a portion of its life (migration for feeding, growth, or reproduction) in both fresh and saltwater, in international waters, or in another jurisdiction, and may suffer mortality or other pressures. These must be accounted for when assessing stock status.



EVIDENCE:
 The NOAA-SEFSC directed stock assessment process for the three shrimp species (to which all Gulf states regularly contribute fishery-dependent and fishery-independent data) includes all areas of the US EEZ within the GOM (i.e., their full distribution and range within and between federal and state waters). The commercial fishery's catch is targeted and harvested solely by US-based harvesters and includes best estimates of each state's recreational catch.

There is no basis to require that the assessment consider, when appropriate, demographic independence of populations or stocks (i.e., if a component stock of a species is demographically independent from another because it is genetically different, has significant

1.2. Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.

difference in age structure, or if there is insignificant exchange among groups due to distance, environmental barriers, or other reasons). It bears repeating that the three shrimp species under consideration are short-lived with biological traits that make them highly productive and inherently resilient to fishing pressure. They essentially produce “annual crops”. Abundance is driven primarily by environmental conditions and as long as these are favourable, populations can rebound from low abundance one year to high abundance the next. Salinity, water temperature, and dissolved oxygen can influence function, distribution, growth, survival, and movement of shrimp. In fact, the hydrological conditions in shrimp nursery areas, particularly in early spring, play a large role in dictating the next shrimping season’s potential harvest. Optimal conditions for growth and survival can vary between species and life-history stages.

The shrimp resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species. The primary focus of management of these resources is to avoid catching small shrimp to the extent possible.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that management measures consider (1) the stock status over its entire area of distribution, (2) the area through which the stock migrates during its life cycle, and (3) other biological characteristics of the stock. Examples may include the presence of genetic studies, age structure data, stock assessments or other relevant information.



EVIDENCE:
 The availability and adequacy of the evidence is sufficient to substantiate that management measures consider (1) the stock status over its entire area of distribution, (2) the area through which the stock migrates during its life cycle, and (3) other biological characteristics of the stock. Please see supported evidence in the references

References: 1. References cited in SC 1.1 and comments provided by the client group and management agencies during the July 2023 site visits.

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x 3	)	=	Overall score
	All agencies - 10			All agencies - 0				All agencies - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								All agencies - Full Conformance
Non-conformance Number (if applicable):								NA

9.2.1.3 Supporting Clause 1.2.1.

1.2.1. Previously agreed management measures established and applied in the same region is region shall be taken into account by management.	
Relevance:	Relevant.
Evaluation Parameters	Met?
<p>Process: <i>There is a process or system that allows the continuity and updating of previously agreed and implemented management measures. Examples may include a specific review process or management plan where these measures can be clearly identified and continued implementation and updating can be carried out.</i></p>	<input checked="" type="checkbox"/>
<p>EVIDENCE: Federal and state management measures for the GOM’s commercial shrimp fisheries are updated as necessary based on (i) statutory requirements, and/or (ii) new information, and/or (iii) recommendations from various entities, and/or (iv) decisions by legislative bodies. The management systems for the commercial shrimp fisheries managed by the Gulf-based agencies identified in this assessment are defined by various sources, including (i) statutes, (ii) formal management plans, (iii) policies and standards, (iv) fishery-specific objectives, and/or (v) mandatory monitoring and review obligations.</p> <p>The agencies have a longstanding track record of effective inter-state and federal-state collaboration when reviewing management measures and associated public reporting. This collaboration is underwritten by the Gulf States Marine Fisheries Compact which requires that compacting states “<i>promote the better utilization of the fisheries, marine, shell and anadromous, of the seaboard of the Gulf of Mexico, by the development of a joint program for the promotion and protection of such fisheries and the prevention of the physical waste of the fisheries from any cause.</i>”⁸³</p> <p>Moreover, the federal <i>Interjurisdictional Fisheries Act</i>⁸⁴ acts to: (i) promote and encourage State activities in support of the management of interjurisdictional fishery resources, (ii) promote and encourage management of interjurisdictional fishery resources throughout their range, and (iii) promote and encourage research in preparation for the implementation of the use of ecosystems and interspecies approaches to the conservation and management of interjurisdictional fishery resources throughout their range.”</p> <p>The review process is operationalized through the various committees and subcommittees of both the GSMFC and the GMFMC on which participate representatives from all Gulf management agencies. These committees monitor and review all aspects of the interjurisdictional management measures associated with the Gulf shrimp resource and make determinations in relation to (i) stock status and performance, (ii) fish habitat conservation, (iii) ecosystem management, (iv) endangered species listings, (v) enforcement priorities and outcomes, and (vi) regulatory measures and subsequent amendments via formal agency-specific mechanisms.</p> <p>The review and updating processes are informed by statutorily-mandated public consultation requirements such as by the various <i>Administrative Procedures Acts</i>, <i>Open Meetings Acts</i>, and state-specific <i>Administrative Codes</i>. These processes are similarly extended to policy changes that guide the fishery management systems of the Gulf agencies.</p>	
<p>Current status/Appropriateness/Effectiveness: <i>Previously agreed management measures established and applied in the same region are included and part of current management decisions. Examples may include international or other agreements not honored by the management system or a management agency. The management system is effectively continuing implementation of agreed management measures.</i></p>	<input checked="" type="checkbox"/>
<p>EVIDENCE: All Gulf management agencies operationalize their fishery management systems through amendments to measures, regulations, policies, and administrative provisions. Some of these are Gulf-wide across all UoAs (e.g., data collection and reporting, stock assessment, mandatory TEDs) while others are state specific (e.g., Texas closure, Alabama seasonal openings, harvester, and dealer licensing).</p>	

⁸³ <https://www.gsmfc.org/compact>

⁸⁴ <https://www.govinfo.gov/content/pkg/COMPS-1676/pdf/COMPS-1676.pdf>

1.2.1. Previously agreed management measures established and applied in the same region is region shall be taken into account by management.

The participation of federal and state agency representatives across the many committees and subcommittees of the GMFMC and the GSMFC (including working groups and advisory panels) has been successful in designing, harmonizing, and operationalizing effective management measures for all three shrimp stocks throughout their full range of distribution. The core measures include (i) spatial and temporal closures, (ii) designated nursery areas, (iii) bycatch reduction devices, (iv) protection of ESA-designated species such as turtles, (v) mandatory catch reporting, (vi) licensing provisions, and (vii) enforcement and compliance standards.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that previously agreed management measures established and applied in the same region are taken into account by management.

EVIDENCE:
 The availability and adequacy of the evidence is sufficient to substantiate that previously agreed management measures established and applied in the same region are taken into account by management. Please see supported evidence in the references

- References:**
1. GSMFC Compact: <https://www.gsmfc.org/compact>
 2. Interjurisdictional Fisheries Act (1986): <https://www.govinfo.gov/content/pkg/COMPS-1676/pdf/COMPS-1676.pdf>
 3. Documentation provided by the client representatives.
 4. Site visit interactions with agencies and stakeholders.

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
	All agencies - 10			All agencies - 0					All agencies - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									All agencies - Full Conformance
Non-conformance Number (if applicable):									NA

9.2.1.4 Supporting Clause 1.3.

1.3. Where transboundary, shared, straddling, highly migratory, or high seas stocks are exploited by two or more States (neighboring or not), the applicant and appropriate management organizations concerned shall cooperate and take part in the formal fishery commission or arrangements appointed to ensure effective conservation and management of the stock(s) in question and their environment.	
Relevance:	<p>Not relevant.</p> <p>Note: Not applicable if the stock is not transboundary, shared, straddling, highly migratory or high seas in nature. Although there is some movement of adult shrimp in both directions across the U.S.- Mexico boundary, since the early 1980s each country has assessed and managed populations within their respective EEZs independently and the broad scope of this supporting clause is not applicable to the U.S. GOM shrimp fishery.</p>
Evaluation Parameters	
Process: <i>There is a mechanism in place by which the applicant organization(s) cooperates for the management of the transboundary, shared, straddling, highly migratory or high seas stock. This mechanism has the sustainable total exploitation of the stock as its main objective.</i>	<input type="checkbox"/>
EVIDENCE:	
Current Status/Appropriateness/Effectiveness: <i>There is evidence that the mechanism described in the process parameter is effective at ensuring the stock is sustainably exploited. This can take the form of evidence that the stock is not overfished or subject to overfishing across the entirety of the range of the stock.</i>	<input type="checkbox"/>
EVIDENCE:	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that where transboundary, shared, straddling, highly migratory, or high seas fish stocks are exploited by two or more States, the applicant and appropriate management organizations concerned cooperate and take part in formal fishery discussions or arrangements that have been appointed to ensure effective conservation and management of the stock(s) and fisheries in question. Examples may include evidence of formal agreements, records of meetings, and decisions.</i>	<input type="checkbox"/>
EVIDENCE:	
References:	<ol style="list-style-type: none"> Nance, J.M. 1993. Gulf of Mexico Shrimp Fishery Recruitment Overfishing Definition; Workshop 2. NOAA Technical Memorandum, NMFS-SEFSC-323, 12 p. Trifonova, N., Karnauskas, M. and Kelble, C. 2019. Predicting ecosystem components in the Gulf of Mexico and their responses to climate variability with a dynamic Bayesian network model. PLoS ONE 14(1): e0209257. https://doi.org/10.1371/journal.pone.0209257 Tsai, C-H., Munch, S.B., Masi, M.D., and Pollack, A.G. 2023. Predicting nonlinear dynamics of short-lived penaeid shrimp species in the Gulf of Mexico. Can. J. Fish. Aquat. Sci. 80: 57–68: dx.doi.org/10.1139/cjfas-2022-0029 SEDAR. 2023. SEDAR 87 Gulf of Mexico White, Pink, and Brown Shrimp. SouthEast Data, Assessment, and Review: https://sedarweb.org/assessments/sedar-87-gulf-of-mexico-white-pink-and-brown-shrimp/
Numerical score:	$\text{Starting score} - \left(\text{Number of EPs NOT met} \times 3 \right) = \text{Overall score}$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance

1.3. Where transboundary, shared, straddling, highly migratory, or high seas stocks are exploited by two or more States (neighboring or not), the applicant and appropriate management organizations concerned shall cooperate and take part in the formal fishery commission or arrangements appointed to ensure effective conservation and management of the stock(s) in question and their environment.

Non-conformance Number (if applicable):

9.2.1.5 Supporting Clause 1.3.1.

1.3.1. Conservation and management measures established for the stock under consideration within the jurisdiction of the relevant States for transboundary, shared, straddling, highly migratory, or high seas stocks, shall be compatible in a manner consistent with the rights, competence, and interests of the States concerned.	
Relevance:	Not relevant.
	Note: This clause is not relevant per clause 1.3.
Evaluation Parameters	Met?
Process: <i>Identification of common objectives for maintenance of stock biomass.</i>	<input type="checkbox"/>
EVIDENCE:	
Current status/Appropriateness/Effectiveness: <i>Implementation of measures to achieve the common objectives mentioned above (i.e., similar harvest rates based on stock status, common rebuilding objectives for depleted stocks).</i>	<input checked="" type="checkbox"/>
EVIDENCE:	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that conservation and management measures established for the stock within the jurisdiction of the relevant States for shared, straddling, high seas, or highly migratory stocks, are compatible in a manner consistent with the rights, competences, and interests of the States concerned. Examples may include evidence of formal agreements, records of meetings and decisions, stock assessment, and other reports.</i>	<input checked="" type="checkbox"/>
EVIDENCE:	
References:	
Numerical score:	$\text{Starting score} - \left(\text{Number of EPs NOT met} \times 3 \right) = \text{Overall score}$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):	

9.2.1.6 Supporting Clause 1.4.

1.4. A State's fishery management organization not member or participant of a sub-regional or regional fisheries management organization shall cooperate, in accordance with relevant international agreements and law, in the conservation and management of the relevant fisheries resources by giving effect to any relevant measures adopted by such organization or arrangement.	
Relevance:	<p>Not relevant.</p> <p>Note: This clause is not relevant because the fishery under assessment is not subject to an international agreement or law.</p>
Evaluation Parameters	Met?
Process: <i>There is ongoing cooperation in stock assessment, data sharing, and other activities.</i>	<input type="checkbox"/>
EVIDENCE:	
Current status/Appropriateness/Effectiveness: <i>Relevant measures are implemented by non-member States.</i>	<input type="checkbox"/>
EVIDENCE:	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State non-member or participant of a sub-regional or regional fisheries management organization cooperates, in accordance with relevant international agreements and law, in the conservation and management of the relevant fisheries resources by giving effect to any relevant measures adopted by such organization or arrangement. Examples may include reports detailing results of common surveys or acceptable harvest rates.</i>	<input type="checkbox"/>
EVIDENCE:	
References:	
Numerical score:	$\text{Starting score} - \left(\text{Number of EPs NOT met} \times 3 \right) = \text{Overall score}$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):	

9.2.1.7 Supporting Clause 1.4.1

1.4.1. A fishery management organization seeking to take any action through a non-fishery organization which may affect the conservation and management measures taken by a competent sub-regional or regional fisheries management organization or arrangement shall consult with the latter, in advance to the extent practicable, and take its views into account.																			
Relevance:	<p>Not relevant.</p> <p>Note: This clause is not relevant because a non-fishery organization is not applicable in respect of the fishery under assessment.</p>																		
Evaluation Parameters	Met?																		
Process: <i>There is a history of prior consultation.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Current status/Appropriateness/Effectiveness: <i>The views of the managing fishery organization are taken into account.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that a fishery management organization seeking to take any action through a non-fishery organization which may affect the conservation and management measures taken by a competent sub-regional or regional fisheries management organization or arrangement consults with the latter, in advance to the extent practicable, and take its views into account. Examples may include reports detailing action taken by the State(s) in question.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
References:																			
Numerical score:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs <u>NOT</u> met</td> <td style="text-align: center;">x</td> <td style="text-align: center;">3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score	10								
Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score											
10																			
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																		
Non-conformance Number (if applicable):																			

9.2.1.8 Supporting Clause 1.5.

1.5.	The applicant's fishery management system, when appropriate for the stock under consideration, shall actively foster cooperation between States with regard to (1) information gathering and exchange, (2) fisheries research, (3) fisheries management, and (4) fisheries development.	
Relevance:	Relevant.	
Evaluation Parameters		Met?
Process:	<input checked="" type="checkbox"/>	
<i>The extent to which a formal process or system is available.</i>		
EVIDENCE:		
<p>The five GOM States are legally empowered through either administrative codes, statutes or specific legal instruments to introduce and enforce resource management, resource policy, and enforcement measures for the GOM commercial shrimp fishery in waters over which they have jurisdiction. Measures enacted are the result of processes which incorporate scientific and technical study, legal oversight, stakeholder and public engagement, and legislative authorization. The purpose of state representation at the GMFMC level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible approaches and regulations in state and federal waters.</p> <p>The States do not exercise their authorities in a vacuum, independent of federal policies, interests, and laws. There are mechanisms in place which facilitate ongoing inter-state and federal-states discussions and cooperation in regard to the fishery and fishery-related activities i.e., catch data collection and analysis, stock assessment, resource management planning, regulatory measures, enforcement and compliance, and public consultation. Examples include: (i) the Fisheries Information Network (FIN), a state-federal cooperative program among agencies to collect, manage, and disseminate statistical data and information on the commercial and recreational fisheries of the Southeast Region (Gulf of Mexico and Caribbean), (ii) the Gulf Artificial Reef Monitoring and Assessment Program (GARMAP), a similar program where baseline data are collected under a formal protocol that provide managers with the necessary information to make scientifically-based decisions about management of artificial reef habitats and the fish populations they support, (iii) the SouthEast Data, Assessment and Review (SEDAR) Program is the cooperative process by which stock assessment projects are conducted in NOAA Fisheries' Southeast Region and involving the Gulf of Mexico and Caribbean Fishery Management Councils, the Atlantic States and Gulf States Marine Fisheries Commissions, and NOAA Fisheries HMS Division, (iv) the Southeast Area Monitoring and Assessment Program (SEAMAP), a federal-state-university program for the collection, management, and dissemination of fishery-independent data and information, and (v) the Interjurisdictional Fishery Program (IFP), a cooperative federal-state program that promotes and encourages state activities in support of the management of interjurisdictional fishery resources throughout their range, including ecosystems and species interactions.</p> <p>The NMFS' State-Federal Fisheries Division is responsible for building cooperative partnerships to strengthen marine fisheries management and conservation at the state, inter-regional, and national levels.</p> <p>NOAA's Gulf of Mexico Regional Collaboration Team supports activities and efforts that strengthen communication, coordination, and collaboration among NOAA and partners at regional and sub-regional levels. The team maintains a close working partnership with these and other entities in the region:</p> <ol style="list-style-type: none"> 1. Regional Ocean Partnership: Gulf of Mexico Alliance 2. Sea Grant College Programs: Florida, Mississippi-Alabama, Louisiana, Texas 3. Cooperative Institutes: Northern Gulf Institute, Cooperative Institute for Research to Operations in Hydrology, Cooperative Institute for Marine and Atmospheric Studies 4. Regional Coastal Ocean Observing System: Gulf of Mexico Coastal Ocean Observing System 5. Regional Climate Centers: Southern Regional Climate Center, Southeast Regional Climate Center 6. National Estuarine Research Reserves: Rookery Bay National Estuarine Research Reserve, Apalachicola National Estuarine Research Reserve, Weeks Bay National Estuarine Research Reserve, Grand Bay National Estuarine Research Reserve, Mission-Aransas National Estuarine Research Reserve 7. Regional Integrated Sciences and Assessments: Southern Climate Impacts Planning Program 		

1.5. The applicant's fishery management system, when appropriate for the stock under consideration, shall actively foster cooperation between States with regard to (1) information gathering and exchange, (2) fisheries research, (3) fisheries management, and (4) fisheries development.

8. Coastal Zone Management Programs: Florida Coastal Management Program, Alabama Coastal Area Management Program, Mississippi Coastal Resources Management Program, Louisiana Coastal Management Program, Texas Coastal Management Program

9. Regional Fishery Management Council: Gulf of Mexico Fishery Management Council.

Current Status/Appropriateness/Effectiveness:
Level of activity, application, and level of engagement.

EVIDENCE:
 All key federal and state management agencies engage in planning activities that produce, *inter alia*, multi-year strategic plans that reflect their forward priorities for fisheries research (fish stocks, habitat protection, ecological and climate change), development, and enforcement while also identifying new initiatives that will be pursued to strengthen their respective governance and operational frameworks.

The level of engagement is continuous throughout the year and across the organizations' various policy, technical, scientific, and economic bodies.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the applicant's fishery management system, when appropriate for the stock under consideration, fosters active international cooperation on fishery matters with regard to information gathering and exchange, fisheries research, fisheries management, and fisheries development. Example of evidence sources may include outputs from activity (e.g., reports, minutes, common or collective themes).

EVIDENCE:
 The evidence provided above including evidence for Supporting Clauses 1.1 and 1.2 is sufficient to substantiate that both the federal and states fishery management systems for the fishery foster active inter-jurisdictional and inter-agency cooperation on fishery matters with regard to information gathering and exchange, fisheries research, fisheries management, and fisheries development. Please see supported evidence in the references

References: 1. Refer to references cited in Supporting Clauses 1.1 and 1.2.

2. Documentation provided by the client representatives.

Numerical score:	Starting score - (Number of EPs NOT met x 3) = Overall score
	All agencies - 10 - (All agencies - 0 x 3) = All agencies - 10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	All agencies - High
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Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	All agencies - Full
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Non-conformance Number (if applicable):	NA
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9.2.1.9 Supporting Clause 1.6.

1.6. A fishery management organization and sub-regional or regional fisheries management organizations and arrangements, as appropriate, shall agree on the means by which the activities of such organizations and arrangements will be financed, bearing in mind, inter alia, the relative benefits derived from the fishery and the differing capacities of States to provide financial and other contributions. Where appropriate, and when possible, such organizations and arrangements shall aim to recover the costs of fisheries conservation, management, and research.

Relevance:	Relevant.
Evaluation Parameters	Met?
Process:	<input checked="" type="checkbox"/>

EVIDENCE:
 Federal and Gulf of Mexico states with mandates to manage the region’s fisheries have the financial means by which their management activities are operationalized according to information sourced by the Assessment team or that was provided to the team by client or agency representatives.

NOAA - GMFMC

In December 2022, the US signed the *Consolidated Appropriations Act, 2023* ([Pub. L. 117-328](#)) into law. This provided a total of \$6.35B for NOAA. This includes \$4.54B for NOAA Operations, Research and Facilities and \$1.76B in Procurement, Acquisition and Construction. Typically, NOAA submits its forward budget proposal to the Office of Management and Budget in early Fall where it is reviewed and debated by Congressional committees. In a normal process, the President’s federal budget proposal for the coming fiscal year is delivered to Congress in February – it is one step in the federal budget process. Special appropriations can be tabled during a fiscal year to finance extraordinary events like hurricanes, floods, and wildfires.

NOAA will benefit from the recently passed *Infrastructure Law*⁸⁵, reportedly in the amount of \$592M to advance complementary efforts in support of environmental stewardship and promote community economic development. Examples of project provisions include: (i) habitat restoration, (ii) marine debris – National Sea Grant College Program, (iii) coastal zone management, (iv) regional ocean partnerships, and (v) consultations and permitting.

The Council’s business activities are financed, in part, by appropriations from NOAA on behalf of the Department of Commerce. Financial planning and expenditure management are overseen by the Council’s Administrative/Budget Committee, a standing entity whose chair files briefs at regular Council meetings.

Texas

The TPWD’s Financial Overview document is produced on an annual basis by was the Financial Resources Division to provide information on agency responsibilities, sources of funding, budget and financial issues, and appropriation requests. The Fiscal Year 2023 combined budget for TPWD, which includes operating expenses, capital projects, grants and employee benefits, totals approximately \$442.0 million.⁸⁶

The State Parks Division accounts for the largest portion (34.5 %) of the budget. Of the total State Parks Division budget of \$152.5 million, approximately \$21.9 million is “passed through” in the form of grants to local governments and other entities. Funding for the Law Enforcement Division comprises the second largest portion of the budget at 18.9 %, or \$83.4 million.

TPWD generates significant revenues from the sale of Parks and Wildlife products and services, such as hunting and fishing licenses and state park entrance and facility use fees. These revenues help fund a sizable amount of TPWD’s budget, but are reportedly not sufficient to cover all funding needs. As a result, TPWD is funded from a combination of general revenue, general revenue-dedicated, federal, and other funds.

Louisiana

⁸⁵ <https://www.noaa.gov/infrastructure-law/infrastructure-law-fisheries-protected-resources>

⁸⁶ https://tpwd.texas.gov/publications/pwdpubs/media/pwd_rp_a0900_0679_12_22.pdf

1.6. A fishery management organization and sub-regional or regional fisheries management organizations and arrangements, as appropriate, shall agree on the means by which the activities of such organizations and arrangements will be financed, bearing in mind, inter alia, the relative benefits derived from the fishery and the differing capacities of States to provide financial and other contributions. Where appropriate, and when possible, such organizations and arrangements shall aim to recover the costs of fisheries conservation, management, and research.

The state's annual budgetary appropriations process is initiated and concluded by the Legislature. House Bill No. 1 (enrolled)⁸⁷ is a detailed document representing the annual appropriations for Fiscal Year 2023-2024 for the ordinary expenses of the executive branch of state government, pensions, public schools, public roads, public charities, and state institutions and providing with respect to the expenditure of said appropriations.

Schedule 16 of the Bill lists the financial appropriations of the LDWF by budget line. Nondiscretionary expenditures are funded by statutory dedications and the Conservation Fund. On the other hand, discretionary expenditures are funded by (i) interagency transfers, (ii) federal funding, (iii) fees and self-generated revenues, and (iv) statutory dedications consisting of approximately 10 different funds and special accounts for a total of approximately \$70M.

Mississippi

The state's fiscal framework is defined in a FY 2023 Budget Bulletin prepared by the Joint Legislative Budget Committee.⁸⁸ According to the bulletin, total current General Fund appropriations and reappropriations made by the 2022 Legislature for Fiscal Year 2023 amounted to \$6.3B (numbers rounded by Assessment team). The Legislature also appropriated or authorized \$20B from Special Fund sources and reappropriations including Federal Funds, Capital Expense Funds, Coronavirus State Fiscal Recovery and Lost Revenue Funds, Educational Enhancement Funds, Gulf Coast Restoration Funds, Health Care Expendable Funds and Tobacco Control Funds for operation of all agencies and functions during Fiscal Year 2023. The Fiscal Year 2023 General Fund budget is \$475M or 8.20% more than the Fiscal Year 2022 appropriated budget. In addition to the General Funds noted above, the Legislature appropriated \$2.2B from State Support Special Funds for Fiscal Year 2023.

The state's "Conservation" programs in the FY is reportedly funded at approximately \$52M (0.83% of the total budget) of which the DMR received approximately \$2.7M from the General Funds (an increase of 152% over FY 2022), \$7.5M of Federal Funds, and another \$111.3M from "Other" sources.

The DMR receives state funds to provide for the basic mission of the agency. The amount of funding is determined on an annual basis through legislative appropriations bills voted on by both houses and signed by the Governor. It also receives federal funding through competitive and non-competitive grants awarded by NOAA, USFWS, and the GSMFC to support various programs to assist in fulfilling the agency's mission.

Alabama

The Assessment team examined the state's budget process for fiscal year 2022.⁸⁹ The Executive Budget Office (EBO) of the Finance Department is responsible for preparing the initial information concerning the State's budget and its execution, revenue estimates, review of appropriation acts, and fiscal analysis. Budget requests are prepared by the administrative head of each budgeted agency and institution based on guidelines provided by the EBO and include estimated expenditures for the next fiscal year. Expenditure requirements must be classified by programs, program elements or reporting units, and major objects of expenditure in accordance with a standard plan of classification. Requested changes in programmatic expenditures from the prior fiscal year must be explained and proposed capital expenditures must be described and justified. Personnel information and a detailed statement showing actual agency revenue for the preceding year, budgeted revenue for the current year, and estimated revenue for the next fiscal year must also be submitted by each agency.

Executive budget hearings are conducted to allow agency heads the opportunity to discuss their budget requests and answer any questions the Governor and/or Finance Director may have. The state's Governor is required to submit a balanced budget (*§ 41-19-4, Code of Alabama 1975*) whereas proposed expenditures do not exceed recommended available revenue.

⁸⁷ <http://legis.la.gov/legis/ViewDocument.aspx?d=1007886>

⁸⁸ https://www.lbo.ms.gov/pdfs/fy23_bulletin.pdf

⁸⁹ <https://budget.alabama.gov/wp-content/uploads/2021/03/FINAL-State-of-Alabama-Budget-Document-FY22.pdf>

1.6. A fishery management organization and sub-regional or regional fisheries management organizations and arrangements, as appropriate, shall agree on the means by which the activities of such organizations and arrangements will be financed, bearing in mind, inter alia, the relative benefits derived from the fishery and the differing capacities of States to provide financial and other contributions. Where appropriate, and when possible, such organizations and arrangements shall aim to recover the costs of fisheries conservation, management, and research.

The Governor’s Executive Budget that is transmitted to the Legislature includes detailed standard classifications of expenses, such as personnel costs, operating expenses, grants and benefits, capital outlay, equipment purchases, and transportation costs. It is then referred to the House and Senate finance committees for review and alteration. During the review process, the Legislature will hold budget hearings in Joint Committee to hear from agencies regarding their funding needs in the new fiscal year. Once budget hearings are completed, each finance committee will review one of the two budgets: General Fund or Education Trust Fund, along with other accompanying appropriation bills. The Committees can make changes to the Governor’s budget and present it to the Legislature for approval. If the House and Senate cannot agree on the proposed budget, it is then referred to a Conference Committee made up of delegates from the House and Senate. This committee debates any differences, comes to a compromise, and presents the budget once again to the Legislature for approval. Ultimately, once passed by the Legislature, the budget becomes an act and appropriates spending authority to the agencies listed in the act to operate state government for the next fiscal year.

According to the DCNR’s Annual Report for FY 2021-22,⁹⁰ funding for the Department is generated through special revenues, which include federal money, cigarette taxes, user and license fees, mandated interest from endowments and federal regulations. The Forever Wild Land Trust received interest income from the Alabama Trust Fund. Specific revenue sources for the Department’s four operational divisions include:

- Marine Resources: Saltwater fishing licenses, fines, marine gas tax, and federal grants. Marine Resources also has an endowment, but it has not grown enough to enhance operations.
- State Lands: Management fees from the sale of timber, minerals and various leases on state lands administered under the Lands Asset Management Program. Further, the division receives additional federal grants that support specific programs.
- State Parks: User-generated funds in the form of entrance, rental, lodging, golf, and other recreational fees. State Parks received a modest amount of funding from cigarette tax revenue.
- Wildlife and Freshwater Fisheries: Fishing and hunting licenses and permits; fines; waterfowl stamps; federal allocations from excise taxes on sporting arms, ammunition, archery gear and some fishing tackle; and federal grants. Interest income continues to be generated by the Game and Fish endowment fund for resident lifetime hunting and fishing licenses. Direct donations and voluntary state income tax refund check-offs for the Nongame Wildlife Program continue to decrease from previous fiscal years.

Florida

The Assessment team was able to locate a document titled *Programs of the FWC 2022-23*⁹¹ which provides financial data for the Conservation Commission and tallies a total budget approaching \$163M for the period. Funding sources included general revenues (22% of all revenues) as well as funding from 10 specific trusts, including: the Federal Grant Trust Fund, the Grants and Donations Trust Fund, the Land Acquisition Trust Fund, the Marine Resources Conservation Trust Fund, the Nongame Wildlife Trust Fund, the State Game Trust Fund, the Administrative Trust Fund, the Invasive Plant Control Fund, the Save the Manatee Trust Fund, and the Florida Panther Management and Research Trust Fund (78% of all revenues).

Funds are dispersed across six Divisions: (i) Fish and Wildlife Research Institute, (ii) Freshwater Fisheries Management, (iii) Habitat and Species Conservation, (iv) Hunting and Game Management, (v) Law Enforcement, and (vi) Marine Fisheries Management. They are also distributed across the Commissions five Regional Operations as well as to numerous units that fall under the Executive Director’s Office.

Current status/Appropriateness/Effectiveness:
The fishery management organizations and arrangements are currently financed using a cost recovery or other system.

EVIDENCE:
 The federal and states fishery management agencies operating in the Gulf of Mexico are financed by either the Congress and/or State Legislatures. The funding sources also include trust funds, own revenue sharing arrangements, and fees for services and goods.

⁹⁰ <https://www.outdooralabama.com/sites/default/files/ANNUAL%20REPORTS/ADCNR%202021-2022%20Annual%20Report.pdf>

⁹¹ <https://myfwc.com/media/22343/fwc-programs.pdf>

1.6. A fishery management organization and sub-regional or regional fisheries management organizations and arrangements, as appropriate, shall agree on the means by which the activities of such organizations and arrangements will be financed, bearing in mind, inter alia, the relative benefits derived from the fishery and the differing capacities of States to provide financial and other contributions. Where appropriate, and when possible, such organizations and arrangements shall aim to recover the costs of fisheries conservation, management, and research.

Of note, outside the Gulf area, NOAA in Alaska has a formal cost recovery system in place in relation to the Pacific Halibut and Sablefish commercial fisheries.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is agreement on the means by which the activities of such organizations and arrangements are financed. Where appropriate, and when possible, such organizations and arrangements aim to recover the costs of fisheries conservation, management, and research. Examples may include data showing the expenditure and cost recovery derived from fisheries management.



EVIDENCE:
 The evidence provided above is sufficient to substantiate that there is agreement on the means by which the activities of the principle federal and state agencies are financed. Please see supported evidence in the references

- References:**
1. <https://www.noaa.gov/infrastructure-law/infrastructure-law-fisheries-protected-resources>
 2. https://tpwd.texas.gov/publications/pwdpubs/media/pwd_rp_a0900_0679_12_22.pdf
 3. <http://legis.la.gov/legis/ViewDocument.aspx?d=1007886>
 4. <https://www.outdooralabama.com/sites/default/files/ANNUAL%20REPORTS/ADCNR%202021-2022%20Annual%20Report.pdf>
 5. <https://myfwc.com/media/22343/fwc-programs.pdf>
 6. https://www.lbo.ms.gov/pdfs/fy23_bulletin.pdf
 7. <https://budget.alabama.gov/wp-content/uploads/2021/03/FINAL-State-of-Alabama-Budget-Document-FY22.pdf>
 8. Documentation provided by the client representatives.

Numerical score:	Starting score	-	Number of EPs <u>NOT</u> met	x 3	=	Overall score
	All agencies - 10		All agencies - 0			All agencies - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)						All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)						All agencies - Full
Non-conformance Number (if applicable):						NA

9.2.1.10 Supporting Clause 1.6.1.

1.6.1. Without prejudice to relevant international agreements, States or fishery management organizations shall encourage banks and financial institutions not to require, as a condition of a loan or mortgage, fishing vessels or fishing support vessels to be flagged in a jurisdiction other than that of the State of beneficial ownership where such a requirement would have the effect of increasing the likelihood of non-compliance with international conservation and management measures.																			
Relevance:	Not relevant. Note: The fishery under assessment does not occur outside the U.S. EEZ. Foreign-flagged or flags-of-convenience vessels are not permitted to operate in the U.S. EEZ.																		
Evaluation Parameters	Met?																		
Process: <i>There is a system that encourages banks to require vessels to be flagged within the jurisdiction of interest.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Current Status/Appropriateness/Effectiveness: <i>There is regulation that directs for vessels to be flagged outside the State's jurisdiction. The fishery for the stock under consideration occurs outside EEZ, and there are flags of convenience operations present, or evidence of IUU fishing.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State or fishery management organizations encourages banks and financial institutions not to require, as a condition of a loan or mortgage, fishing vessels or fishing support vessels to be flagged in a jurisdiction other than that of the State of beneficial ownership where such a requirement would have the effect of increasing the likelihood of non-compliance with international conservation and management measures. Examples may include data showing fishery operation by vessels flying a flag different from that of the State where fishing geographically occurs.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
References:																			
Numerical score:	<table border="1"> <tr> <td>Starting score</td> <td>-</td> <td>(</td> <td>Number of EPs <u>NOT</u> met</td> <td>x</td> <td>3</td> <td>)</td> <td>=</td> <td>Overall score</td> </tr> <tr> <td>10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score	10								
Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score											
10																			
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																		
Non-conformance Number (if applicable):																			

9.2.1.11 Supporting Clause 1.7.

1.7.	Within the fishery management system, procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information.	
Relevance:	Relevant.	
Evaluation Parameters		Met?
Process:	<p><i>There is a procedure to review management measures. The procedure includes the use of outcome indicators against which the success of management measures in achieving specific management objectives is measured. The procedure covers all management measures, including those relating to the sustainable exploitation of the target stock; the mitigation of negative impacts on non-target species through bycatch, discarding, and indirect effects; and the protection of Endangered, Threatened, Protected (ETP) species and the physical environment. Please note that both the management processes of the North Pacific Fishery Management Council (NPFMC) for federal waters, and the Alaska Board of Fisheries (BOF) for state waters, allow for the continuous review of conservation and management measures. Such processes shall be clearly documented as relevant to key management measures for the fishery under assessment.</i></p>	
		<input checked="" type="checkbox"/>
EVIDENCE:	<p>GOM-based federal and state fishery management agencies have a procedure in place to review their management measures. For example:</p> <p>Federal (GMFMC): The Council’s Statement of Organization Practices and Procedures (February 2023)⁹² includes certain <u>administrative measures</u> that inform the tasks of monitoring and performance management evaluation, such as: Section 6.8 – Audits; Section 7.0 – Recordkeeping; Section 7.3 – Administrative Records for Fishery Management Plans. These measures are in addition to the regular monitoring and performance evaluation activities that are assigned to and conducted by the Council’s standing committees and other supporting structures. The Council’s Shrimp Committee plays an active role in compiling data from the commercial fisheries of the Gulf. Four types of data are collected for use in completing an array of scientific and management analyses and outputs. They include effort data, bycatch rates, landings data, and additional data for economic and regulatory analysis. Bycatch information is acquired through observer programs and covers about 2 % of offshore trips. Landings, economic, and regulatory data are collected through monthly dealer-reported state trip tickets and through the gear, landings, and economic paper surveys completed by fishermen. Effort data is derived from time-stamped GPS coordinates collected by the 3G cellular electronic logbooks (cELBs).</p> <p>Federal (GSMFC): GSMFC staff systematically monitor and evaluate the performance of key commercial (and recreational) fisheries and ecosystem components in accordance with approved workplans, and, collaboratively, with state and other federal agencies under established partnerships. The key components of the fishery-specific management system for GOM shrimp include: (i) stock status indices, (ii) ecosystem interactions, (iii) habitat characteristics, (iv) management measures, (v) compliance and enforcement, and (vi) socio-economic outcomes.⁹³ The mechanisms in place to evaluate these key parts include:</p> <ol style="list-style-type: none"> a. Formal stock assessments conducted by NOAA’s Galveston, TX laboratory. b. Independent and joint academic research and published studies. c. Commission and State annual reports. d. Mandatory State annual compliance reports. e. Official meetings of various State-Federal and State-specific Commissions, Committees and Advisory Groups with input from affected stakeholder organizations and the general public. <p>Federal (USCG, NOAA-OLE): Both law enforcement agencies provide regular operational reports of their activities and outcomes at meetings of the GMFMC and GSMFC Committees. Information frequently includes performance assessments and emerging priorities. Federal-state joint fisheries enforcement operations are also presented as well as in annual state agency reports.</p> <p>Texas: The TPWD maintains and reports on both key and non-key performance measures in accordance with the requirements and guidelines of the Legislative Budget Board (LBB), the State Auditor’s Office (SAO), and the Governor’s Office. TPW works with oversight agencies each biennium to align these performance measures with the objectives and key functions as identified in its</p>	

⁹² https://gulfcouncil.org/wp-content/uploads/Gulf-Council-SOPPs_February-2023.pdf

⁹³ The Commission is not a regulatory body; it does not actively manage the GOM commercial fishery.

1.7. Within the fishery management system, procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information.

Natural Agenda (strategic plan) and Land and Water Resources Conservation and Recreation Plan. Performance measure results are reported quarterly to agency management and oversight offices.

Provisions of *Texas Government Code* §2001.039⁹⁴ require that a state agency review each of its regulations no less frequently than every four years and to re-adopt, adopt with changes, or repeal each rule as a result of the review. Departmental staff carry out the reviews and submit their recommendations for consideration at scheduled meetings of the Commission. Rule changes that are endorsed by the Commission are published in the *Texas Register* where public and stakeholder comments can be placed for further consideration.

The Texas Sunset Advisory Commission,⁹⁵ a 12-member legislative commission tasked with identifying and eliminating waste, duplication, and inefficiency, examines the need for more than 130 Texas state agencies, looks for potential duplication of other public services or programs, and considers new and innovative changes to improve each agency's operations and activities.

TPWD's Law Enforcement Division uses monthly data from Contact Data Reports provided by its Game Wardens and maintains the data in various divisional databases from which performance outcomes are determined. Typically, the data fields include various land and water-based patrol activities by Game Wardens, and prosecutorial results (conviction rates) arising from court decisions. Outcomes are then compared against the program's annual fiscal year targets. Outcomes for FY 2018 are available at: https://tpwd.texas.gov/publications/nonpwdpubs/media/tpwd_sunset_self_evaluation_report2019.pdf.

TPWD's Coastal Fisheries Division⁹⁶ conducts annual status assessments of finfish, shrimp, crab, and oyster populations within the marine waters of Texas. This also includes updating long-range management plans for optimal sustainable yield of marine resources that will provide consistent economic and sociological benefits to users and consumers of aquatic products while protecting the resource.

Louisiana: The LDWF's Five-Year Strategic Plan for Fiscal Years 2023-24 through 2027-28 (July 2022)⁹⁷ contains a number of strategic objectives, strategies, and performance indicators (benchmarks and/or tasks) that are intended to support the organization's various departmental programs, such as (i) Enforcement (wildlife, fisheries, ecosystems, boating safety and waterways), Search and Rescue and Maritime Security, Habitat Stewardship, Species Management, and Fisheries Resource Management. Performance measures and standards can be seen at: <https://www.wlf.louisiana.gov/assets/Footer/Files/2022-Strategic-Plan.pdf>.

Mississippi: The Commission's financial budgets and operating expenses are audited annually, typically by a third-party accounting firm under contract. The Department of Marine Resources' Strategic Plan 2019-2023⁹⁸ contains a number of goals, strategies, quantitative outputs and tasks in support of various program, such as marine patrols, marine and estuarine habitat, coastal marine environment, and coastal resources management. These can be seen at: <https://dmr.ms.gov/wp-content/uploads/2019/07/MDMR-Strategic-Plan-2019-2023.pdf>.

Alabama: While the Commissioner of the DCNR [with the assistance of the Conservation Advisory Board] has the authority to establish and promulgate rules and regulations, including amendments and repeals thereof, with respect to the manner of performance of all functions and duties of the Department, the Assessment team is of the opinion that documentary evidence is lacking that would assist in a clearer understanding of whether the fishery management system for the commercial shrimp fishery is informed by short and long-term objectives, and they are measurable.

⁹⁴ https://texas.public.law/statutes/tex._gov't_code_section_2001.039

⁹⁵ <https://www.sunset.texas.gov/about-us>

⁹⁶ <https://tpwd.texas.gov/about/administration-divisions/coastal-fisheries>

⁹⁷ <https://www.wlf.louisiana.gov/assets/Footer/Files/2022-Strategic-Plan.pdf>

⁹⁸ <https://dmr.ms.gov/wp-content/uploads/2019/07/MDMR-Strategic-Plan-2019-2023.pdf>

1.7. Within the fishery management system, procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information.

Florida: The Fish and Wildlife Conservation Commission’s Long-Range Program Plan (LRPP) 2020-21 to 2024-25⁹⁹ is an important planning and evaluation tool that informs and guides the manner by which the Commission’s Divisions and Offices contribute to achieving the themes, goals and objectives as defined in the organization’s Strategic Agenda. The Plan’s detailed performance measures and standards serve as guideposts against which the activities of each of the Commission’s programs are planned, carried out and measured in relation to specific goals and objectives over a five-year timeframe. The programs included in the current version of the LRPP include (i) Law enforcement, (ii) Habitat and Species conservation, (iii) Freshwater Fisheries management, (iv) Marine Fisheries management, (v) Freshwater Fisheries Research Institute, (vi) Regional Operations, and (vii) various Commission Offices. Performance measures and standards can be seen at: <http://floridafiscalportal.state.fl.us/Document.aspx?ID=24408&DocType=PDF>.

Current status/Appropriateness/Effectiveness:

If, as a result of the review process, it is determined that management measures are not achieving the specific management objectives they are designed to achieve, they are revised and updated as appropriate.



EVIDENCE:

All federal and state agencies (including Alabama) included in the Gulf of Mexico Shrimp Fishery Assessment have procedures and mechanisms in place to undertake varying regular reviews of their fishery management systems. All agencies have representatives on the various regional committees, sub-committees and other groups of the GMFMC and the GSMFC and are engaged in regular discussions and analysis of program performance. Some program management measures are required by statute, others by internal administrative processes.

All jurisdictions initiate regulatory amendments, rule changes or policy shifts to their fishery management system in support of new conservation requirements, program changes, or in response to judicial findings. Beyond the fishery management programs, all agencies have internal audit staff whose mandates are to ascertain whether activities are generating value-for-money, and, where that is not occurring, identifying where improvements are required.

Of note, however, Alabama’s DCNR has not defined short and long-term objectives for its domestic commercial shrimp fishery thus limiting the organization’s capacity to determine whether the fishery’s management measures are achieving specific management objectives.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that within the fishery management system, procedures are in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information. Examples may include data showing recent regulation or management plan revisions.



EVIDENCE:

Except for Alabama, the availability and quality of evidence is sufficient to substantiate that applicant and appropriate management organizations at the federal and states levels have monitoring and performance evaluation mechanisms in place to keep the efficacy of current conservation and management measures under continuous review, and to revise or abolish them In light of new information. Please see supported evidence in the references

References:

1. https://gulfcouncil.org/wp-content/uploads/Gulf-Council-SOPPs_February-2023.pdf
2. https://tpwd.texas.gov/publications/nonpwdpubs/media/tpwd_sunset_self_evaluation_report2019.pdf
3. <http://floridafiscalportal.state.fl.us/Document.aspx?ID=24408&DocType=PDF>
4. <https://www.wlf.louisiana.gov/assets/Footer/Files/2022-Strategic-Plan.pdf>
5. https://texas.public.law/statutes/tex.gov/t_code_section_2001.039
6. <https://www.sunset.texas.gov/about-us>
7. <https://tpwd.texas.gov/about/administration-divisions/coastal-fisheries>
8. <https://myfwc.com/about/overview/long-range/>
9. <https://www.wlf.louisiana.gov/assets/Footer/Files/2022-Strategic-Plan.pdf>
10. <https://dmr.ms.gov/wp-content/uploads/2019/07/MDMR-Strategic-Plan-2019-2023.pdf>

⁹⁹ <https://myfwc.com/about/overview/long-range/>

1.7.	Within the fishery management system, procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information.		
	11.https://dmr.ms.gov/wp-content/uploads/2019/07/MDMR-Strategic-Plan-2019-2023.pdf		
Numerical score:	Starting score	Number of EPs NOT met	Overall score
	All agencies - 10	$- \left(\begin{array}{l} \text{Federal - 0} \\ \text{Texas - 0} \\ \text{Mississippi - 0} \\ \text{Louisiana - 0} \\ \text{Florida - 0} \\ \text{Alabama - 1} \end{array} \right) \times 3 =$	$\begin{array}{l} \text{Federal - 10} \\ \text{Texas - 10} \\ \text{Mississippi - 10} \\ \text{Louisiana - 10} \\ \text{Florida - 10} \\ \text{Alabama - 7} \end{array}$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			All agencies except Alabama - High Alabama - Medium
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			All agencies except Alabama - Full Alabama - Minor NC
Non-conformance Number (if applicable):			1

9.2.1.12 Supporting Clause 1.8.

1.8.	The management arrangements and decision-making processes for the fishery shall be organized in a transparent manner.	
Relevance:	Relevant.	
Evaluation Parameters		Met?
Current status: <i>There is transparency in management arrangements. Please note that both the management processes of the NPFMC for federal waters, and the BOF for state waters, shall be clearly documented to provide evidence for the transparency of these arrangements and decision-making processes.</i>		<input checked="" type="checkbox"/>
EVIDENCE: An effective and accountable public consultation and engagement strategy typically will give rise to a decision-making process that is effective, transparent and balanced. All federal and state management agencies examined for this assessment have well defined and progressive internal and external communications strategies that inform their decision-making processes.		
<u>Consultation frameworks</u> NOAA Fisheries partners with federal agencies and federally-recognized tribes to advise and collaborate on activities that might impact endangered and threatened species, marine mammals, and important marine habitats. ¹⁰⁰ This work includes: <ul style="list-style-type: none"> • Consulting with federal agencies whose work might affect important fish habitats that are necessary for the spawning, breeding, feeding, and/or growth of healthy fish populations, and working to mitigate impacts; • Collaborating with federal agencies and tribes to address threats to endangered and threatened species that might result from federal programs and actions, including adverse impacts to species' habitats; • Working with tribal governments on marine mammal issues (e.g., whales and seals); • Working with federal agencies and tribal governments on the development of fishery management plans; • Working with federal agencies and tribal governments on hatchery activities and the development of hatchery and genetic management plans; and • Working with federal agencies and tribal governments on scientific research permits. GMFMC's consultation process with stakeholders and the public is described in the Council's Statement of Organization, Practices and Procedures (2023), specifically Section 3.2 (Conduct of Meetings) and sub-section 3.2.7 (Consideration of Information from Interested Parties), and Section 3.7 (Public Meetings/Scoping Meetings). ¹⁰¹ For example: <ul style="list-style-type: none"> • Interested persons shall be permitted to present oral or written statements regarding matters on the agenda at all publicly noticed meetings of the Council or any of its advisory bodies. • It is the policy of the Council to afford interested parties an opportunity to review and respond to new data or other information which may be used by the Council as a basis for its management decisions. New information includes the technical data and analyses developed and compiled in printed, unpublished form by NMFS, state agencies or universities, Council staff, or other entities associated with the Council, which has not previously been distributed to the public, and which is used in the decision-making process. • Responses to the new information by interested members of the public may be through testimony at public hearings or at the Council session where final action will be taken, or by submitting written statements at the public hearings or to the Council office. <p>The Council's consultation and engagement process is facilitated through its' main website and other social media platforms, including live broadcasts of meetings. For example, amendments under development that impact any of the FMPs under the authority of the Council are posted (available at: https://gulfcouncil.org/fishery-management/proposed-amendments/) for public commentary. An online quarterly newsletter titled Gulf Fishery News¹⁰² is particularly useful in ensuring that stakeholders and the public are fully informed of current issues and upcoming events.</p> Texas		

¹⁰⁰ <https://www.fisheries.noaa.gov/topic/consultations>

¹⁰¹ https://gulfcouncil.org/wp-content/uploads/Gulf-Council-SOPPs_August-2022.pdf

¹⁰² <https://gulfcouncil.org/newsletters/archive/>

1.8. The management arrangements and decision-making processes for the fishery shall be organized in a transparent manner.

Departmental and Commission meetings are, with few exceptions, open to stakeholder groups and members of the general public. The state's *Open Meetings Act* (Government Code, Chapter 551)¹⁰³ provides that meetings of governmental bodies must be open to the public (except for expressly authorized executive sessions). Both state and regional agencies file notices of open meetings with the Secretary of State including posting the notices on their websites.

Department staff actively solicit constituent input through local meetings, referred to as “scoping” meetings (e.g., non-statutory initiatives). These meetings occur throughout the state and are generally held in areas with significant resource issues or in geographic areas where constituents might be affected by proposed regulatory changes.

The Department uses several advisory committees (e.g., Coastal Resources Advisory Committee) as a means of gathering and disseminating information related to specific issues or department programs. In general, these boards are specifically assembled to represent a broad diversity of insights and opinions. Information gathered from these boards is reported to the Commission. Each advisory committee is established pursuant to rules of the *Texas Administrative Code* (Title 31, Chapter 51, Subchapter O). The Department also hosts constituent meetings on an informal but frequent basis. In most cases, these meetings are held to address immediate issues or to help the Department and Commission set long-term goals.

The TPWD's Communications Division has developed numerous communications products to facilitate interactions with stakeholders and the general public. They include: departmental websites, social media platforms (Facebook, Twitter, Instagram, Pinterest, YouTube, and Snapshot), mobile apps, Texas Parks & Wildlife magazine, a weekly PBS television series, the Passport to Texas daily radio program, a video news report program, plus a wide range of internal and external public information items.¹⁰⁴ The services it provides are guided by a document titled: *Compact with Texans*¹⁰⁵ wherein the Department pledges to, inter alia, engage in problem solving, being responsive, and working with different user groups to resolve conflicts.

The Commission is also fully engaged in the agency's consultation and engagement processes. It conducts 5 scheduled meetings per year, one of which is an annual public meeting usually in August to receive public comments on any issue relating to its' regulatory powers and duties. It recently began hosting regional public hearings in conjunction with the annual meetings to increase statewide public participation opportunities.

Apart from these annual meetings, the Commission consults with stakeholders and the general public on an on-going and structured basis when considering changes to state-managed FMPs (and other initiatives) before making recommendations to the TPWD. For example, the Commission is required to take public comment on all rulemaking activities, as required in the *Administrative Procedure Act*.¹⁰⁶ These comments are compiled by departmental staff and provided to the Commission prior to and during public hearings regarding each rule the Commission considers for adoption.

Louisiana

The Shrimp Task Force is responsible for studying and monitoring the shrimp industry and making recommendations to LDWF, the LWFC, and other state agencies on improving production and the economic sustainability of the industry. It is not a decision-making body, only a recommendation-making one. Section 3 of the Task Force's Bylaws requires that it operate under the *Open Meetings Law*¹⁰⁷ whose provisions include in part:

RS 42:14 - Meetings of public bodies to be open to the public

- Every meeting of any public body shall be open to the public.
- All votes made by members of a public body shall be viva voce and shall be recorded in the minutes, journal, or other official, written proceedings of the body, which shall be a public document.

¹⁰³ <https://statutes.capitol.texas.gov/Docs/GV/htm/GV.551.htm>

¹⁰⁴ <https://tpwd.texas.gov/about/administration-divisions/communications>

¹⁰⁵ <https://tpwd.texas.gov/site/compact>

¹⁰⁶ <https://statutes.capitol.texas.gov/Docs/GV/htm/GV.2001.htm>

¹⁰⁷ The *Open Meetings Act* also applies to meetings conducted by the LDWF and LWFC:
https://parlouisiana.org/wp-content/uploads/2016/03/Open_Meetings_Law.pdf

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- Except school boards, each public body conducting a meeting which is subject to the notice requirements shall allow a public comment period at any point in the meeting prior to action on an agenda item upon which a vote is to be taken. The governing body may adopt reasonable rules and restrictions regarding such comment period.

RS 42:19 - Notice of meetings

- All public bodies, except the legislature and its committees and subcommittees, shall give written public notice of their regular meetings, if established by law, resolution, or ordinance, at the beginning of each calendar year. Such notice shall include the dates, times, and places of such meetings.
- Such notice shall include the agenda, date, time, and place of the meeting, provided that upon unanimous approval of the members present at a meeting of a public body, the public body may take up a matter not on the agenda.

RS 42:20 - Written minutes

- All public bodies shall keep written minutes of all of their open meetings. The minutes to be kept shall include but need not be limited to: (i) the date, time, and place of the meeting, (ii) the members of the public body recorded as either present or absent, (iii) the substance of all matters decided, and, at the request of any member, a record, by individual member, of any votes taken, and (iv) any other information that the public body requests be included or reflected in the minutes.

Section 11 of the Bylaws stipulates that meetings shall include a period for public testimony; each speaker shall be limited to three minutes; public comment shall be limited to (i) the current agenda items, and (ii) requests for items to be placed on future agendas.¹⁰⁸ The Task Force meets on a regular basis. Past and current meeting dates, agendas, decisions and documents are posted on the Department's website.¹⁰⁹

The Commission meets monthly, and meetings are open to the public. A live audio/video stream of each meeting is also available via Zoom for those who are not able to attend in person. Detailed minutes of past and current sessions are posted on the Commission's website.¹¹⁰ Any action items that require further consideration are also highlighted on the website.

Mississippi

Mississippi Code Title 25 (Public Officers and Employees; Public Records), Chapter 41 (Open Meetings), stipulates at § 25-41 that:

- All official meetings of any public body, unless otherwise provided in this chapter or in the Constitutions of the United States of America or the State of Mississippi, are declared to be public meetings and shall be open to the public at all times unless declared an executive session.
- An agenda and materials that will be distributed to members of the public body and that have been made available to the staff of the public body in sufficient time for duplication and forwarding to the members of the public body shall be made available to the public at the time of the meeting. Votes taken during any meeting conducted through teleconference or video means shall be taken in a manner that is clearly audible or visible to all members of the public body and to members of the public present at the public location.
- Minutes shall be kept of all meetings of a public body, whether in open or executive session, showing the members present and absent; the date, time and place of the meeting; an accurate recording of any final actions taken at such meeting; and a record, by individual member, of any votes taken; and any other information that the public body requests be included or reflected in the minutes. The minutes shall be recorded within a reasonable time not to exceed thirty (30) days after recess or adjournment and shall be open to public inspection during regular business hours.

The state's *Administrative Code* is another source of information as to how the agencies are to engage stakeholders and the public on matters under their jurisdiction. For example, Title 22 (Mississippi Department of Marine Resources), Part 22 (General Administrative Rules of the Mississippi Advisory Commission on Marine Resources) includes the following provisions:

- Rule 22-22-1.2: Official minutes of the regular monthly meetings will be transcribed, certified, and preserved as a public record. Final actions recommended to and approved by the Executive Director during an Executive Session shall be read into the record upon return to the regular meeting. Minutes from each proceeding meeting shall be approved by the

¹⁰⁸ https://www.wlf.louisiana.gov/assets/Fishing/Files/Commercial-Shrimp/shrimp_task_force_bylaws.pdf

¹⁰⁹ <https://www.wlf.louisiana.gov/resources/category/shrimp-task-force/211>

¹¹⁰ <https://www.wlf.louisiana.gov/resources/category/commission-meeting-minutes>

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Commission and final actions taken by the Executive Director based upon the Commission's recommendation shall become part of the official record to be maintained by the Department.

- Rule 22-22-1.4: Any documents or materials presented to the Commission by the Department or by any person, firm or corporation in support of or in opposition to any matter presented to the Commission which requires their recommendation for approval by vote shall be part of the official record of the Commission.
- Rule 22-22-1.6: To request that a matter be placed on the agenda, a written request must be submitted to the Executive Director at least ten (10) days in advance of the Commission meeting. The number of individuals that may present and the time of each presentation may be limited. To address the Commission during a regularly scheduled meeting, individuals must complete a Public Comments Sign-In sheet provided by the Department prior to the commencement of the scheduled meeting.

Meetings of the Advisory Commission on Marine Resources are held monthly and are open to the public. The public is also provided the opportunity to address items not on the agenda with physical attendance of the meetings. The meetings are also live streamed on YouTube; however public comment is only available with physical attendance. Meeting records (agendas, presentations, transcripts) are easily located on the Department's website (available at <https://dmr.ms.gov/cmr/>).

Alabama

It is the policy of the state that the deliberative process of governmental bodies shall be open to the public during meetings as defined in the state's *Alabama Code*, Section 36-25A-1 also known as the *Alabama Open Meetings Act*¹¹¹, except for executive sessions permitted in Section 36-25A-7(a). Other relevant provisions include:

- Any governmental body with statewide jurisdiction shall submit notice of its meeting to the Secretary of State. The Secretary of State shall post the notice on the Internet for at least seven calendar days prior to the day of the meeting. The Secretary of State shall also send electronic mail notifications to anyone who has registered with the Secretary of State to receive notification of meetings per Section 36-25A-3.
- A governmental body shall maintain accurate records of its meetings, excluding executive sessions, setting forth the date, time, place, members present or absent, and action taken at each meeting. Except as otherwise provided by law, the records of each meeting shall become a public record and be made available to the public as soon as practicable after approval per Section 36-25A-4.
- A meeting of a governmental body, except while in executive session, may be openly recorded by any person in attendance by means of a tape recorder or any other means of sonic, photographic, or video reproduction provided the recording does not disrupt the conduct of the meeting. The governmental body may adopt reasonable rules for the implementation of this section 36-25A-6.

The Conservation Advisory Board usually meets in February, March or May. Past and current meeting minutes are available at: <https://www.outdooralabama.com/conservation-advisory-board/conservation-advisory-board-minutes>. Meetings are the subject of various Standing Rules, such as:

- Those who wish to address the Board must register between 8:00 and 8:30 am.
- Bring 18 copies of all documents to be distributed to the Board.
- The person wishing to speak should go to the designated microphone when called. The time limit to speak is three minutes.
- If several persons wish to speak on the same subject, the group should choose one speaker to represent them. The Chair may or may not choose to call on each person in that group to speak for additional information.
- Questions or debate from Advisory Board members shall be limited to 10 minutes.
- No person may speak twice until all registered speakers have spoken, and then only at the discretion of the Chair.

Florida

Commissioners of the Florida Fish and Wildlife Conservation Commission meet 5 times annually to hear staff reports, consider rule proposals and conduct other Commission business. Meetings are conducted at different locations across the state, are generally of two days duration, and are open to the public. The conduct of all public meetings and workshops are subject to a formal protocol¹¹²

¹¹¹ <https://www.openmeetings.alabama.gov/generalpublic/publicdefault.aspx>

¹¹² <https://myfwc.com/about/commission/meeting-protocol/>

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that describes how (i) meeting notices and agendas are developed, (ii) motions tabled and acted upon, (iii) public participation is undertaken, (iv) minutes are prepared, and (v) disruptions are dealt with.

The meetings' dates, locations and agendas are posted on the Commission's website. Agenda items that are listed as requiring decision (such as the disposition of a "final rule") are supported by background information and other documentation (e.g., summary memo, slide presentation etc.). This is especially beneficial for stakeholders and the general public who may wish to comment on the item under consideration.

The Marine Fisheries Management Division issues a monthly newsletter that provides updated information on current issues and initiatives.¹¹³ The Division's Director routinely forwards memoranda to FFWC Commissioners to update them on actions from recent GMFMC meetings, and to lay the groundwork for follow-up direction that would be needed by staff on a go-forward basis.

The Commission's Office of Community Relations coordinates the communication efforts of the FWC. These efforts include internal agency communications, external media coordination, social media activity, digital communication direct to residents and visitors, and community outreach events. The Office also coordinates agency activities to inform Floridians and visitors of the role and value of Florida's fish and wildlife resources and to foster a sense of stewardship for these resources. The Commission's Divisions and Offices use a variety of social media platforms to communicate with stakeholders and the general public, and to invite comments and suggestions e.g., Facebook, Twitter, YouTube, Instagram, Flickr, Snapchat and LinkedIn. A web-based "Events Calendar" informs the public on past, current and proposed events covering a broad range of categories, including public hearings and workshops.¹¹⁴ Press Releases are consistently posted on the Commission's website.¹¹⁵

Decision-making frameworks

GMFMC

Regional councils are responsible for preparing, monitoring, and revising management plans for fisheries requiring management within their jurisdiction. The Secretary is responsible for promulgating regulations to implement proposed plans and amendments after ensuring that management measures are consistent with the MSA, and with other applicable laws. In most cases, the Secretary has delegated this authority to the NMFS.¹¹⁶

The decision-making process followed by the GMFMC is described in the Council's Statement of Organization, Practices, and Procedures (February 2023).¹¹⁷ Section 3.2.2 provides for decisions to be taken by consensus except if it involves a/an: (i) FMP, (ii) amendment to an FMP, (iii) proposed regulation, (iv) secretarial FMP or amendment, or (v) Council finding that an emergency exists involving any fishery.

When reviewing potential rule changes, the Council draws upon the services of knowledgeable people from other state and federal agencies, universities, and the public to balance competing interests and achieve the greatest overall benefit to the nation. Scoping workshops and public hearings are held throughout the Gulf coast to collect input. Public comment is considered by the Council before it takes final action on proposed rule changes. The Council also collects comments on proposed changes through virtual meetings and online comment forms. Public testimony is heard during each Council meeting. After the Council takes final action, proposed rule changes are submitted to National Marine Fisheries Service for further review and approval before implementation by the Secretary of Commerce.

Fishery management decision-making is also affected by a number of other federal statutes designed to protect the biological and human components of US fisheries, as well as the ecosystems that support those fisheries. Major laws affecting federal fishery management decision-making include the *Endangered Species Act* (Section 1.4.3), Executive Order 12866 (Regulatory Planning and

¹¹³ <https://myfwc.com/media/23329/fitkapril2020.pdf>

¹¹⁴ https://outreach.myfwc.com/events/event_list.asp

¹¹⁵ <https://myfwc.com/news/>

¹¹⁶ <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.643.5154&rep=rep1&type=pdf>

¹¹⁷ https://gulfcouncil.org/wp-content/uploads/Gulf-Council-SOPPs_February-2023.pdf

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Review, Chapter 3), Executive Order 12898 (Environmental Justice, Section 1.6.3), and Executive Order 13132 (Federalism). The latter E.O. serves to guarantee the division of governmental responsibilities between the national government and the states as intended by the Constitution. Federalism is rooted in the belief that issues not national in scope or significance are most appropriately addressed by the level of government closest to the people. This Order is relevant to FMPs and amendments given the overlapping authorities of NMFS, the states, and local authorities in managing coastal resources, including fisheries, and the need for a clear definition of responsibilities. Other applicable laws are summarized below.

Scientific information and data are key components of fishery management plans (FMPs) and amendments. To be consistent with the MSA, FMPs and amendments must be based on the best available information and data, be properly referenced, and be reviewed by technically competent individuals prior to being presented for public commentary.

The public is involved in the fishery management process through participation at public meetings, on advisory panels and through Council meetings that, with few exceptions for discussing personnel matters, are open to the public. The regulatory process is in accordance with the afore-mentioned APA, in the form of “notice and comment” rulemaking, which provides extensive opportunity for public scrutiny and comment, and requires consideration of and response to those comments.¹¹⁸

The eRulemaking Initiative¹¹⁹

In October 2002, the eRulemaking Program was established as a cross-agency E-Gov initiative under Section 206 of the 2002 *E-Government Act* (H.R. 2458/S.803) and is based within the US General Services Administration. It offers a voice to stakeholders and the general public in federal decision-making. Twice a year in the Spring and Fall, agencies like the US Department of Commerce (NOAA/NMFS) publish a Regulatory Agenda of the regulations it intends to issue or has recently completed (available at: <https://www.regulations.gov/>).

- Search all publicly available regulatory materials, e.g., posted public comments, supporting analyses, FR notices, and rules.
- Submit a comment on a regulation or on another comment.
- Submit an applications or adjudication document.
- Download agencies regulatory materials as an excel file.
- Sign up for email alerts about a specific regulations.
- Access regulations that are trending, newly posted or closing soon - directly from the home page.

All federal rulemaking is governed under the provisions of the APA (5 U.S.C Subchapter II) which establishes a “notice and comment” procedure to enable public participation in the rulemaking process. Under the APA, the NMFS is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider, and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day waiting period from the time a final rule is published until it takes effect.

The Council’s Gulf Shrimp Committee is one of several standing committees that reports to the GMFMC. According to 16 U.S.C 1852. MSA § 302. 101-627, 109-479. (g) :

1A. Each Council shall establish, maintain, and appoint the members of a scientific and statistical committee to assist it in the development, collection, evaluation, and peer review of such statistical, biological, economic, social, and other scientific information as is relevant to such Council’s development and amendment of any fishery management plan.

1B. Each scientific and statistical committee shall provide its Council ongoing scientific advice for fishery management decisions, including recommendations for acceptable biological catch, preventing overfishing, maximum sustainable yield, and achieving rebuilding targets, and reports on stock status and health, bycatch, habitat status, social and economic impacts of management measures, and sustainability of fishing practices.

The Committee reviews recommendations and provides liaison between the Shrimp Advisory Panel, the SSC and the Council; assists the Panel and monitors the assigned work including work of contractors and staff in the development and drafting of fishery management plans.

¹¹⁸ <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.643.5154&rep=rep1&type=pdf>

¹¹⁹ <https://www.regulations.gov/aboutUs>

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The Council's Advisory Panels consist of members who are recreational and commercial fishermen, charter boat operators, buyers, sellers, and consumers with knowledge about a particular fishery. The Shrimp Advisory Panel meets once or twice annually to address ongoing and emerging issues of direct and indirect interest to the GOM's shrimp fishery. Meetings are open to the public and opportunities are provided for public comment. The panel is not a decision-making body but rather develops recommendations for consideration by the Shrimp Committee whose members then review, vote on, and forward positions to the full Council. The Panel routinely tracks Committee and Council decisions with respect to the status of its recommendations.

Texas

Chapter 2001 of the *Texas Administrative Code*¹²⁰ stipulates that "a state agency rule, order, or decision made or issued on or after January 1, 1976, is not valid or effective against a person or party, and may not be invoked by an agency, until the agency has indexed the rule, order, or decision and made it available for public inspection as required by this chapter." Moreover, "an agency shall adopt rules of practice stating the nature and requirements of all available formal and informal procedures"; and "index, cross-index to statute, and make available for public inspection all rules and other written statements of policy or interpretations that are prepared, adopted, or used by the agency in discharging its functions."

The Code defines the decision-making powers assigned by law to the Executive Director of the TPWD.¹²¹ Specifically, the Executive Director shall:

- have the duties, responsibilities, and authority to take action as necessary, including but not limited to emergency rulemaking, to modify state coastal fisheries regulations to conform with federal regulations in the Exclusive Economic Zone and implement fishery management plans ultimately approved by the Secretary of Commerce, including but not limited to Exempted Fishing Permits (EFPs), when such action is deemed to be in the best interest of the State of Texas;
- promptly notify the chairman of the commission when any such action is required and prior to any such action being taken;
- cause to be published in the *Texas Register* a public notice of any action taken, including the period during which such action is to be in effect, pursuant to subsection (a) of this section; and
- any action taken by the executive director pursuant to this section shall remain in effect for the period specified for such action but shall not exceed the effective period of the respective federal regulation in the Exclusive Economic Zone.

The purpose of state representation at the Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters. The state's participation provides an entry point for affected stakeholder groups and the general public to participate in decisions taken by the Department and the Commission.

As reported previously, the TPWC's primary mandate is to develop policies for consideration by the TPWD. Arguably, the recommendations themselves are in fact decisions by the Commission.

Louisiana

The decision-making authority assigned to the LWFC is informed in part by the *Revised Statutes* and its participation in, and involvement with, the work of the Gulf of Mexico Fishery Management Council and the Gulf States Marine Fisheries Commission, all of which serve to define and inform the LWFC's internal decision-making procedures and practices.

According to Title 56, Chapter 1, Part 1 of the Revised Statutes:

- §2 (Supervision and direction of commission; meetings), the commission shall not take any action except by vote in meeting assembled, all actions shall be included in the minutes.
- §494 (Louisiana Shrimp Task Force), the task force shall adopt bylaws under which it shall operate, and four voting members of the task force shall constitute a quorum sufficient to conduct meetings and business of the task force.¹²² The bylaws

¹²⁰ https://texas.public.law/statutes/tex.gov/t_code_section_2001.004

¹²¹ [https://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=2&ch=57&rl=801](https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=2&ch=57&rl=801)

¹²² https://www.wlf.louisiana.gov/assets/Fishing/Commercial_Fishing/Files/Commercial-Shrimp/shrimp_task_force_bylaws.pdf

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stipulate that (i) it shall operate under the open meetings law (R.S. 42:4.1- 12) and the public records law (R.S. 44:1-37), (ii) its affairs shall be managed by a board of voting members, and (iii) meetings shall include a period for public testimony.

Rule-making procedures by the state's agencies are stipulated in the *Revised Statutes* and include, in part, the following procedural requirements:

- §952 (Public information; adoption of rules; availability of rules and orders), (i) file with the Office of the State Register a description of its organization, stating the general course and method of its operations and the methods whereby the public may obtain information or make submissions or requests, (ii) adopt rules of practice setting forth the nature and requirements of all formal and informal procedures available, (iii) make available for public inspection all rules, preambles, responses to comments, and submissions and all other written statements of policy or interpretations formulated, adopted, or used by the agency in the discharge of its functions and publish an index of such rules, preambles, responses to comments, submissions, statements, and interpretations on a regular basis, and (iv) make available for public inspection all final orders, decisions, and opinions.
- §953 (Procedure for adoption of rules; agency rule review).

A. Prior to the adoption, amendment, or repeal of any rule, the agency shall:

- Give notice of its intended action and a copy of the proposed rules at least ninety days prior to taking action on the rule. The notice shall include: (i) a statement of either the terms or substance of the intended action or a description of the subjects and issues involved; (ii) a statement, approved by the legislative fiscal office, of the fiscal impact of the intended action, if any; or a statement, approved by the legislative fiscal office, that no fiscal impact will result from such proposed action; (iii) a statement, approved by the legislative fiscal office, of the economic impact of the intended action, if any; or a statement, approved by the legislative fiscal office, that no economic impact will result from such proposed action; (iv) the name of the person within the agency who has the responsibility for responding to inquiries about the intended action; (v) the time when, the place where, and the manner in which interested persons may present their views thereon; (vi) a statement that the intended action complies with the statutory law administered by the agency, including a citation of the enabling legislation; (vii) the preamble, which explains the basis and rationale for the intended action and summarizes the information and data supporting the intended action; (viii) a statement concerning the impact on family formation, stability, and autonomy as set forth in R.S. 49:972; (ix) a statement concerning the impact on child, individual, or family poverty in relation to individual or community asset development as set forth in R.S. 49:973; and (x) a statement concerning the economic impact on small businesses, as set forth in R.S. 49:978.4, and the small business regulatory flexibility analysis, as set forth in R.S. 49:978.5.

B. The notice shall be published at least once in the Louisiana Register and shall be submitted with a full text of the proposed rule to the Louisiana Register at least one hundred days prior to the date the agency will take action on the rule.

C. Afford all interested persons reasonable opportunity to submit data, views, comments, or arguments, orally or in writing. In case of substantive rules, opportunity for oral presentation or argument must be granted if requested within twenty days after publication of the rule as provided in this Subsection, by twenty-five persons, by a governmental subdivision or agency, by an association having not less than twenty-five members, or by a committee of either house of the legislature to which the proposed rule change has been referred under the provisions of R.S. 49:968.

D. Make available to all interested persons copies of any rule intended for adoption, amendment, or repeal from the time the notice of its intended action is published in the Louisiana Register. Any hearing pursuant to the provisions of this Paragraph shall be held no earlier than thirty-five days and no later than forty days after the publication of the Louisiana Register in which the notice of the intended action appears. The agency shall consider fully all written and oral comments and submissions respecting the proposed rule.

E. An interested person may petition an agency requesting the adoption, amendment, or repeal of a rule. Each agency shall prescribe by rule the form for petitions and the procedure for their submission, considerations, and disposition. Within ninety days after submission of a petition, the agency shall either deny the petition in writing, stating reasons for the denial, or shall initiate rulemaking proceedings in accordance with this Chapter.

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- §954 (Filing; taking effect of rules). No rule adopted on or after January 1, 1975, is valid unless adopted in substantial compliance with this Chapter. Each rulemaking agency shall file a certified copy of its rules with the Office of the State Register. No rule, whether adopted before, on, or after January 1, 1975, shall be effective, nor may it be enforced, unless it has been properly filed with the Office of the State Register.

Mississippi

The structure and duties of the state’s **Advisory Commission on Marine Resources** are described in the Mississippi Code. In relation to the management of the state’s marine resources programs and policies, the Commission is not a decision-making entity in the strict sense. Of note:

§ 49-15-301: The commission shall not take any action, except by vote in meeting assembled, and such action shall be included in the minutes of the commission. A majority of the members shall constitute a quorum of the commission.

- § 49-15-303: To adopt, amend or repeal any rules and regulations necessary for the operation of the commission and the department necessary for the protection, conservation and propagation of seafood, and necessary for the management of commercial and recreational taking of seafood.
- § 49-15-304: The commission may adopt, modify or repeal rules or regulations to utilize, manage, conserve, preserve and protect the flora, fauna, tidelands, coastal wetlands, coastal preserves, marine waters and any other matter pertaining to marine resources under its jurisdiction.

The Commission’s general administrative rules stipulate that:¹²³

- A simple majority of the Commission constitutes a quorum and an act of the majority will constitute Commission action (Rule 1.2 J).
- The Department of Marine Resources will seek the Commission’s recommendations concerning the enactment of rules and regulations at the regularly scheduled meetings (Rule 1.7 A).
- Any comments received during the required notice period will be presented to the Commission along with any recommended changes to the proposed regulation (Rule 1.7 D), and
- The Commission will then vote on whether to recommend to the Executive Director to adopt the regulation with or without changes (Rule 1.7 E).

The decision-making authorities of the Department of Marine Resources reside with the Executive Director or his/her delegate. These include:

- Carry out all regulations and rules adopted by the commission and enforce all licenses and permits issued by the department (§ 49-15-305-2f).
- Implement the policy of the commission regarding marine resources within the jurisdiction of the department (§ 49-15-305-a).

The Department’s Strategic Plan (2019-2023) states that the decision-making responsibilities will “continue to be based on the best available science and information and accurate up-to-date needs assessments.”¹²⁴

Alabama

According to *Alabama Code* § 9-2-15¹²⁵, the Commissioner of the DCNR shall have the power and authority to establish and promulgate rules and regulations, including amendments and repeals thereof, with respect to the manner of performance of all functions and duties of the Department, which rules and regulations shall be reasonably calculated to effect the expeditious and efficient performance of such functions and duties and shall not be in conflict with applicable statutes. The rule-making power of the Commissioner shall not be delegated, except as otherwise expressly provided.

The Conservation Advisory Board assists in formulating policies for the DCNR, examines all rules and regulations and makes recommendations for their change or amendment. By a two-thirds vote of the members present and with the governor’s approval,

¹²³ <https://dmr.ms.gov/wp-content/uploads/2021/09/Title-22-Part-22-20210823.pdf>

¹²⁴ <https://dmr.ms.gov/wp-content/uploads/2019/07/MDMR-Strategic-Plan-2019-2023.pdf>

¹²⁵ <https://www.outdooralabama.com/sites/default/files/Enforcement/2019-2020%20Title%209%20Only.pdf>

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the Board can amend, make any changes, repeal or create and promulgate additional rules and regulations (AL Code § 9-2-15). The Board also assists in publicizing the department’s programs and activities.

Florida

The state’s decision-making authorities are underwritten by the statutory provisions of the *Constitution* and *Administrative Code* and its participation in, and involvement with, the work of the Gulf of Mexico Fishery Management Council and the Gulf States Marine Fisheries Commission, all of which serve to define and inform the FFWC’s internal decision-making procedures and practices.

The Commission’s decision-making process with respect to marine fisheries, for example, is informed by annual workplans that are prepared by Marine Fisheries Management staff and submitted to Commissioners for approval. Input from staff of the Fish and Wildlife Research Institute (FWRI) helps align research and management priorities and coordinate staff efforts for the coming fiscal year. Workplan development takes into account Commissioner input, stock assessment schedules, staff recommendations, public concerns, federal issues, and issues carried over from the previous year’s workplan.

Individuals can challenge a decision by the Commission either through the state’s judicial process or by filing a document with the state’s Division of Administrative Hearings.¹²⁶ Decisions are issued in writing and posted on the division’s website.¹²⁷

When a rule is amended or a new rule is proposed, the sponsoring agency is required to give notice of public meetings, hearings, and workshops by publication in the Florida Administrative Weekly not less than 7 days before the event.¹²⁸ It must also follow the process that is defined in Chapter 120 of the *Florida Statutes* in respect of the *Administrative Procedure Act*.¹²⁹ Specifically,

- ss 120.525 - notice of public meetings, hearings, and workshops by publication in the Florida Administrative Weekly not less than 7 days before the event.
- ss 120.54 - rulemaking procedures.
- ss 120.545 - committee review of agency proposed rule.
- ss 120.55 - publication.
- ss 120.56 - challenging the validity of a rule or proposed rule.
- ss 120.573 - dispute resolution mechanism.
- ss 120.68 - judicial review.

Effectiveness:
There is transparency in decision-making processes.

EVIDENCE:
 There is sufficient evidence that the decision-making processes of the Federal and Gulf states management agencies profiled here are statutory-based thus requiring and ensuring full transparency in all facets of the rule-making undertakings i.e., public and stakeholder engagement, recordkeeping, oversight, voting and accountability, publication, and enactment.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the management arrangements and decision-making processes for the fishery are organized in a transparent manner. Examples may include records of the management arrangements and decision-making processes.

EVIDENCE:
 The availability and quality of evidence is sufficient to substantiate that the management arrangements and decision-making processes for the fishery are organized in a transparent manner. Please see supported evidence in the references

References:

1. <https://www.fisheries.noaa.gov/topic/consultations>
2. https://gulfcouncil.org/wp-content/uploads/Gulf-Council-SOPPs_August-2022.pdf
3. <https://gulfcouncil.org/newsletters/archive/>

¹²⁶ <https://www.doah.state.fl.us/ALJ/>

¹²⁷ <https://www.doah.state.fl.us/ALJ/Decisions/>

¹²⁸ <https://www.flrules.org/Default.asp>

¹²⁹ http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&URL=0100-0199/0120/0120ContentsIndex.html

1.8. The management arrangements and decision-making processes for the fishery shall be organized in a transparent manner.

4. <https://statutes.capitol.texas.gov/Docs/GV/htm/GV.551.htm>
5. <https://tpwd.texas.gov/about/administration-divisions/communications>
6. <https://tpwd.texas.gov/site/compact>
7. <https://statutes.capitol.texas.gov/Docs/GV/htm/GV.2001.htm>
8. <https://myfwc.com/about/commission/meeting-protocol/>
9. <https://myfwc.com/media/23329/fitkapril2020.pdf>
10. https://outreach.myfwc.com/events/event_list.asp
11. <https://myfwc.com/news/>
12. https://parlouisiana.org/wp-content/uploads/2016/03/Open_Meetings_Law.pdf
13. https://www.wlf.louisiana.gov/assets/Fishing/Commercial_Fishing/Files/Commercial-Shrimp/shrimp_task_force_bylaws.pdf
14. <https://www.wlf.louisiana.gov/resources/category/shrimp-task-force/211>
15. <https://www.wlf.louisiana.gov/resources/category/commission-meeting-minutes>
16. <https://www.openmeetings.alabama.gov/generalpublic/publicdefault.aspx>
17. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.643.5154&rep=rep1&type=pdf>
18. https://gulfcouncil.org/wp-content/uploads/Gulf-Council-SOPPs_February-2023.pdf
19. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.643.5154&rep=rep1&type=pdf>
20. <https://www.regulations.gov/aboutUs>
21. https://texas.public.law/statutes/tex._gov't_code_section_2001.004
22. [https://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=2&ch=57&rl=801](https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=2&ch=57&rl=801)
23. <https://www.doah.state.fl.us/ALJ/>
24. <https://www.doah.state.fl.us/ALJ/Decisions/>
25. <https://www.flrules.org/Default.asp>
26. http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&URL=0100-0199/0120/0120ContentsIndex.html
27. https://www.wlf.louisiana.gov/assets/Fishing/Commercial_Fishing/Files/Commercial-Shrimp/shrimp_task_force_bylaws.pdf
28. <https://dmr.ms.gov/wp-content/uploads/2021/09/Title-22-Part-22-20210823.pdf>
29. <https://dmr.ms.gov/wp-content/uploads/2019/07/MDMR-Strategic-Plan-2019-2023.pdf>
30. <https://www.outdooralabama.com/sites/default/files/Enforcement/2019-2020%20Title%209%20Only.pdf>
31. Documentation provided by the client representatives.

Numerical score:	Starting score	-	Number of EPs NOT met	x	3	=	Overall score	
	All agencies - 10		All agencies - 0				All agencies - 10	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							All agencies - High	
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							All agencies - Full	
Non-conformance Number (if applicable):							NA	

9.2.1.13 Supporting Clause 1.9.

1.9. Management organizations not party to the Agreement to Promote Compliance with International Conservation and Management Measures by Vessels Fishing in the High Seas shall be encouraged to accept the Agreement and to adopt laws and regulations consistent with the provisions of the Agreement.																	
Relevance:	<p>Not relevant.</p> <p>Note: The clause is not relevant because the U.S. GOM shrimp fishery under assessment is not located in the High Seas.</p>																
Evaluation Parameters	Met?																
Process: <i>Regulation to implement the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas has been adopted. Assessors shall consult the following document http://www.fao.org/docrep/meeting/003/x3130m/X3130E00.htm for reference to the Agreement.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Current status/Appropriateness/Effectiveness: <i>There are laws regulating high seas fishing activity. Describe how they accomplish this.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization is party to the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, or has adopted laws and regulations consistent with the provisions of the Agreement. Examples may include reports on the management of high seas fishing activities.</i>	<input type="checkbox"/>																
EVIDENCE:																	
References:																	
Numerical score:	<table border="0"> <tr> <td align="center">Starting score</td> <td align="center">-</td> <td align="center">(</td> <td align="center">Number of EPs <u>NOT</u> met</td> <td align="center">x 3</td> <td align="center">)</td> <td align="center">=</td> <td align="center">Overall score</td> </tr> <tr> <td align="center">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score	10							
Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score										
10																	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																
Non-conformance Number (if applicable):																	

9.2.2 Fundamental Clause 2. Coastal area management frameworks

Management organizations shall participate in coastal area management, decision-making processes and activities related to the fishery and its users, supporting sustainable and integrated resource use, and conflict avoidance.

9.2.2.1 Supporting Clause 2.1.

2.1.	<p>Within the fisheries management organization’s jurisdiction, an appropriate policy, legal, and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, (1) taking into account the fragility of coastal ecosystems and finite nature of their natural resources, (2) allowing for determination of the possible uses of coastal resources and governing access to them, and (3) recognizing the rights and needs of coastal communities and their customary practices to the extent compatible with sustainable development. In setting policies for the management of coastal areas, States shall take due account of the risks and uncertainties involved.</p>
Relevance:	Relevant.
Evaluation Parameters	
<p>Process: <i>A mechanism exists by which the integrated management of multiple coastal area uses is conducted, the possible uses of coastal resources are assessed, and access to them is governed. Accordingly, policies for the management of the coastal area are set. Assessment teams shall document how existing authorities and/or processes cooperate and interact together to manage coastal resources (living and non-living) in a transparent, organized, and sustainable way that minimizes environmental issues while taking into account the socio-economic aspects, needs, and interests of the various stakeholders of the coastal zone.</i></p>	<p>Met?</p> <p style="text-align: right;"><input checked="" type="checkbox"/></p>
<p>EVIDENCE: There is in place an appropriate policy, legal and institutional framework to achieve sustainable and integrated use of living marine resources. The system takes into account the fragility of coastal ecosystems and the finite nature of natural resources, and it considers the rights, needs and customary practices of coastal communities. The system allows for determination of possible uses of coastal resources and governs access to them. Policies for coastal zone management take due account of the risks and uncertainties involved.</p> <p>The federal Coastal Zone Management Act (CZMA) of 1972 authorized a voluntary partnership between the federal government and coastal states to address national coastal issues with a local focus. NOAA’s Office for Coastal Management organizes participation from all states and territories with a coastal zone (including the great lakes).¹³⁰ Each state has their own Coastal Management Program (CMP) and the Gulf States are referenced below. The federal CZMA allows for cooperation among states which includes cooperation with NOAA. All states in the Gulf have Coastal Zone Management Programs (CZMPs) which allow for cooperation among them if needed.</p>	
<p>Current status/Appropriateness/Effectiveness: <i>The coastal management framework includes explicit consideration of the fragility of coastal ecosystems, the finite nature of coastal resources, and the needs of coastal communities, and accounts for the rights and customary practices of coastal communities. These policies take due account of risks and uncertainties.</i></p>	<p style="text-align: right;"><input checked="" type="checkbox"/></p>
<p>EVIDENCE: The major components of the National CZMP is to provide federal consistency amongst states, coastal zone enhancement, nonpoint pollution control, and coastal and estuarine land conservation. The federal consistency provides protocols across states and also gives states an opportunity to influence federal decisions where they otherwise would not be able to. Coastal zone enhancement provides incentives to states and territories to enhance their CMPs within nine areas of national significance. Nonpoint pollution control ensures that states have appropriate resources to prevent and control pollution runoff. And coastal and estuarine land conservation purchases threatened lands for conservation purposes.</p> <p>Below is each state’s CMP (or CAMP and CRMP) and details their efforts toward each of the four major components of the national program. Texas Coastal Management Program¹³¹</p>	

¹³⁰ <https://coast.noaa.gov/>

¹³¹ <https://www.glo.texas.gov/coast/grant-projects/cmp/index.html>

2.1. Within the fisheries management organization’s jurisdiction, an appropriate policy, legal, and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, (1) taking into account the fragility of coastal ecosystems and finite nature of their natural resources, (2) allowing for determination of the possible uses of coastal resources and governing access to them, and (3) recognizing the rights and needs of coastal communities and their customary practices to the extent compatible with sustainable development. In setting policies for the management of coastal areas, States shall take due account of the risks and uncertainties involved.

Louisiana Coastal Management Program¹³²
 Mississippi Coastal Resources Management Program¹³³
 Alabama Coastal Area Management Program¹³⁴
 Florida Coastal Management Program¹³⁵

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that within the fisheries management organization’s jurisdiction, an appropriate policy within the legal and institutional framework has been adopted in order to achieve sustainable and integrated use of living marine resources. Examples may include coastal management plans or other policy documents, and frameworks for resource/coastal management.



EVIDENCE:
 Refer to the *Process and Current status/Appropriateness/Effectiveness* Evaluation Parameters for evidence.

References:	Refer to embedded footnotes		
Numerical score:	Starting score	- (Number of EPs <u>NOT</u> met x 3)	= Overall score
	10	(0 x 3)	= 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance		
Non-conformance Number (if applicable):	N/A		

¹³² <https://www.dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=85&ngid=5>

¹³³ <https://dmr.ms.gov/coastal-resources-management-2/>

¹³⁴ <http://adem.alabama.gov/programs/coastal/default.cnt>

¹³⁵ <https://floridadep.gov/fcmp>

9.2.2.2 Supporting Clause 2.1.1.

2.1.1. States shall establish mechanisms for cooperation and coordination in planning, development, conservation, and management of coastal areas.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is a mechanism to allow cooperation between neighboring States to improve coastal resource management.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The Gulf of Mexico Fishery Management Council (GMFMC or The Council) is one of eight US regional fishery management councils. ¹³⁶ The Council is made up of state, federal, industry, and at large entities which are responsible for preparing the fishery management plans (FMPs) for the GOM. The Council uses scientific advice from NOAA Fisheries and public input to inform decisions that are forwarded to NMFS for implementation. The Council serves as a mechanism to allow cooperation between neighboring states and federal jurisdiction.	
Current status/Appropriateness/Effectiveness: <i>There are records of cooperation. Examples may include fishery, fishery enhancement, or other agreements or records from international forums.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The GMFMC consists of 17 voting members: the Southeast Regional Administrator of NOAA Fisheries' Southeast Regional Office, the directors of the five Gulf state marine resource management agencies, and 11 members who are nominated by the state governors and appointed by the US Secretary of Commerce. There are also four non-voting members representing the US Coast Guard, US Fish and Wildlife Service, US Department of State, and the Gulf States Marine Fisheries Commission. The Council meets regularly, and meeting minutes are posted online for public reference. ¹³⁷ There are also Advisory Panels (APs) which fall under the purview of The Council and those panel minutes are also published online for public reference. The Council currently has three different regulatory instruments for addressing fishery management issues. First, it may develop a fishery management plan or plan amendment to establish management measures. The amendment process can take one to three years depending on the analysis needed to support the amendment actions. Second, it may vote to request an interim or emergency rule that could remain effective for 180 days with the option to extend it for an additional 186 days. Interim and emergency rules are only meant as short-term management tools while permanent regulations are developed through an amendment. Third, it may prepare a framework action based on a pre-determined procedure that allows changes to specific management measures and parameters. Typically, framework actions take less than a year to implement and, like plan amendments, are effective until amended. ¹³⁸	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the States establish mechanisms for cooperation and coordination in planning, development, conservation, and management of coastal areas. Examples may include reports or data on the international cooperation/information exchange in these events.</i>	<input checked="" type="checkbox"/>
EVIDENCE: There are records of cooperation between states which can be found on the GMFMC website in the form of meeting minutes.	
References:	Refer to embedded footnotes
Numerical score:	$\text{Starting score} - \left(\text{Number of EPs NOT met} \times 3 \right) = \text{Overall score}$ $10 - \left(0 \times 3 \right) = 10$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level:	Full Conformance

¹³⁶ <https://gulfcouncil.org/>

¹³⁷ <https://gulfcouncil.org/meetings/meetings-archive/council-meetings-archive/>

¹³⁸ <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.643.5154&rep=rep1&type=pdf>

2.1.1.	States shall establish mechanisms for cooperation and coordination in planning, development, conservation, and management of coastal areas.
(10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	
Non-conformance Number (if applicable):	N/A

9.2.2.3 Supporting Clause 2.1.2.

2.1.2. The fisheries management organization shall ensure that the authority or authorities representing the fisheries sector and fishing communities in the coastal management process have the appropriate technical capacities and financial resources.																			
Relevance:	Relevant.																		
Evaluation Parameters	Met?																		
Process: <i>There are appropriate technical capacities and financial resources.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: The federal government and all five states received funding necessary to implement technical capacities required for management. The assessment team received documentation of funding from each of the jurisdictions. See below in evidence basis evaluation parameter for documentation.																			
Current status/Appropriateness/Effectiveness: <i>It can be determined with confidence that there are appropriate technical capacities and financial resources.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: It can be determined with confidence that there are appropriate technical capacities and financial resources.																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fisheries management organization ensures that the authority or authorities representing the fisheries sector and fishing communities in the coastal management process have the appropriate technical capacities and financial resources. Examples may include reports or data, overall operating staff, and financial resources/budgets available.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: Financial Overview Texas Parks and Wildlife Department – December 2022 ¹³⁹ Louisiana House Bill No. 1: APPROPRIATIONS: Provides for the ordinary operating expenses of state government for Fiscal Year 2023-2024 ^{140,141} Mississippi Legislature 2023 Regular Session. House Bill 1636 Appropriations: an act making an appropriation for the support and maintenance of the Department of Marine Resources for the fiscal year 2024. ¹⁴² State of Alabama Executive Budget Fiscal Year 2022 ¹⁴³ Florida Fish and Wildlife Conservation Commission. Budget FY 22-23 ¹⁴⁴																			
References:	Refer to embedded footnotes																		
Numerical score:	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Starting score</td> <td>-</td> <td>(</td> <td>Number of EPs <u>NOT</u> met</td> <td>x</td> <td>3</td> <td>)</td> <td>=</td> <td>Overall score</td> </tr> <tr> <td>10</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>10</td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score	10			0					10
Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score											
10			0					10											
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance																		

¹³⁹ https://tpwd.texas.gov/publications/pwdpubs/media/pwd_rp_a0900_0679_12_22.pdf

¹⁴⁰ <https://legis.la.gov/legis/BillInfo.aspx?i=244061>

¹⁴¹ <https://legis.la.gov/legis/ViewDocument.aspx?d=1333457>

¹⁴² <http://billstatus.ls.state.ms.us/documents/2023/html/HB/1600-1699/HB1636SG.htm>

¹⁴³ <https://budget.alabama.gov/wp-content/uploads/2021/03/FINAL-State-of-Alabama-Budget-Documents-FY22.pdf>

¹⁴⁴ <https://myfwc.com/research/about/budget/>

9.2.2.4 Supporting Clause 2.2.

<p>2.2. Representatives of the fisheries sector and fishing communities shall be consulted in the decision-making processes involving activities related to coastal area management planning and development. The public, as well as others affected, shall also be kept aware of the need for protection and management of coastal resources, and shall participate in the coastal management process.</p>	
<p>Relevance:</p>	<p>Relevant.</p>
<p>Evaluation Parameters</p>	
<p>Process: <i>Describe how fishery-related information is disseminated and how a process is in place to consult with the fishery sector and fishing communities.</i></p>	
	<p>Met?</p> <p style="text-align: center;"><input checked="" type="checkbox"/></p>
<p>EVIDENCE:</p> <p><u>Information Dissemination:</u></p> <p>US and All Gulf States (All UoAs)</p> <p>There is evidence to demonstrate that GOM federal and state management agencies are committed to accountability and transparency in their decision-making processes. This evidence is sourced in statutes, agency mandates and operations guidelines, and multi-year strategic plans. The membership of several committees, sub-committees and advisory bodies for the GOM’s commercial fisheries as described in this report includes a broad cross-section of stakeholders’ organizations with direct access to first-hand information pertaining to the fishery’s performance and management action. Non-members can obtain information on request and government agencies are required to provide it such as under access-to-information laws.</p> <p>Members of the public and representatives of stakeholders’ groups can access information generated from research, monitoring, evaluation and review activities that are presented and debated at formal committee venues including at public hearings, workshops and outreach initiatives. Agency websites are sources of information where formal reporting is presented. Most committee meetings are open to the general public (<i>Open Meetings Act</i>) and administrative procedures (<i>Administrative Procedures Act</i>) exist that allow individuals the opportunity to (i) question officials, express concerns, and offer suggestions, and (ii) receive explanations for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. Non-confidential information and data are available publicly. Examples include information associated with (i) environmental impact assessments, (ii) fishery management plan amendments and actions, (iii) fishery dependent, independent and socio-economic data, (iv) agency reports to legislative bodies, (v) access and allocations decisions, and (vi) infractions outcomes against fishery regulations and consequent penalties.</p> <p><u>Stakeholder participation:</u></p> <p>US (Federal UoAs)</p> <p>The decision-making process followed by the GMFMC is described in the Council’s Statement of Organization, Practices, and Procedures (May 2020). Section 3.2.2 provides for decisions to be taken by consensus except if it involves a/an: (i) FMP, (ii) amendment to a FMP, (iii) proposed regulation, (iv) secretarial FMP or amendment, or (v) Council finding that an emergency exists involving any fishery.</p> <p>When reviewing potential rule changes, the Council draws upon the services of knowledgeable people from other state and federal agencies, universities, and the public to balance competing interests and achieve the greatest overall benefit to the nation. Scoping workshops and public hearings are held throughout the Gulf coast to collect input. Public comment is considered by the Council before it takes final action on proposed rule changes. The Council also collects comments on proposed changes through virtual meetings and online comment forms. Public testimony is heard during each Council meeting. After the Council takes final action, proposed rule changes are submitted to the NMFS for further review and approval before implementation by the Secretary of Commerce.</p> <p>Texas UoAs</p> <p>The <i>Texas Administrative Code</i> defines the decision-making powers assigned by law to the Executive Director of the TPWD.¹⁴⁵ Specifically,</p>	

¹⁴⁵[https://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=2&ch=57&rl=801](https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=2&ch=57&rl=801)

2.2. Representatives of the fisheries sector and fishing communities shall be consulted in the decision-making processes involving activities related to coastal area management planning and development. The public, as well as others affected, shall also be kept aware of the need for protection and management of coastal resources, and shall participate in the coastal management process.

- The executive director shall have the duties, responsibilities, and authority to take action as necessary, including but not limited to emergency rulemaking, to modify state coastal fisheries regulations to conform with federal regulations in the Exclusive Economic Zone and implement fishery management plans ultimately approved by the Secretary of Commerce, including but not limited to Exempted Fishing Permits (EFPs), when such action is deemed to be in the best interest of the State of Texas.
- The executive director shall promptly notify the chairman of the commission when any such action is required and prior to any such action being taken.
- The executive director shall cause to be published in the *Texas Register* a public notice of any action taken, including the period during which such action is to be in effect, pursuant to subsection (a) of this section.
- Any action taken by the executive director pursuant to this section shall remain in effect for the period specified for such action but shall not exceed the effective period of the respective federal regulation in the Exclusive Economic Zone.

The purpose of state representation at the Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters. The state's participation provides an entry point for affected stakeholder groups and the general public to participate in decisions taken by the Department and the Commission.

As reported previously, the TPWC's primary mandate is to develop policies for consideration by the TPWD. Arguably, the recommendations themselves are in fact decisions by the Commission.

Louisiana UoAs

The decision-making authority assigned to the Louisiana Wildlife and Fisheries Commission is informed in part by the *Revised Statutes* and its participation in, and involvement with, the work of the Gulf of Mexico Fishery Management Council and the Gulf States Marine Fisheries Commission, all of which serve to define and inform the LWFC's internal decision-making procedures and practices.

Rule-making procedures by the state's agencies are stipulated in the *Revised Statutes* and include, *inter alia*, the following procedural requirements:

- §952 (Public information; adoption of rules; availability of rules and orders), (i) file with the Office of the State Register a description of its organization, stating the general course and method of its operations and the methods whereby the public may obtain information or make submissions or requests, (ii) adopt rules of practice setting forth the nature and requirements of all formal and informal procedures available, (iii) make available for public inspection all rules, preambles, responses to comments, and submissions and all other written statements of policy or interpretations formulated, adopted, or used by the agency in the discharge of its functions and publish an index of such rules, preambles, responses to comments, submissions, statements, and interpretations on a regular basis, and (iv) make available for public inspection all final orders, decisions, and opinions.
 - §953 (Procedure for adoption of rules; agency rule review).
- A. Prior to the adoption, amendment, or repeal of any rule, the agency shall:
- Give notice of its intended action and a copy of the proposed rules at least ninety days prior to taking action on the rule. The notice shall include: (i) a statement of either the terms or substance of the intended action or a description of the subjects and issues involved; (ii) a statement, approved by the legislative fiscal office, of the fiscal impact of the intended action, if any; or a statement, approved by the legislative fiscal office, that no fiscal impact will result from such proposed action; (iii) a statement, approved by the legislative fiscal office, of the economic impact of the intended action, if any; or a statement, approved by the legislative fiscal office, that no economic impact will result from such proposed action; (iv) the name of the person within the agency who has the responsibility for responding to inquiries about the intended action; (v) the time when, the place where, and the manner in which interested persons may present their views thereon; (vi) a statement that the intended action complies with the statutory law administered by the agency, including a citation of the enabling legislation; (vii) the preamble, which explains the basis and rationale for the intended action and summarizes the information and data supporting the intended action; (viii) a statement concerning the impact on family formation, stability,

2.2. Representatives of the fisheries sector and fishing communities shall be consulted in the decision-making processes involving activities related to coastal area management planning and development. The public, as well as others affected, shall also be kept aware of the need for protection and management of coastal resources, and shall participate in the coastal management process.

and autonomy as set forth in R.S. 49:972; (ix) a statement concerning the impact on child, individual, or family poverty in relation to individual or community asset development as set forth in R.S. 49:973; and (x) a statement concerning the economic impact on small businesses, as set forth in R.S. 49:978.4, and the small business regulatory flexibility analysis, as set forth in R.S. 49:978.5.

- B. The notice shall be published at least once in the Louisiana Register and shall be submitted with a full text of the proposed rule to the Louisiana Register at least one hundred days prior to the date the agency will take action on the rule.
- C. Afford all interested persons reasonable opportunity to submit data, views, comments, or arguments, orally or in writing. In case of substantive rules, opportunity for oral presentation or argument must be granted if requested within twenty days after publication of the rule as provided in this Subsection, by twenty-five persons, by a governmental subdivision or agency, by an association having not less than twenty-five members, or by a committee of either house of the legislature to which the proposed rule change has been referred under the provisions of R.S. 49:968.
- D. Make available to all interested persons copies of any rule intended for adoption, amendment, or repeal from the time the notice of its intended action is published in the Louisiana Register. Any hearing pursuant to the provisions of this Paragraph shall be held no earlier than thirty-five days and no later than forty days after the publication of the Louisiana Register in which the notice of the intended action appears. The agency shall consider fully all written and oral comments and submissions respecting the proposed rule.
- E. An interested person may petition an agency requesting the adoption, amendment, or repeal of a rule. Each agency shall prescribe by rule the form for petitions and the procedure for their submission, considerations, and disposition. Within ninety days after submission of a petition, the agency shall either deny the petition in writing, stating reasons for the denial, or shall initiate rulemaking proceedings in accordance with this Chapter.

Mississippi UoAs

The decision-making authorities of the Department of Marine Resources reside with the Executive Director or his/her delegate and provisions of the *Mississippi Code*. They include to (i) carry out all regulations and rules adopted by the commission and enforce all licenses and permits issued by the department (§ 49-15-305-2f), and (ii) Implement the policy of the commission regarding marine resources within the jurisdiction of the department (§ 49-15-305-a).

The Commission’s general administrative rules stipulate that:¹⁴⁶

- A simple majority of the Commission constitutes a quorum and an act of the majority will constitute Commission action (Rule 1.2 J).
- The Department of Marine Resources will seek the Commission’s recommendations concerning the enactment of rules and regulations at the regularly scheduled meetings (Rule 1.7 A).
- Any comments received during the required notice period will be presented to the Commission along with any recommended changes to the proposed regulation (Rule 1.7 D), and
- The Commission will then vote on whether to recommend to the Executive Director to adopt the regulation with or without changes (Rule 1.7 E).

Alabama UoAs

According to *Alabama Code* § 9-2-15¹⁴⁷, the Commissioner of the DCNR shall have the power and authority to establish and promulgate rules and regulations, including amendments and repeals thereof, with respect to the manner of performance of all functions and duties of the Department, which rules and regulations shall be reasonably calculated to effect the expeditious and efficient performance of such functions and duties and shall not be in conflict with applicable statutes. The rule-making power of the Commissioner shall not be delegated, except as otherwise expressly provided.

The Conservation Advisory Board, created by statute, is composed of 10 members appointed by the Governor for alternating terms of six years, and three ex-officio members in the persons of the Governor, the Commissioner of Agriculture and Industries, and the

¹⁴⁶ <https://dmr.ms.gov/wp-content/uploads/2021/09/Title-22-Part-22-20210823.pdf>

¹⁴⁷ <https://www.outdooralabama.com/sites/default/files/Enforcement/2019-2020%20Title%209%20Only.pdf>

2.2. Representatives of the fisheries sector and fishing communities shall be consulted in the decision-making processes involving activities related to coastal area management planning and development. The public, as well as others affected, shall also be kept aware of the need for protection and management of coastal resources, and shall participate in the coastal management process.

Director of the Alabama Cooperative Extension System. The Commissioner of Conservation and Natural Resources serves as the ex-officio secretary of the board.¹⁴⁸

Florida UoAs

The Commission’s decision-making process with respect to marine fisheries, for example, is informed by **annual workplans** that are prepared by Marine Fisheries Management staff and submitted to Commissioners for approval. Input from staff of the Fish and Wildlife Research Institute (FWRI) helps align research and management priorities and coordinate staff efforts for the coming fiscal year. Workplan development takes into account Commissioner input, stock assessment schedules, staff recommendations, public concerns, federal issues, and issues carried over from the previous year’s workplan.

Individuals can challenge a decision by the Commission either through the state’s judicial process or by filing a document with the state’s Division of Administrative Hearings.¹⁴⁹ Decisions are issued in writing and posted on the division’s website.¹⁵⁰

Current status/Appropriateness/Effectiveness:

There are records of consultations with the fisheries sector and fishing communities. Attempts have been made to create public awareness on the need for protection and management of coastal resources, and those affected by the management process have been made aware of its provision.



EVIDENCE:

US and All Gulf States (All UoAs)

The components of the management systems at the federal and state levels are well established and updated as required. They include detailed descriptions of the consultation and engagement approaches in place to seek input to proposed amendments to the systems, including new initiatives. The management systems themselves are integrated in a manner that promotes fishery and management objectives and are structured so as to receive relevant information from affected parties, including local knowledge. All federal and state management committees are open to the public, and opportunities are provided to offer knowledge and recommendations on the management systems. Moreover, the management committees are operationalized in accordance with the administrative requirements of the *Open Meetings Act* and records of these meetings are published and available to the public.

Both federal and state organisations have mature consultation processes that are directly tied to and defined by their statutory authorities and obligations. The dates and venues of meetings of the various management committees with accompanying meeting agendas and discussion documents are web-posted and scheduled well in advance, both of which allow affected parties and the general public time to properly prepare their input. Consideration of information received is reflected in meeting minutes, many of which are reported verbatim. In addition to these venues, other mechanisms are regularly in play when input from affected parties and the general public is sought. These include proposed amendments to Fisheries Management Plans that are posted in the *Federal Register*, draft Environmental Impact Statements that inform on proposed changes, outreach sessions throughout the year, and various social media sites.

Both federal and state organisations have public affairs divisions that make extensive use of traditional and electronic media outlets to inform affected and interested parties on a broad cross-section of information sources related to their management systems. There is evidence to indicate that explanations are generally provided when information is used in support of changes to the management systems, including when information is not used.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that representatives of the fisheries sector and fishing communities are consulted in the decision-making processes and involved in other activities related to coastal area management planning and development. The public, and others affected, are also kept aware of the need for the protection and management of coastal resources and are participants in the management process. Examples may



¹⁴⁸ <https://www.outdooralabama.com/about-us/conservation-advisory-board>

¹⁴⁹ <https://www.doah.state.fl.us/ALJ/>

¹⁵⁰ <https://www.doah.state.fl.us/ALJ/Decisions/>

2.2. Representatives of the fisheries sector and fishing communities shall be consulted in the decision-making processes involving activities related to coastal area management planning and development. The public, as well as others affected, shall also be kept aware of the need for protection and management of coastal resources, and shall participate in the coastal management process.

include public records of consultation activities and other available documentation published on the internet or distributed at public meetings.

EVIDENCE:

See evidence provided in Evaluation Parameters above.

References: Refer to embedded footnotes

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									N/A

9.2.2.5 Supporting Clause 2.3.

2.3.	Fisheries practices that avoid conflict among fishers and other users of the coastal area (e.g., fisheries enhancement facilities, tourism, energy) shall be adopted, and fishing shall be regulated in such a way as to avoid risk of conflict among fishers using different vessels, gear, and fishing methods. Procedures and mechanisms shall be established at the appropriate administrative level to settle conflicts that arise within the fisheries sector and between fisheries resource users and other coastal users.	
Relevance:	Relevant.	
Evaluation Parameters		Met?
Process:	<i>These practices have been adopted, and there is a process to regulate fishing gear, methods, and vessels so as to avoid risk of conflict. If conflicts arise, there is a process in place to settle conflicts between fishery users and other users.</i>	<input checked="" type="checkbox"/>
EVIDENCE:	<i>Federal and All Gulf State UoAs</i>	
	The US judicial system at the state and federal levels includes a longstanding court-based mechanism that informs the management regimes for resolving legal disputes that may arise within the system (e.g., judicial challenges, administrative reviews). The mechanism provides for the resolution of legal disputes in a public forum, thus ensuring transparency at all stages of the legal process. The judicial system at the state and federal levels is considered to be effective in that disputes are ultimately resolved in favour of a litigating party.	
Current Status/Appropriateness/Effectiveness:	<i>Describe these practices and their effectiveness within the fishery sector, and between fishers and other coastal users.</i>	<input checked="" type="checkbox"/>
EVIDENCE:	The Assessment Team found no evidence of federal-state legal disputes in respect of the management system for the GOM shrimp fisheries since at least 2010. That is not surprising given the record of cooperation between the agencies and the emphasis that is placed on seeking and achieving consensus in the decision-making processes. That said, there is compelling evidence that the management system has been tested repeatedly and proven to be effective when responding to offences committed by fishery participants (licence holders, onshore companies, or other entities).	
Evidence Basis:	<i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fisheries practices that avoid conflict among fishers and other users of the coastal area (e.g., fisheries enhancement facilities, tourism, energy) are adopted and fishing is regulated in such a way as to avoid risk of conflict among fishers using different vessels, gear, and fishing methods. Procedures and mechanisms are established at the appropriate administrative level to settle conflicts that arise within the fisheries sector, and between fisheries resource users and other coastal users. Examples may include laws and regulations or other documents.</i>	<input checked="" type="checkbox"/>
EVIDENCE:	Magnuson-Stevens Fishery Conservation and Management Act (MSA) ¹⁵¹ Texas Administrative Code (TAC) ¹⁵² Louisiana Revised Statutes ¹⁵³ Mississippi Code 1972 ¹⁵⁴ Alabama Administrative Code ¹⁵⁵ Florida Administrative Code ¹⁵⁶	
References:	Refer to embedded footnotes	

¹⁵¹ http://www.nmfs.noaa.gov/sfa/laws_policies/msa/

¹⁵² <https://www.sos.texas.gov/tac/index.shtml>

¹⁵³ https://www.legis.la.gov/legis/Laws_Toc.aspx?folder=75&level=Parent

¹⁵⁴ <https://law.justia.com/codes/mississippi/2020/>

¹⁵⁵ <https://www.law.cornell.edu/regulations/alabama>

¹⁵⁶ <https://www.flrules.org/>

9.2.2.6 Supporting Clause 2.4.

2.4. States' fisheries management organizations and sub-regional or regional fisheries management organizations and arrangements shall give due publicity to conservation and management measures and ensure that laws, regulations, and other legal rules governing their implementation are effectively disseminated. The bases and purposes of such measures shall be explained to users of the resource in order to facilitate their application and thus gain increased support in the implementation of such measures.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is a process that allows for fishery-related information to be disseminated.</i>	<input checked="" type="checkbox"/>
EVIDENCE: All gulf state and federal decisions are open for public consultation and published in a way that is publicly available. All documents and presentations given to GMFMC, committees, task forces, advisory panels, etc. are published along with meeting minutes.	
Current status/Appropriateness/Effectiveness: <i>There is a record of the disseminated information, and is it disseminated effectively, and the basis and purposes of such regulation explained to users.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The long-term objectives for the GOM's fisheries management system are set out in various federal and state instruments, including:	
A. <u>Federal statutes and State codes</u> <ul style="list-style-type: none"> ● Conservation: stock assessments, sustainability, precautionary approach, best available science; ● Resource management: social and economic (licensing, access, and allocations); ● Coastal zones: environmental management; ● Habitat and Ecosystems: ecosystem management, sanctuaries; ● Species-at-risk and mammals: non-retention prohibitions; and ● Enforcement: compliance, deterrence, penal provisions. 	
B. <u>Strategic Plans (partial)</u> <ul style="list-style-type: none"> ● Organizations: mission and mandates, roles, responsibilities, and decision-making; ● Goals and objectives: actions, tactics, performance measures; and ● Stakeholders and Public: communications and engagement, accountability. 	
C. <u>Annual Reports and Internal Audits</u> <ul style="list-style-type: none"> ● Organizations: strategic planning, accountability, transparency. 	
<p>In 2018, the Council began work on developing a Fishery Ecosystem Plan (FEP) to work toward ecosystem-based fishery management in the Gulf of Mexico. The FEP is a guiding document that provides a framework to incorporate ecosystem-aspects into fishery management decisions. Little progress has been made due to staff changes, competing Council priorities, and delays and cancelations due to the COVID-19 pandemic. To date, the Council has formed an Ecosystem Technical Committee to provide guidance on the development of the plan. It met in March 2020 to consider a draft outline of the FEP. The proposed work product would include but not be limited to:</p> <ul style="list-style-type: none"> ● An overview of NOAA Fisheries policies addressing ecosystem-based fisheries. ● A summary of FEPs developed by other Fishery Management Councils to define the structure of the documents and key methods that would be applied on an FEP for the Gulf of Mexico region. ● Identification of key ecosystem indicators and the predicted social, economic, and biological responses that would be used to comprise large sections of the FEP. ● Layout a framework to directly incorporate the results into management actions. ● Outcomes from this work will be refined based on Council input and insights from public comments during Council meetings, and results from Council and SEFSC stakeholder workshops. 	
<p>The most recent draft version of the FEP is dated March 2022.¹⁵⁷ In its current form, the document includes 5 chapters:</p> <ul style="list-style-type: none"> ● Chapter 1: Vision, Goals and Objectives 	

¹⁵⁷ https://gulfcouncil.org/wp-content/uploads/Q-4b-Gulf-of-Mexico-Fishery-Ecosystem-Plan-2022_03_25-AS-SUBMITTED-2.pdf

2.4. States' fisheries management organizations and sub-regional or regional fisheries management organizations and arrangements shall give due publicity to conservation and management measures and ensure that laws, regulations, and other legal rules governing their implementation are effectively disseminated. The bases and purposes of such measures shall be explained to users of the resource in order to facilitate their application and thus gain increased support in the implementation of such measures.

- Chapter 2: Guiding Principles and Overarching Concepts
- Chapter 3: Expanded Research Infrastructure
- Chapter 4: Processes and Procedures
- Chapter 5: Summary and Recommendations

The Committee most recently met on April 19-20, 2023. It previously met on December 14-15, 2021. Minutes of the April 2023 meeting provide a roadmap of future work requirements.¹⁵⁸ Staff is scheduled to present the recommendations from the meeting during the June 2023 Council meeting. The ETC recognizes that there is still work to do, such as fine-tuning the FEP and FEI loops; further developing prioritization metrics; and discussing the outcomes via a publicly-noticed webinar after the June 2023 Council meeting.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States' fisheries management organizations and sub-regional or regional fisheries management organizations and arrangements give due publicity to conservation and management measures and ensure that laws, regulations and other legal rules governing their implementation are effectively disseminated. The bases and purposes of such measures are explained to users of the resource in order to facilitate their application and thus gain increased support in the implementation of such measures. Examples may include records of such management measures published in the internet or distributed at public meetings.



EVIDENCE:
 Gulf Council Meeting Archive¹⁵⁹
 TPW Commission Meeting Archive¹⁶⁰
 Louisiana Shrimp Task Force Meeting Archives¹⁶¹
 Mississippi Advisory Commission on Marine Resources (MACMR) Meeting Archive¹⁶²
 Florida Fish and Wildlife Conservation Commission Meeting Archive¹⁶³

References:	Refer to embedded footnotes		
Numerical score:	Starting score	- (Number of EPs NOT met x 3)	= Overall score
	10	- (0 x 3)	= 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance		
Non-conformance Number (if applicable):	N/A		

¹⁵⁸ https://gulfcouncil.org/wp-content/uploads/ETC_mtg_April_19_2023_05052023.pdf

¹⁵⁹ <https://gulfcouncil.org/meetings/council/>

¹⁶⁰ <https://tpwd.texas.gov/business/feedback/meetings/>

¹⁶¹ <https://www.wlf.louisiana.gov/page/shrimp-task-force>

¹⁶² <https://dmr.ms.gov/cmrr/>

¹⁶³ <https://myfwc.com/about/commission/commission-meetings/>

9.2.2.7 Supporting Clause 2.5.

2.5. The economic, social, and cultural value of coastal resources shall be assessed by the appropriate fisheries management organization in order to assist decision making on their allocation and use.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is a system that allows for socio-economic value assessments and cultural value assessments to be carried out.</i>	<input checked="" type="checkbox"/>
EVIDENCE: <i>Federal and all Gulf State UoAs</i> US marine fisheries are scientifically monitored, regionally managed, and legally enforced under a number of requirements, including ten national standards. The National Standards are principles that must be followed in any fishery management plan to ensure sustainable and responsible fishery management. As mandated by the <i>Magnuson-Stevens Fishery Conservation and Management Act</i> , NOAA Fisheries has developed guidelines for each National Standard. When reviewing fishery management plans, plan amendments, and regulations, the Secretary of Commerce must ensure that they are consistent with the National Standard guidelines. ¹⁶⁴	
National Standard 1 – Optimum Yield Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.	
National Standard 2 – Scientific Information Conservation and management measures shall be based upon the best scientific information available.	
National Standard 3 – Management Units To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.	
National Standard 4 – Allocations Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (a) fair and equitable to all such fishermen; (b) reasonably calculated to promote conservation; and (c) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privilege.	
National Standard 5 – Efficiency Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.	
National Standard 6 – Variations and Contingencies Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.	
National Standard 7 – Costs and Benefits Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.	
National Standard 8 – Communities Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirement of paragraph (2) [i.e., National Standard 2], in order to (a) provide for the sustained participation of such communities, and (b) to the extent practicable, minimize adverse economic impacts on such communities.	
National Standard 9 – Bycatch Conservation and management measures shall, to the extent practicable, (a) minimize bycatch and (b) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.	
National Standard 10 – Safety of Life at Sea Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea. These standards effectively create a system where socio-economic and cultural values are considered in fishery management.	

¹⁶⁴ <https://www.fisheries.noaa.gov/national/laws-and-policies/national-standard-guidelines>

2.5. The economic, social, and cultural value of coastal resources shall be assessed by the appropriate fisheries management organization in order to assist decision making on their allocation and use.

Current status/Appropriateness/Effectiveness:

There are socio-economic value assessments and cultural value assessments, both of which are effectively assisting decision making on resource allocation and use.



EVIDENCE:

Serious issues for which the decision-making processes at the federal and Gulf states levels are triggered by statutes and regulations and/or are identified in the mandates and plans of the various committees, sub-committees and advisory panels. These issues frequently have implications across federal-state or state-to-state jurisdictions because of their particularities (e.g., fleet viability or community socio-economics). Examples include the fishery’s harvest management measures, annual allocations, stock population dynamics, and habitat and ecosystem impacts. They are researched, evaluated, and discussed with affected parties including the general public before decisions are taken. Serious issues frequently undergo a rigorous environmental impact assessment process which demands that the broader implications of an intended action be thoroughly considered.

The decision-making processes associated with the GoM shrimp fisheries are generally informed by the ranking of a broad cross-section of issues that comprise an agency’s annual plan or multi-year strategic plan. Lower ranked issues are considered “important” or they would not be retained and studied. Like “serious” issues, they would be identified in relevant research, monitoring, evaluation and consultation, and would be pursued in accordance with the approach and timeframes identified in the plan. The most serious issues often have implications across jurisdictions with particular interests (e.g., fleet viability or community socio-economics). They may be studied, evaluated, and discussed more intensively, perhaps involving an adhoc committee of experts, and by other committees, before decisions are taken. Decisions reflect the consensus requirement under which all committees operate. A series of checks and balances akin to a challenge function exist across some committees through a peer review process as does an accountability standard for all committees so that wider implications of decisions are considered. The decisions taken are described in reports that all committees are required to file.

While there is some evidence to indicate that a few committees include a form of adaptive management in addressing their assigned issues, there is no conclusive evidence to indicate that the established decision-making processes are capable of responding to all issues on a timely basis. Some issues are beyond the decision-making authorities of fisheries management agencies. For example, this would be the case if a decision was the subject of a legal challenge by competing resource uses implicating other statutes, or if a matter required a legislative decision such as climate change mitigation, hurricane relief, new oil and gas exploration etc.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the economic, social, and cultural value of coastal resources is assessed in order to assist decision-making on their allocation and use. Examples may include reports on social, cultural, and economic value of the resource.



EVIDENCE:

Gulf Shrimp FMP¹⁶⁵
 Magnuson-Stevens Fishery Conservation and Management Act

References:

	Starting score	Number of EPs <u>NOT</u> met			Overall score
Numerical score:	10	-	(0 x 3)	=	10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)					High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					Full Conformance
Non-conformance Number (if applicable):					N/A

¹⁶⁵ <https://gulfcouncil.org/fishery-management-2/implemented-plans/shrimp/>

9.2.2.8 Supporting Clause 2.6.

2.6. States shall cooperate to support and improve coastal area management, and in accordance with capacities, measures shall be taken to establish or promote (1) systems for research and monitoring of the coastal environment, and (2) multidisciplinary research of the coastal area using physical, chemical, biological, economic, social, legal, and institutional capabilities.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is a system that allows research and monitoring of the coastal environment, and multidisciplinary research in support of coastal area management is promoted.</i>	<input checked="" type="checkbox"/>
EVIDENCE: <p>There is sufficient evidence of additional formal reporting to all interested stakeholders and the general public of comprehensive information on the fishery’s performance and management actions at the federal and states levels. Non-confidential information and data are available publicly. Examples include information associated with (i) environmental impact assessments, (ii) fishery management plan amendments and actions, (iii) fishery dependent, independent and socio-economic data, (iv) agency reports to legislative bodies, (v) access and allocations decisions, and (vi) infractions outcomes against fishery regulations and consequent penalties.</p> <p>NOAA’s Office for Coastal Management organizes participation from all states and territories with a coastal zone (including the great lakes).¹⁶⁶ Each state has their own Coastal Management Program (CMP) and the Gulf States are referenced below. Texas Coastal Management Program¹⁶⁷ Louisiana Coastal Management Program¹⁶⁸ Mississippi Coastal Resources Management Program¹⁶⁹ Alabama Coastal Area Management Program¹⁷⁰ Florida Coastal Management Program¹⁷¹</p>	
Current status/Appropriateness/Effectiveness: <i>Systems of monitoring and research have taken into account physical, chemical, biological, economic, social, legal, and institutional capabilities to support coastal area management.</i>	<input checked="" type="checkbox"/>
EVIDENCE: <u>Texas CMP</u> ¹⁶⁷ Refer to the Texas Section 309 Assessment and Strategies Report: 2021-2025 ¹⁷² for systems of monitoring and research. <u>Louisiana CMP</u> ¹⁶⁸ Refer to the Louisiana Section 309 Assessment and Strategies Report: 2021-2025 ¹⁷³ for systems of monitoring and research. <u>Mississippi CRMP</u> ¹⁶⁹ Refer to the Mississippi Section 309 Assessment and Strategies Report: 2021-2025 ¹⁷⁴ for systems of monitoring and research. <u>Alabama CAMP</u> ¹⁷⁰	

¹⁶⁶ <https://coast.noaa.gov/>

¹⁶⁷ <https://www.glo.texas.gov/coast/grant-projects/cmp/index.html>

¹⁶⁸ <https://www.dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=85&ngid=5>

¹⁶⁹ <https://dmr.ms.gov/coastal-resources-management-2/>

¹⁷⁰ <http://adem.alabama.gov/programs/coastal/default.cnt>

¹⁷¹ <https://floridadep.gov/fcmp>

¹⁷² TGLO. 2020. Texas Coastal Management Program Section 309 Assessment and Strategies Report: 2021-2025. Texas Coastal Management Program.

<https://www.glo.texas.gov/coast/grant-projects/forms/cmp-309-assessment-and-strategies-2021-2025.pdf>

¹⁷³ LOCM. 2020. Louisiana Coastal Management Program Section 309 Assessment and Strategies Report: 2021-2025. Louisiana Office of Coastal Management.

https://www.dnr.louisiana.gov/assets/OCM/Interagency/309/309_2021_2025AS_FINAL.pdf

¹⁷⁴ MDMR. 2020. Mississippi Coastal Program Coastal Zone Management Act § 309 Assessment and Strategy 2021 – 2025. Mississippi Department of Marine Resources.

<https://dmr.ms.gov/wp-content/uploads/2021/09/MS-309-Assessment-and-Strategy-2021-2025-final.pdf>

2.6. States shall cooperate to support and improve coastal area management, and in accordance with capacities, measures shall be taken to establish or promote (1) systems for research and monitoring of the coastal environment, and (2) multidisciplinary research of the coastal area using physical, chemical, biological, economic, social, legal, and institutional capabilities.

The ACAMP is a joint effort of the Alabama Department of Conservation and Natural Resources-State Lands Division and the ADEM Coastal Program. ALDCNR-SLD is responsible for planning and policy development while ADEM is responsible for permitting, monitoring and enforcement activities, as detailed in the ADEM Division 8 Coastal Programs Rules (ADEM Admin. Code R 335-8).

A major focus of the ADEM's permitting, monitoring, and enforcement activities in the coastal area is determining federal consistency (often referred to as coastal consistency) for projects and activities which require federal permits--for example, US Army Corps of Engineers' permits to dredge new navigation channels. In addition, ADEM's Coastal Program rules include the review and permitting for the following types of activities when they are to occur within the Coastal Area: beach and dune construction projects, developments and subdivision of properties greater than five (5) acres in size, dredging and filling of state water bottoms and wetlands, the drilling and operation of groundwater wells with a capacity of 50 gpm or greater, the siting of energy facilities, and other various activities which may have an impact on coastal resources.

Florida CMP¹⁷¹

The Florida CMP is a network of state and local agencies created to implement 24 statutes intended to protect and enhance the state's natural, cultural, and economic coastal resources. Refer to the Florida Section 309 Assessment and Strategies Report: 2021-2025¹⁷⁵ for systems of monitoring and research.

<p>Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is cooperation to support and improve coastal area management, and in accordance with capacities, measures are taken to establish or promote (1) systems for research and monitoring of the coastal environment, and (2) multidisciplinary research of the coastal area using physical, chemical, biological, economic, social, legal, and institutional capabilities. Examples may include reports on the status of the coastal area using the various aspects listed above.</i></p>	<input checked="" type="checkbox"/>
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EVIDENCE:
Refer to the *Process and Current status/Appropriateness/Effectiveness* Evaluation Parameters for evidence.

References: Refer to embedded footnotes

Numerical score:	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score
	10			0					10

<p>Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)</p>	<p style="color: red;">High</p>
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<p>Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)</p>	<p style="color: red;">Full Conformance</p>
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<p>Non-conformance Number (if applicable):</p>	<p>N/A</p>
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¹⁷⁵ Edmond, Holly. 2020. Final Assessment and Strategies FY 2021- 2025 Prepared in accordance with Section 309 of the Coastal Zone Management Act. Florida Coastal Management Program. <https://floridadep.gov/rcp/fcmp/documents/fcmp-final-assessment-and-strategies-fy2021-fy2025>

9.2.2.9 Supporting Clause 2.7.

2.7. In the case of a States' activities that may have an adverse environmental effect on coastal areas of other States, States shall provide timely information and if possible, prior notification to potentially affected States, and consult with those States as early as possible.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is a system to allow early information sharing (i.e., within appropriate timeframes to avoid negative consequences) between States in case of adverse environmental effects from one State.</i>	<input checked="" type="checkbox"/>
EVIDENCE: <p>The federal Coastal Zone Management Act (CZMA) of 1972 authorized a voluntary partnership between the federal government and coastal states to address national coastal issues with a local focus. The federal Coastal Zone Management Act allows for cooperation among states which includes cooperation with NOAA. All states in the Gulf have Coastal Zone Management Programs which allow for cooperation among them if needed.</p> <p>Texas Coastal Management Program¹⁷⁶ Louisiana Coastal Management Program¹⁷⁷ Mississippi Coastal Resources Management Program¹⁷⁸ Alabama Coastal Area Management Program¹⁷⁹ Florida Coastal Management Program¹⁸⁰</p> <p>NOAA has a broad portfolio of activities and services throughout the region. Communication and coordination across NOAA and its partners can be challenging, given the extent of locations, missions, and needs. In order to improve, focus, and better integrate the development and delivery of NOAA's products and services, NOAA's Gulf of Mexico Regional Collaboration Team supports activities and efforts that strengthen communication, coordination, and collaboration among NOAA and partners at regional and sub-regional levels.</p>	
Current status/Appropriateness/Effectiveness: <i>There are current agreements for or past records of such occurrences. Examples may include oil spills, and aquaculture farm escapes among others.</i>	<input checked="" type="checkbox"/>
EVIDENCE: <p>The Deepwater Horizon Oil Spill in the Gulf of Mexico is probably the most relevant example of cooperation among states affected by the same disaster. The Gulf Coast Ecosystem Restoration Council (GCERC)¹⁸¹ was created by the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (RESTORE Act) in 2012 as an independent federal agency charged with administering a portion of the civil settlements associated with the Deepwater Horizon oil spill.¹⁸²</p> <p>The Council includes the governors of the States of Alabama, Florida, Louisiana, Mississippi and Texas; the secretaries of the US Departments of the Interior, Army, Commerce, Agriculture, and Homeland Security; and the administrator of the US Environmental Protection Agency, who currently serves as the chair of the Council.</p> <p>The GCERC makes an annual report to Congress and in the 2022 report¹⁸³ the second update to the initial <i>2013 Comprehensive Plan: Restoring the Gulf coast's Ecosystem and Economy</i> was approved (also updated in 2016) and awarded more than \$147M to carry out</p>	

¹⁷⁶ <https://www.glo.texas.gov/coast/grant-projects/cmp/index.html>

¹⁷⁷ <https://www.dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=85&ngid=5>

¹⁷⁸ <https://dmr.ms.gov/coastal-resources-management-2/>

¹⁷⁹ <http://adem.alabama.gov/programs/coastal/default.cnt>

¹⁸⁰ <https://floridadep.gov/fcmp>

¹⁸¹ <https://www.restorethegulf.gov/>

¹⁸² <https://www.epa.gov/deepwaterhorizon>

¹⁸³ GCERC. 2022. Annual Report to Congress – Gulf Coast Ecosystem Restoration Council, Fiscal Year 2022

https://www.restorethegulf.gov/sites/default/files/Annual_Report_to_Congress_2022_508.pdf

2.7. In the case of a States’ activities that may have an adverse environmental effect on coastal areas of other States, States shall provide timely information and if possible, prior notification to potentially affected States, and consult with those States as early as possible.

projects and programs under the RESTORE Act. The 2022 Comprehensive Plan Update¹⁸⁴ intends to refine and guide the CGERC decisions by:

- Ensuring consistency with the Priority Criteria referenced in the RESTORE Act.
- Reinforcing the Council’s goals, objectives, and Comprehensive Plan commitments.
- Recommitting to the Council’s Funding Strategy, including the Council’s vision for ecosystem restoration.
- Continuing collaboration among Council members and partner ecosystem restoration and protection programs.
- Ensuring that the Council’s decisions are informed by the best available science.
- Communicating benefits of past funding decisions and describing how lessons learned from past actions inform future decisions.
- Improving the efficiency, effectiveness, and transparency of Council actions.

The RESTORE Act and the GCERC are evidence of interstate collaboration to share information through agreements when adverse environmental effects take place.

Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the case of a States’ activities that may have an adverse environmental effect on coastal areas of other States, the State provides timely information and if possible, prior notification to potentially affected States. Examples may include reports or data on the international cooperation in these events.</i>	<input checked="" type="checkbox"/>
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EVIDENCE:
Refer to the *Process and Current status/Appropriateness/Effectiveness* Evaluation Parameters for evidence.

References:	Refer to embedded footnotes		
Numerical score:	Starting score 10	– (	Number of EPs <u>NOT</u> met 0 x 3) =
			10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance		
Non-conformance Number (if applicable):	N/A		

¹⁸⁴ GCERC. 2022. 2022 Comprehensive Plan Update. <https://www.restorethegulf.gov/comprehensive-plan>

9.2.3 Fundamental Clause 3. Management objectives and plan

Management objectives shall be implemented through management rules and actions formulated in a plan or other framework.

9.2.3.1 Supporting Clause 3.1.

3.1.	Long-term management objectives shall be translated into a plan or other management document (taking into account uncertainty and imprecision) and be subscribed to by all interested parties.	
Relevance:	Relevant.	
Evaluation Parameters		Met?
Process: <i>Management objectives based on the best scientific evidence available (which can include traditional/local knowledge, if verifiable) have been translated into a fishery management plan, are in regulation, or are in another document.</i>		<input checked="" type="checkbox"/>
EVIDENCE:		
Federal waters		
The initial GOM Shrimp fishery FMP (1981) ¹⁸⁵ incorporated the following long-term management objectives:		
<ul style="list-style-type: none"> ● Optimize the yield from shrimp recruited to the fishery. ● Encourage habitat protection measures to prevent undue loss of shrimp habitat. ● Coordinate the development of shrimp management measures by the Council with the shrimp management programs of the several states, where feasible. ● Promote consistency with the <i>Endangered Species Act</i> and the <i>Marine Mammal Protection Act</i>. ● Minimize the incidental capture of finfish by shrimpers, when appropriate. ● Minimize conflicts between shrimpers and stone crab fishermen. ● Minimize adverse effects of obstructions to shrimp trawling. ● Provide for a statistical reporting system. 		
US marine fisheries are scientifically monitored, regionally managed, and legally enforced under a number of requirements, including ten national standards. <u>The National Standards are principles that must be followed in any fishery management plan to ensure sustainable and responsible fishery management.</u> As mandated by the <i>Magnuson-Stevens Fishery Conservation and Management Act</i> , NOAA Fisheries has developed guidelines for each National Standard. When reviewing fishery management plans, plan amendments, and regulations, the Secretary of Commerce must ensure that they are consistent with the National Standard guidelines.		
National Standard 1 – Optimum Yield		
Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.		
National Standard 2 – Scientific Information		
Conservation and management measures shall be based upon the <u>best scientific information available</u> .		
National Standard 3 – Management Units		
To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.		
National Standard 4 – Allocations		
Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (a) fair and equitable to all such fishermen; (b) reasonably calculated to promote conservation; and (c) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privilege.		
National Standard 5 – Efficiency		
Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.		
National Standard 6 – Variations and Contingencies		

¹⁸⁵ <https://www.gsmfc.org/publications/Technical%20Report%20Series%20No.%20202.PDF>

3.1. Long-term management objectives shall be translated into a plan or other management document (taking into account uncertainty and imprecision) and be subscribed to by all interested parties.

Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

National Standard 7 – Costs and Benefits

Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

National Standard 8 – Communities

Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirement of paragraph (2) [i.e., National Standard 2], in order to (a) provide for the sustained participation of such communities, and (b) to the extent practicable, minimize adverse economic impacts on such communities.

National Standard 9 – Bycatch

Conservation and management measures shall, to the extent practicable, (a) minimize bycatch and (b) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

National Standard 10 – Safety of Life at Sea

Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Texas

The state’s Shrimp Fishery Management Plan and Economic Impact Analysis are embodied in the *Administrative Code*, Title 31 (Natural Resources and Conservation), Part 2 (Texas Parks and Wildlife Department), Chapter 57 (Fisheries), Subchapter H (Fishery Management Plans), Rule §57.691d (Fishery Management Plans).¹⁸⁶

However, a report by the TDPW (2002) titled “The Texas Shrimp Fishery” describes the management objectives in place for the commercial fishery at that time.¹⁸⁷ The report noted that the legislature had directed the Commission to both prevent overfishing of the resource and achieve optimum yield for the fishery. Optimum yield was defined in the FMP as “the amount of shrimp that the fishery will produce on a continuing basis to achieve the maximum economic benefits to the shrimping industry and the state as modified by any relevant social or ecological factors.”

Title 5 (Wildlife and Plant Conservation), Chapter 77 (Shrimp), Section 77.004 (Research Program) of the *Parks and Wildlife Code*¹⁸⁸ stipulates that (a) The department shall conduct continuous research and study of:

- The supply, economic value, environment, and reproductive characteristics of the various economically important species of shrimp.
- Factors affecting the increase or decrease in shrimp stocks in both an annual and long-term cycle.
- The use and effectiveness of trawls, nets, and other devices for the taking of shrimp.
- Industrial and other pollution of the water naturally frequented by shrimp.
- Statistical information gathered by the department on the marketing, harvesting, processing, and catching of shrimp landed at points in the state.
- Environmental parameters in the bay and estuary areas that may serve as limiting factors of shrimp population abundance.
- Other factors that, based on the best scientific information available, may affect the health and well-being of the economically important shrimp resource.
- Alternative management measures for shrimp that may be considered for implementation in the management regime.

Section 77.007 (Regulation of Catching, Possession, Purchase and Sale of Shrimp) of the Code stipulates that (a) The commission by proclamation may regulate the catching, possession, purchase, and sale of shrimp. A proclamation issued under this section must contain findings by the commission that support the need for the proclamation. (b) In determining the need for a proclamation under Subsection (a) of this section, the commission shall consider:

- Measures to prevent overfishing while achieving, on a continuing basis, the optimum yield for the fishery.

¹⁸⁶[https://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1& tac=&ti=31&pt=2&ch=57&rl=691](https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1& tac=&ti=31&pt=2&ch=57&rl=691)

¹⁸⁷https://tpwd.texas.gov/publications/pwdpubs/media/pwd_rp_v3400_857.pdf

¹⁸⁸<https://statutes.capitol.texas.gov/Docs/PW/htm/PW.77.htm>

3.1. Long-term management objectives shall be translated into a plan or other management document (taking into account uncertainty and imprecision) and be subscribed to by all interested parties.

- Measures based on the best scientific information available.
- Measures to manage shrimp throughout their range.
- Measures, where practicable, that will promote efficiency in utilizing shrimp resources, except that economic allocation may not be the sole purpose of the measures.
- Measures, where practicable, that will minimize cost and avoid unnecessary duplication in their administration.
- Measures which will enhance enforcement.

Louisiana

The state's long-term fishery objectives are listed in its Fishery Management Plan (2016).¹⁸⁹ The overarching goal of the Plan is to ensure long-term conservation and sustainable use of shrimp resources for the maximum environmental, social, and economic benefit to the State and her citizens and visitors. The goal is informed by the following objectives:

- Enhance economic value of the shrimp resource by promoting more effective and efficient harvesting strategies and practices.
- Achieve a level of fishing capacity that provides for a sustainable harvest and allows for a profitable fishery.
- Minimize incidental harvest of finfish, crustaceans, and protected species.
- Promote the protection, restoration, and enhancement of habitat and environmental quality necessary for sustaining the shrimp resource.
- Reduce conflicts among and within user groups, including non-shrimping user groups and activities.
- Minimize adverse effects of underwater obstructions to shrimp trawling.
- Reduce to the maximum extent possible waste of the resource by discouraging operations that result in culling to increase size of retained harvest.
- Promote research, surveys, and outreach efforts that contribute to achieving management goals and objectives.

Mississippi

While the state does not have a Shrimp Fishery Management Plan per se, according to § 49-15-2 of the *Mississippi Code*, any fishery management plan, and any regulation promulgated to implement that plan or promulgated under the state seafood laws, shall be consistent with the following standards for fishery conservation and management:

- Conservation and management measures shall be based upon the best scientific information available.
- If it becomes necessary to allocate or assign fishing privileges among various fishermen, that allocation shall be (i) fair and equitable to those fishermen, (ii) reasonably calculated to promote conservation, and (iii) carried out in a manner that no particular individual, corporation or other entity acquires an excessive share of the privileges.
- Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, but no measure shall have economic allocation as its sole purpose.
- Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.
- Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.
- Conservation and management measures shall, consistent with the conservation requirements of this state (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (i) provide for the sustained participation of the communities, and (ii) to the extent practicable, minimize adverse economic impacts on those communities; Conservation and management measures shall, to the extent practicable, (i) minimize bycatch, and (ii) to the extent bycatch cannot be avoided, minimize the mortality of that bycatch; and Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Alabama

The state's long-term objectives for the management of the commercial fisheries in its waters currently is informed by statutes such as the Alabama Code 2022, Title 9 (Conservation and Natural Resources), Chapter 12 (Seafoods), Divisions 2 and 3. The regulations include provisions in respect of the licensing requirements, landing and reporting requirements, and fishing restrictions.

¹⁸⁹https://www.wlf.louisiana.gov/assets/Resources/Publications/Marine_Fishery_Management_Plans/2016_Shrimp_Fishery_Management_Plan.pdf

3.1. Long-term management objectives shall be translated into a plan or other management document (taking into account uncertainty and imprecision) and be subscribed to by all interested parties.

Management measures include spatial and temporal closures to protect juvenile shrimp and various ETP species as well as a state-wide coastal zone management program. Notwithstanding, the state should (i) undertake to more clearly define its long-term objectives, (ii) establish that they are based on the best available scientific evidence, and (iii) are translated into a management plan, or regulations, or another document.

Florida

The state’s management of the commercial shrimp fishery in its waters currently is not informed by long-term objectives that are incorporated in a fishery management plan per se. This was confirmed to the Assessment team during the July 2023 site visit with FFWC officials. However, the state’s policy and standards in respect of the management of marine fisheries is enshrined in Chapter 379 of the *Florida Statutes (ss.379.2401)*.¹⁹⁰ It reads:

1. The Legislature hereby declares the policy of the state to be management and preservation of its renewable marine fishery resources, based upon the best available information, emphasizing protection and enhancement of the marine and estuarine environment in such a manner as to provide for optimum sustained benefits and use to all the people of this state for present and future generations.
2. All rules relating to saltwater fisheries adopted by the commission shall be consistent with the following standards:
 - The paramount concern of conservation and management measures shall be the continuing health and abundance of the marine fisheries resources of this state.
 - Conservation and management measures shall be based upon the best information available, including biological, sociological, economic, and other information deemed relevant by the commission.
 - Conservation and management measures shall permit reasonable means and quantities of annual harvest, consistent with maximum practicable sustainable stock abundance on a continuing basis.
 - When possible and practicable, stocks of fish shall be managed as a biological unit.
 - Conservation and management measures shall assure proper quality control of marine resources that enter commerce.
 - State marine fishery management plans shall be developed to implement management of important marine fishery resources.
 - Conservation and management decisions shall be fair and equitable to all the people of this state and carried out in such a manner that no individual, corporation, or entity acquires an excessive share of such privileges.
 - Federal fishery management plans and fishery management plans of other states or interstate commissions should be considered when developing state marine fishery management plans. Inconsistencies should be avoided unless it is determined that it is in the best interest of the fisheries or residents of this state to be inconsistent.

Current status/Appropriateness/Effectiveness: <i>The objectives described by the management plan are consistent with the sustainable use of the resource, and are subscribed to by all relevant fishery stakeholders.</i>	<input checked="" type="checkbox"/>
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EVIDENCE:
The objectives described in this section by a combination of management plans and/or statutes are consistent with the sustainable use of the resource, and are subscribed to by all fishery stakeholders.

Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that scientifically based long-term management objectives consistent with the sustainable use of the resource are translated into a plan or other management document which is subscribed to by all interested parties. Examples may include fishery management plan/framework or legal rules.</i>	<input checked="" type="checkbox"/>
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EVIDENCE:
The availability and adequacy of the evidence is sufficient to substantiate that scientifically based long-term management objectives consistent with the sustainable use of the resource are translated into a plan or other management document which is subscribed to by all interested parties in all jurisdictions. Please see supported evidence in the references

¹⁹⁰http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=Ch0379/SEC2401.HTM&Title=-%3E2008-%3ECh0379-%3ESection%202401#0379.2401

3.1. Long-term management objectives shall be translated into a plan or other management document (taking into account uncertainty and imprecision) and be subscribed to by all interested parties.

References:

1. https://www.wlf.louisiana.gov/assets/Resources/Publications/Marine_Fishery_Management_Plans/2016_Shrimp_Fishery_Management_Plan.pdf
2. [https://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=2&ch=57&rl=691](https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=2&ch=57&rl=691)
3. https://tpwd.texas.gov/publications/pwdpubs/media/pwd_rp_v3400_857.pdf
4. http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=Ch0379/SEC2401.HTM&Title=-%3E2008-%3ECh0379-%3ESection%202401#0379.2401
5. <https://www.gsmfc.org/publications/Technical%20Report%20Series%20No.%202.PDF>
6. <https://statutes.capitol.texas.gov/Docs/PW/htm/PW.77.htm>

	Starting score	Number of EPs <u>NOT</u> met	Overall score
Numerical score:	All agencies -10	Federal - 0 Texas - 0 Louisiana - 0 Mississippi - 0 Alabama - 1 Florida - 0	Federal - 10 Texas - 10 Louisiana - 10 Mississippi - 10 Alabama - 7 Florida - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			All agencies except Alabama - High Alabama - Medium
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			All agencies except Alabama - Full Alabama - Minor NC
Non-conformance Number (if applicable):			2

9.2.3.2 Supporting Clause 3.1.1.

3.1.1. There shall be management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any fisheries enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is a process that allows for setting specific management objectives in fishery management plans or other relevant regulation (or other appropriate frameworks) for the protection of ETP species.</i>	<input checked="" type="checkbox"/>
EVIDENCE:	
<p>All federal and states fishery management agencies of the Gulf have programs and formal processes in place to identify ETP candidate species, assess their status, enact regulations and other measures for their protection, and enforce their protected status. Management objectives for ETP species are prescribed in much the same manner as any other objective e.g., enabling legislation passed by federal or state legislatures following science-based observations, formal consultations with interested parties and executive-level decision-making.</p> <p>The Assessment team has identified ETP species recognized by federal and state legislation provided by the <i>Endangered Species Acts</i> for the federal government¹⁹¹ and state governments for Texas¹⁹², Louisiana¹⁹³, Mississippi¹⁹⁴, Alabama¹⁹⁵, and Florida¹⁹⁶. Additionally, the US grants protection to all marine mammal species via the <i>Marine Mammal Protection Act</i>.¹⁹⁷ This act prohibits the taking, harassment, hunting, capturing, collecting, or killing of any marine mammal including cetaceans, pinnipeds, polar bears, otters, and sirenians.</p> <p>ETP management objectives [or purposes] at the federal and states levels are generally similar; they are also statutory-based as described below</p> <p>NOAA Fisheries has jurisdiction over 163 endangered and threatened marine species (79 endangered; 84 threatened), including 65 foreign species (39 endangered; 26 threatened) (U.S. Fish and Wildlife Service retains jurisdiction for terrestrial and freshwater species). Additional species are currently under review or have been proposed for <i>Endangered Species Act</i> listing: 3 petitioned species awaiting a 90-day finding, 13 candidate species for ESA listing, 3 proposed species for ESA listing. NOAA Fisheries also has jurisdiction over approximately 119 marine mammal species, while the US Fish and Wildlife Service has jurisdiction over polar bears, walrus, sea otters, manatees, and dugongs. The Act's overarching objectives are defined in Section 2(b) as being to (i) provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, (ii) provide a program for the conservation of such endangered species and threatened species, and (iii) take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section.</p> <p>The protection listing and the IUCN Redlist¹⁹⁸ assessment statuses are shown in Table 34. In addition to the described legislation, the Brown Pelican (<i>Pelecanus occidentalis</i>) is also protected by the <i>Migratory Bird Treaty Act of 1918</i>.¹⁹⁹</p> <p>Once listed, ETP species are the beneficiaries of various protection measures that include spatial and temporal closures, non-retention prohibitions, bycatch and gear restrictions, and mandatory reporting of encounters. The various agency statutes referenced in this section include ETP objectives.</p>	

¹⁹¹ NOAA. 2023. Threatened and Endangered species <https://www.fisheries.noaa.gov/species-directory/threatened-endangered>

¹⁹² TPWD. 2023. Listed species Texas. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/listed-species/

¹⁹³ LDWF. 2023. Rare species and natural communities by parish <https://www.wlf.louisiana.gov/page/rare-species-and-natural-communities-by-parish>

¹⁹⁴ MDWFP. 2018. Mississippi listed species 2018. <https://www.mdwfp.com/media/255911/ms-listed-species-2018.pdf> <https://www.mdwfp.com/media/255911/ms-listed-species-2018.pdf>

¹⁹⁵ OA. Nongame fishes, protected species Alabama regulations Outdoor Alabama. <https://www.outdooralabama.com/hunting-wildlife-regulations/nongame-fishes-protected-alabama-regulations>

¹⁹⁶ FWC. 2023. Threatened and Endangered Species. Fish and Wildlife Service <https://myfwc.com/media/1945/threatened-endangered-species.pdf>

¹⁹⁷ NOAA. 2023. Marine Mammal Protection Act <https://www.fisheries.noaa.gov/topic/marine-mammal-protection>

¹⁹⁸ IUCN page <https://www.iucnredlist.org/>

¹⁹⁹ FWS. 2023. Migratory Bird Act 1918. Fish and Wildlife Service <https://www.fws.gov/law/migratory-bird-treaty-act-1918>

3.1.1. There shall be management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any fisheries enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

Table 34. ETP species caught by the Gulf of Mexico shrimp fishery and the respective legislation that protects those species.

Common name	Type	CITES (Appendix I, II, or III)	US ESA	US MMPA	TX ESA	LA ESA	MS ESA	AL ESA	FL ESA	IUCN REDLIST
Green turtle	Reptile	Appx. 1	X		X	X	X		X	EN
Hawksbill turtle	Reptile	Appx. 1	X		X	X	X		X	CR
Kemp's Ridley turtle	Reptile	Appx. 1	X		X	X	X		X	CR
Leatherback turtle	Reptile	Appx. 1	X		X	X	X		X	VU
Loggerhead Turtle	Reptile	Appx. 1	X		X	X	X		X	VU
Bottlenose Dolphin	Mammal			X						LC
Brown Pelican	Bird						X			LC
Smalltooth sawfish	Chondrichthyan	Appx. 1	X		X	X			X	CR
Giant manta ray	Chondrichthyan	Appx. 2	X							EN
Gulf sturgeon	Fish	Appx. 2	X			X	X	X	X	VU

Texas

Section 68.002 of the Texas Parks and Wildlife (TPW) Code states that species of fish or wildlife indigenous to Texas are endangered if listed on the United States List of Endangered Native Fish and Wildlife or the list of fish or wildlife threatened with statewide extinction as filed by the director of TPWD. Species listed as Endangered or Threatened by the *Endangered Species Act* are protected by both Federal and State Law. The State also lists and protects additional species considered to be threatened with extinction within Texas.

The state's program is directed by the Texas Conservation Action Plan's (TCAP) of 2012²⁰⁰ whose purpose is to provide a statewide "roadmap" for research, restoration, management, and recovery projects addressing Species of Greatest Conservation Need (SGCN) and important habitats. SGCN includes terrestrial, freshwater, and marine birds, mammals, reptiles, amphibians, invertebrates, fishes, plants and plant communities. The goal of the plan is ultimately to conserve and improve the status of these species and, as possible, prevent listings under the *Endangered Species Act*.

Louisiana

Almost 700 species of native Louisiana plants and animals are considered SGCN, a designation, like Texas, that includes threatened and endangered species as well as uncommon species that rely on imperilled habitats (e.g. barrier islands) for survival. In addition to NOAA Fisheries' designations under the ESA, the LDWF also assigns a state protection status to rare, threatened, and endangered species and species impacted by commerce.

The purpose of the state's legislature in respect of ETP species is set out in Section 56:1901 of the *Louisiana Revised Statutes*.²⁰¹ The Louisiana Legislature finds:

- A. That it is the policy of this state to conserve species of wildlife and native plants for human enjoyment, for scientific purposes, and to insure their perpetuation as viable components of this state's economic and ecological systems.
- B. That species of wildlife and native plants normally occurring within this state which may be found to be "threatened" or "endangered" within the state should be accorded such protection as is necessary to maintain and to enhance their numbers.
- C. That the state should assist in the protection of species of wildlife that are determined to be "threatened" or "endangered" elsewhere pursuant to the federal *Endangered Species Act* as concurred in by the LWFC, by prohibiting the taking, possession, transportation, exportation from the state, processing, sale or offer for sale or shipment within this state of such endangered

²⁰⁰ Texas Conservation Action Plan: <https://tpwd.texas.gov/landwater/land/tcap/>

²⁰¹ Louisiana Revised Statutes: <http://legis.la.gov/legis/Law.aspx?d=105015>

3.1.1. There shall be management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any fisheries enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

species, or by carefully regulating such activities with regard to such species. Exceptions to such prohibitions, for the purpose of enhancing the conservation of such species, may be permitted as set forth elsewhere in this Part.

Mississippi

The state legislature's approach to ETP species conservation is set out in § 49-5-101 to 49-5-119 of the *Mississippi Code* known also as the *Nongame and Endangered Species Conservation Act*.²⁰² Specifically, § 49-5-103 states that the Legislature finds and declares [in part] the following:

- A. That it is the policy of the Mississippi Department of Wildlife, Fisheries and Parks to manage certain nongame wildlife for human enjoyment, for scientific purposes, and to insure their perpetuation as members of ecosystems.
- B. That species or subspecies of wildlife indigenous to this state which may be found to be endangered within the state should be accorded protection in order to maintain and to the extent possible enhance their numbers.
- C. That the state should assist in the protection of species or subspecies of wildlife which are deemed to be endangered by prohibiting the taking, possession, transportation, exportation, processing, sale or offer for sale or shipment within this state of species or subspecies of wildlife listed on the United States' Lists of Endangered Fish and Wildlife as set forth herein unless such actions will assist in preserving or propagating the species or subspecies.

Alabama

The state's Legislature²⁰³ issued a findings and policy with respect to how marine mammals are to be protected. The provision reads, in part:

- A. Certain species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man's activities.
- B. Such species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part, and, consistent with this major objective, they should not be permitted to diminish below their optimum sustainable population. Further measures should be immediately taken to replenish any species or population stock which has already diminished below that population.
- C. There is inadequate knowledge of the ecology and population dynamics of such marine mammals and of the factors which bear upon their ability to reproduce themselves successfully.
- D. Marine mammals have proven themselves to be resources of great international significance, esthetic and recreational as well as economic, and it is the sense of the Legislature that they should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management and that the primary objective of their management should be to maintain the health and stability of the marine ecosystem. Whenever consistent with this primary objective, it should be the goal to obtain an optimum sustainable population keeping in mind the optimum carrying capacity of the habitat.

Alabama does not have a state law equivalent to the federal endangered species act so species do not have regulatory protection as state endangered or threatened species. However, some species do receive regulatory protection through the Alabama Regulations on Game Fish and Fur Bearing Animals published annually. The protected list contains a very large number of fish, mammal, and invertebrate species.

That said, the list is managed by the Division of Wildlife and Freshwaters Fisheries of the DCNR. Specifically, Section 220-2-.92 of the state's hunting and fishing regulations in regard to nongame species regulations states that " It shall be unlawful to take, capture, kill, or attempt to take, capture or kill; possess, sell, trade for anything of monetary value, or offer to sell or trade for anything of monetary value; or propagate [named] nongame wildlife species, any parts or reproductive products of such species, or any hybrids of such species without a scientific collection permit or written permit from the Commissioner, Department of Conservation and Natural Resources, which shall specifically state what the permittee may do with regard to said species."²⁰⁴

²⁰² Mississippi Nongame and Endangered Species Conservation Act: <https://www.animallaw.info/statute/ms-endangered-species-chapter-5-fish-game-and-bird-protection-and-refuges-nongame-and#%C2%A7%2049-5-103>

²⁰³ Alabama Code - Marine Mammal Protection: <https://law.justia.com/codes/alabama/2022/title-9/chapter-11/article-14/section-9-11-392/>

²⁰⁴ Alabama Regulations 2020-2021: <https://www.outdooralabama.com/sites/default/files/Enforcement/2020-2021%20REGULATION%20BOOK.pdf>

3.1.1. There shall be management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any fisheries enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

Florida

Florida's imperilled species are fish and wildlife species that meet criteria to be listed as federally endangered, federally threatened, state threatened or Species of Special Concern. The state's species listing status is current to December 2022.²⁰⁵ While the USFWS has primary responsibility for Florida species that are federally endangered or threatened, the FFWC works in partnership with USFWS to help conserve these species.

The FFWC's Imperilled Species Management Plan (November 2016)²⁰⁶ was developed to address the needs of state listed species that did not already have a management plan or specific program in place. These species also have Commission approved Species Conservation Measures and Permitting Guidelines that have been developed to clarify what is needed for conservation and permitting of these species. The goal of Florida's ISMP is "With broad public and partner support, conserve or improve the status of threatened species to effectively reduce the risk of extinction."

There are three fish ETP species that interact with the GOM shrimp fishery: Gulf sturgeon, giant manta ray, and smalltooth sawfish. Gulf sturgeon and giant manta ray are not frequently encountered in the fishery. In the observer data, there was a single Gulf sturgeon capture of this species between July 2007 and December 2010 and no recorded catch between January 2011 and December 2016. The capture of these species are very low and although there are not many quantifiable bycatch mortality rates, the Atlantic sturgeon had no records of immediate mortality when captured via otter trawl from a study conducted from Atlantic fisheries observer data.²⁰⁷

All but one smalltooth sawfish catch records (n=10) in the GOM are from south Florida. The toothed rostra make it nearly impossible to be excluded from catch via TEDs or BRDs as they typically become entangled in the nets.²⁰⁸ The mortality rate for sawfish is very high in the shrimp fisheries because of entanglement and long tow times.

Finally, the brown pelican is the only ETP bird species captured by the GOM shrimp fishery. There were four instances of capture in observer coverage from 2007 to 2016. Two out of four were released alive. The brown pelican was formerly protected by the United States ESA but was delisted in 2009 as a result of significant recovery and expansion following the ban of DDT in 1972.²⁰⁹ It still remains federally protected under the Migratory Bird Treaty Act and the Mississippi Natural Heritage Program (ESA equivalent).

Current status/Appropriateness/Effectiveness:

There are clear objectives in management plans or other relevant regulations (or other appropriate frameworks) seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and fishery enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Such objectives may be outlined in overarching fisheries legislation, regulations, or management plans.



EVIDENCE:

Federal and states listed ETP objectives are set out in associated legislation (per previous section). Listed species are protected from known sources of adverse impacts through fishery-specific management measures across all UoAs (per FC 1.1 and SC 1.3.1).

²⁰⁵ Florida's Endangered and Threatened Species: <https://myfwc.com/media/1945/threatened-endangered-species.pdf>

²⁰⁶ Florida's Imperilled Management Plan (2016-2026): <https://myfwc.com/wildlifehabitats/wildlife/plan/>

²⁰⁷ Stein, A.B., Friedland, K.D. and Sutherland, M., 2004. Atlantic sturgeon marine bycatch and mortality on the continental shelf of the northeast United States. *North American Journal of Fisheries Management*, 24(1), pp.171-183. https://www.researchgate.net/profile/Andrew-Stein-2/publication/233003531_Atlantic_Sturgeon_Marine_Bycatch_and_Mortality_on_the_Continental_Shelf_of_the_Northeast_United_States/links/54adae660cf24aca1c6f6ab2/Atlantic-Sturgeon-Marine-Bycatch-and-Mortality-on-the-Continental-Shelf-of-the-Northeast-United-States.pdf

²⁰⁸ Graham, J., Kroetz, A.M., Poulakis, G.R., Scharer, R.M., Carlson, J.K., Lowerre-Barbieri, S.K., Morley, D., Reyier, E.A. and Grubbs, R.D., 2022. Commercial fishery bycatch risk for large juvenile and adult Smalltooth sawfish (*Pristis pectinata*) in Florida waters. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 32(3), pp.401-416.

https://www.researchgate.net/profile/Jasmin-Graham-3/publication/358639112_Commercial_fishery_bycatch_risk_for_large_juvenile_and_adult_smalltooth_sawfish_Pristis_pectinata_in_Florida_waters/links/6210033c08bee946f38b3685/Commercial-fishery-bycatch-risk-for-large-juvenile-and-adult-smalltooth-sawfish-Pristis-pectinata-in-Florida-waters.pdf

²⁰⁹ SNZCBB. Species Profile: Brown Pelican. Smithsonian's National Zoo & Conservation Biology Institute <https://nationalzoo.si.edu/migratory-birds/species-profile-brown-pelican#:~:text=In%201972%2C%20the%20United%20States,pelicans%20have%20recovered%20and%20expanded.>

3.1.1. There shall be management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any fisheries enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to ensure that endangered species are protected from adverse impacts resulting from interactions with the unit of certification and any associated culture or enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Examples may include fishery management plans/framework or legal rules.



EVIDENCE:

The availability, quality, and adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to ensure that endangered species are protected from known sources of adverse impacts resulting from interactions with the unit of certification. Please see supported evidence in the references

References:

1. NOAA. 2023. Threatened and Endangered species <https://www.fisheries.noaa.gov/species-directory/threatened-endangered>
2. TPWD. 2023. Listed species Texas. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/listed-species/
3. LDWF. 2023. Rare species and natural communities by parish <https://www.wlf.louisiana.gov/page/rare-species-and-natural-communities-by-parish>
4. MDWFP. 2018. Mississippi listed species 2018. <https://www.mdwfp.com/media/255911/ms-listed-species-2018.pdf> <https://www.mdwfp.com/media/255911/ms-listed-species-2018.pdf>
5. OA. Nongame fishes, protected species Alabama regulations Outdoor Alabama. <https://www.outdooralabama.com/hunting-wildlife-regulations/nongame-fishes-protected-alabama-regulations>
6. FWC. 2023. Threatened and Endangered Species. Fish and Wildlife Service <https://myfwc.com/media/1945/threatened-endangered-species.pdf>
7. NOAA. 2023. Marine Mammal Protection Act <https://www.fisheries.noaa.gov/topic/marine-mammal-protection>
8. IUCN page <https://www.iucnredlist.org/>
9. FWS. 2023. Migratory Bird Act 1918. Fish and Wildlife Service <https://www.fws.gov/law/migratory-bird-treaty-act-1918>
10. Texas Conservation Action Plan: <https://tpwd.texas.gov/landwater/land/tcap/>
11. Louisiana Revised Statutes: <http://legis.la.gov/legis/Law.aspx?d=105015>
12. Mississippi Nongame and Endangered Species Conservation Act: <https://www.animallaw.info/statute/ms-endangered-species-chapter-5-fish-game-and-bird-protection-and-refuges-nongame-and#%C2%A7%2049-5-103>
13. Alabama Code - Marine Mammal Protection: <https://law.justia.com/codes/alabama/2022/title-9/chapter-11/article-14/section-9-11-392/>
14. Alabama Regulations 2020-2021: <https://www.outdooralabama.com/sites/default/files/Enforcement/2020-2021%20REGULATION%20BOOK.pdf>
15. Florida's Endangered and Threatened Species: <https://myfwc.com/media/1945/threatened-endangered-species.pdf>
16. Florida's Imperiled Management Plan (2016-2026): <https://myfwc.com/wildlifehabitats/wildlife/plan/>
17. Stein, A.B., Friedland, K.D. and Sutherland, M., 2004. Atlantic sturgeon marine bycatch and mortality on the continental shelf of the northeast United States. *North American Journal of Fisheries Management*, 24(1), pp.171-183. https://www.researchgate.net/profile/Andrew-Stein-2/publication/233003531_Atlantic_Sturgeon_Marine_Bycatch_and_Mortality_on_the_Continental_Shelf_of_the_Northeast_United_States/links/54adae660cf24aca1c6f6ab2/Atlantic-Sturgeon-Marine-Bycatch-and-Mortality-on-the-Continental-Shelf-of-the-Northeast-United-States.pdf

3.1.1. There shall be management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any fisheries enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

18. Graham, J., Kroetz, A.M., Poulakis, G.R., Scharer, R.M., Carlson, J.K., Lowerre-Barbieri, S.K., Morley, D., Reyier, E.A. and Grubbs, R.D., 2022. Commercial fishery bycatch risk for large juvenile and adult Smalltooth sawfish (*Pristis pectinata*) in Florida waters. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 32(3), pp.401-416. https://www.researchgate.net/profile/Jasmin-Graham-3/publication/358639112_Commercial_fishery_bycatch_risk_for_large_juvenile_and_adult_smalltooth_sawfish_Pristis_pectinata_in_Florida_waters/links/6210033c08bee946f38b3685/Commercial-fishery-bycatch-risk-for-large-juvenile-and-adult-smalltooth-sawfish-Pristis-pectinata-in-Florida-waters.pdf

	Starting score	Number of EPs <u>NOT</u> met		Overall score
Numerical score:	All agencies - 10	Federal - 0 Texas - 0 Louisiana - 0 Mississippi - 0 Alabama - 0 Florida - 0	) - ( x 3 =	Federal - 10 Texas - 10 Louisiana - 10 Mississippi - 10 Alabama - 10 Florida - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)				All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)				All agencies - Full
Non-conformance Number (if applicable):				NA

9.2.3.3 Supporting Clause 3.1.2.

3.1.2. There shall be management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration’s essential habitats, and on habitats that are highly vulnerable to damage by the unit of certification’s fishing gear.	
Relevance:	Relevant.
Evaluation Parameters	Met?
<p>Process: <i>There is a mechanism in place by which the essential habitat of the stock under consideration and the potential impacts of the fishery (i.e., employing bottom contact gear) upon them are identified. This or a similar mechanism shall also be in place to identify habitats, which are highly vulnerable to fishery activities by the unit of certification. The information provided by these mechanisms shall be used to produce specific management objectives seeking to avoid significant negative impacts on habitats. When identifying highly vulnerable habitats, their value to ETP species shall be also considered, with habitats essential to ETP species being categorized accordingly. Note that this clause shall consider Alaska-specific designation of important and essential fish habitats categorized as such at the state and federal level. Such objectives may be outlines in overarching fisheries legislation, regulations, or management plans.</i></p>	<input checked="" type="checkbox"/>
<p>EVIDENCE: Benthic Habitats The Assessment team considered three characteristics in describing the GOM’s benthic habitat: substratum, geomorphology and biota.</p> <p>The benthic substrate of the Gulf of Mexico is predominantly characterized by soft/mixed sediments with small, patchy outcroppings of rock in the northern range and larger reefs to the east and southeast (Figure 28).²¹⁰ The soft bottom habitats consists of mud and sand; mixed bottom consists of gravel, sand, and mud; and hard bottoms consists of rock, which is typically pavements, pinnacles, and bedrock outcrops. There is a strong division between benthic substrate and geomorphology on the east and west side of the Mississippi River delta. At the mouth of the delta, there is a very narrow continental shelf (due to erosion from the river) that is characterized by mud from silty discharge from the river. To the west, the seafloor is dominated by mud and sand as a result of the westward currents that carry the same silt and river discharge to the habitats off of Texas and Louisiana. Rocky/hard bottom does occur on this western range at the margin of the continental shelf and continental slope, which is likely a result of erosion of soft sediments at the edge of the shelf.²¹¹</p> <p>To the east, the bottom is composed of much more sand, gravel, and rocky habitats. The deeper parts of the western half are still dominated by muddy bottom, but upper portions of the continental slope are characterized by notable and extensive areas of hard substrate. This hard substrate is largely the delineation between the muddy and sandy/gravel habitat types. The majority of the very wide continental shelf off the coast of Florida is dominated by irregular patchiness of sand and gravel. These sandy and gravel dominated areas can be characterized by seafloor sand waves (or seabed dunes).</p> <p>Furthermore, the Gulf Council in the 2016 EFH Review²¹², divided habitat zones in the Gulf of Mexico into three types (Figure 29):</p> <ul style="list-style-type: none"> • estuarine (inside barrier islands and estuaries), • nearshore (60 ft (18m) or less in depth) and • offshore (greater than 60 ft (18m) in depth, 	

²¹⁰ Jenkins C. Dominant Bottom Types and Habitats in Gulf of Mexico Data Atlas [Internet]. Stennis Space Center (MS): National Centers for Environmental Information; 2011. [5 screens]. Available from: <https://gulfatlas.noaa.gov/>.

²¹¹ Pratson, L.F., Nittrouer, C.A., Wiberg, P.L., Steckler, M.S., Swenson, J.B., Cacchione, D.A., Karson, J.A., Murray, A.B., Wolinsky, M.A., Gerber, T.P. and Mullenbach, B.L., 2007. Seascape evolution on clastic continental shelves and slopes. *Continental margin sedimentation: from sediment transport to sequence stratigraphy*, pp.339-380.

https://www.academia.edu/download/51234813/Seascape_Evolution_on_Clastic_Continenta20170107-2501-tu55zo.pdf

²¹² GMFMC. 2016. Final Report 5-Year Review of Essential Fish Habitat Requirements. Gulf of Mexico Fishery Management Council https://gulfcouncil.org/wp-content/uploads/EFH-5-Year-Review-plus-App-A-and-B_Final_12-2016.pdf

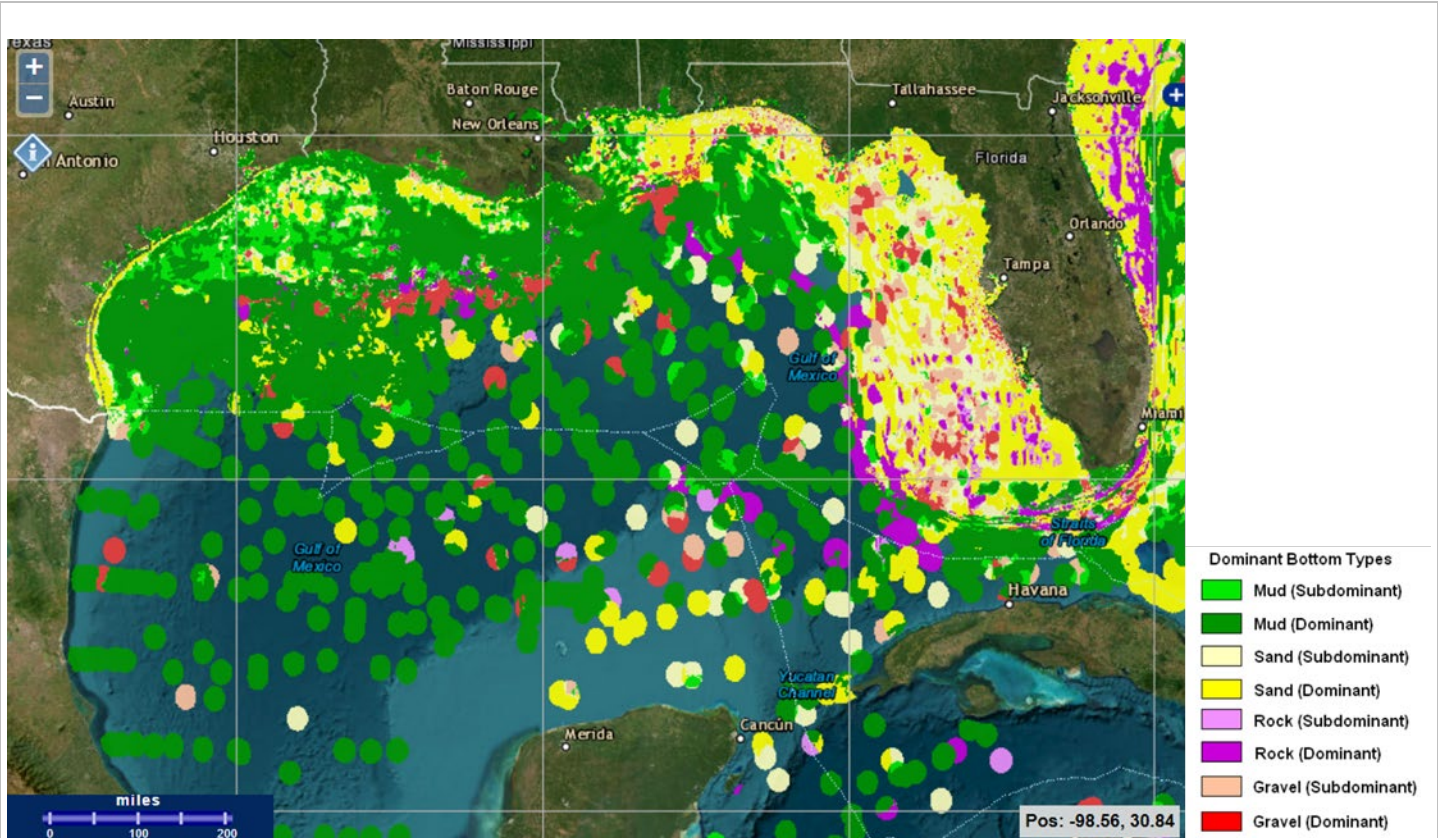


Figure 28. Major substrates on the shelf of Gulf of Mexico. Source: Jenkins 2011¹⁴².

Regardless of the proximity to shore, the Gulf of Mexico is characterized as having high benthic diversity.²¹³ The US Department of the Interior authorized the Deep Gulf of Mexico Benthos project in 1999.²¹⁴ Its purpose was to study the structure and function of the biota associated with the seafloor to determine the extent of impact of future oil and gas exploration and exploitation. From this project, a study was produced that characterized the habitats and benthic ecology of infauna/meiofauna, macrofauna, and megafauna/fishes.

Three major groups of macrofauna are known to inhabit the GOM benthic community: isopods (Crustacea), bivalves (Mollusca), polychaetes (Annelida), amphipods (Crustacea), copepods (Crustacea), and jellies (Cnidaria). Among these major species groups there were trends that are relevant to the GOM shrimp fishery. Isopods varied with depth but showed highest densities and diversity at depths between 1000 and 2000 meters. At shallower and deeper depths, species richness and diversity decreased. There were 94 total species of bivalves collected with highest abundance at shallower sites and closest to the Mississippi River delta. Abundance decreased with increasing depth, but diversity peaked at mid-range depths (1000-2000m). Finally, there were 410 different polychaete species collected from 226 different genera. Both diversity and abundance were greatest at shallow depths (<1000m) and decreased as a function of increasing depth.

None of these species are cause for concern with regard to population recovery time or integral functionality within the ecosystem.

²¹³ Briones, E.E., 2004. Current knowledge of benthic communities in the Gulf of Mexico. *Environmental Analysis of the Gulf of Mexico*; Withers, K., Nippers, M., Eds, pp.108-136.

<https://www.hartheresearch.org/sites/default/files/inline-files/7.pdf>

²¹⁴ Rowe, G.T. and Kennicutt, M.C., 2009. Northern Gulf of Mexico continental slope habitats and benthic ecology study: Final report. *OCS Study MMS, 39*, p.456.

<https://www.fws.gov/doiddata/dwh-ar-documents/1187/DWH-AR0009351.pdf>

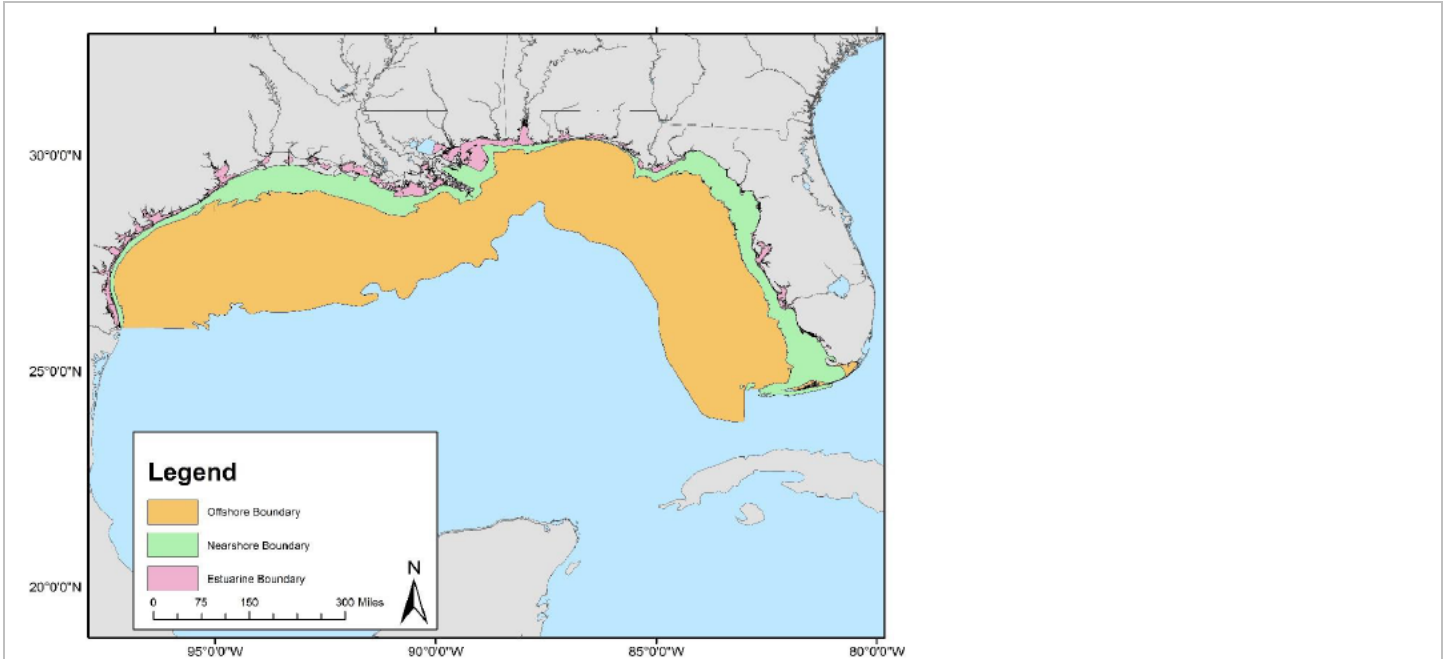
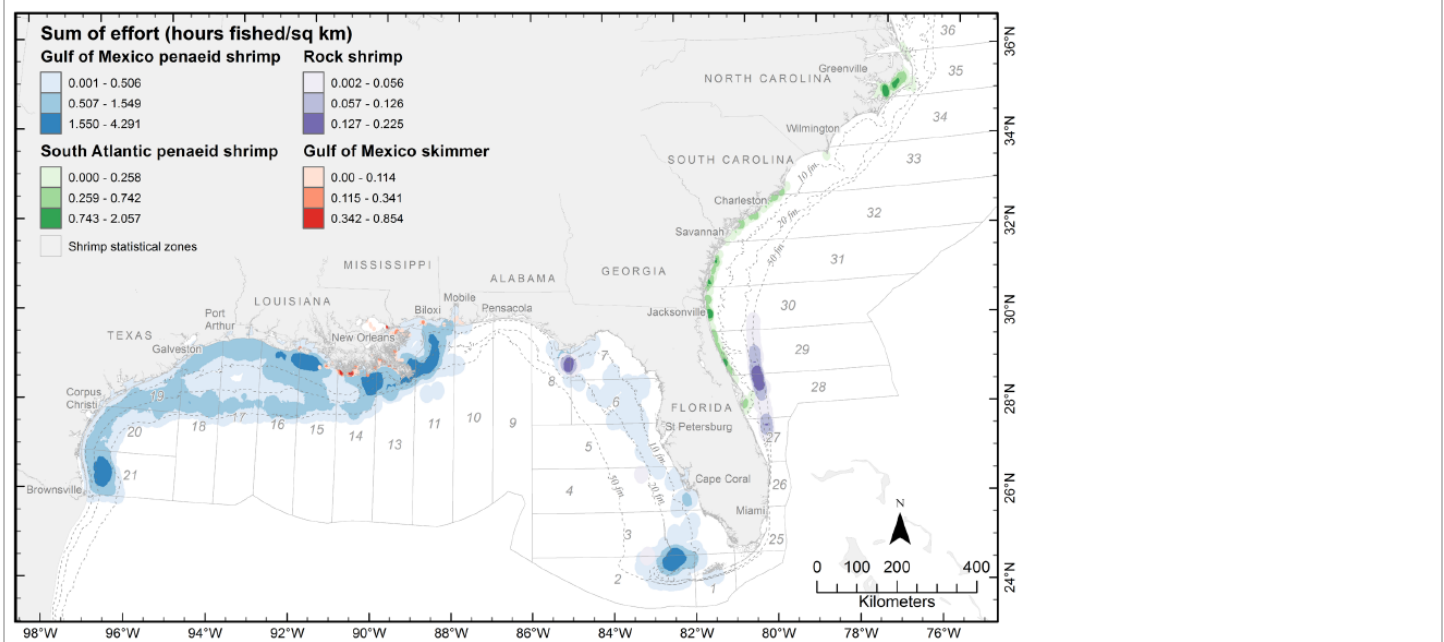


Figure 29. Spatial depiction of habitat zones: estuarine (inside barrier islands and estuaries), nearshore (60 ft (18m) or less in depth) and offshore (greater than 60 ft (18m) in depth).

Fishing Effort

The bulk of trawling effort (otter and skimmer) occurs on the western portion of the GOM, off the waters of Mississippi, Louisiana, and Texas.²¹⁵ Figure 30 shows the difference in effort between the skimmer (red) and trawl (blue) in the GoM. Figure 31 shows the fishing effort with higher resolution from ELB points from vessels engaged in fishing activities.²¹⁶ The majority of this effort takes place over muddy flat bottoms as vessels make a strong conscious effort to avoid rocky outcrops because those habitats can destroy the gear, and because brown, white and pink shrimp occur mainly in soft, muddy bottoms (and occasionally sand covered bottoms).²¹⁷ As seen in Figure 31, the fishing effort is absent (or low intensity) in areas that are dominated by sand, gravel, and rocky outcrops as depicted in Figure 28. The fishery primarily interacts with mud bottom, especially around the mouth of the Mississippi river which discharges a great deal of mud/silt to the GoM.



²¹⁵ Scott-Denton, E., Cryer, P.F., Duffin, B.V., Duffy, M.R., Gocke, J.P., Harrelson, M.R., Whatley, A.J. and Williams, J.A., 2020. Characterization of the US Gulf of Mexico and South Atlantic Penaeidae and Rock Shrimp (Sicyoniidae) Fisheries through Mandatory Observer Coverage, from 2011 to 2016. *Marine Fisheries Review*, 82(1-2), pp.17-47.

²¹⁶ Riley, K.L., Wickliffe, L.C., Jossart, J.A., MacKay, J.K., Randall, A.L., Bath, G.E., Balling, M.B., Jensen, B.M., Morris Jr., J.A. 2021. An Aquaculture Opportunity Area Atlas for the U.S. Gulf of Mexico. NOAA Technical Memorandum NOS NCCOS 299: 545p.

²¹⁷ NOAA. 2023. Brown and white shrimp page, species directory. <https://www.fisheries.noaa.gov/species/brown-shrimp> ; <https://www.fisheries.noaa.gov/species/white-shrimp>

Figure 30. Geographic distribution of effort in the Gulf of Mexico shrimp fishery (by gear type) given by hours fished per square km. The data reflects vessel tows monitored by an on-board observer from January 2011 to December 2022. Source: Scott Denton *et al.*, 2020²¹⁸.

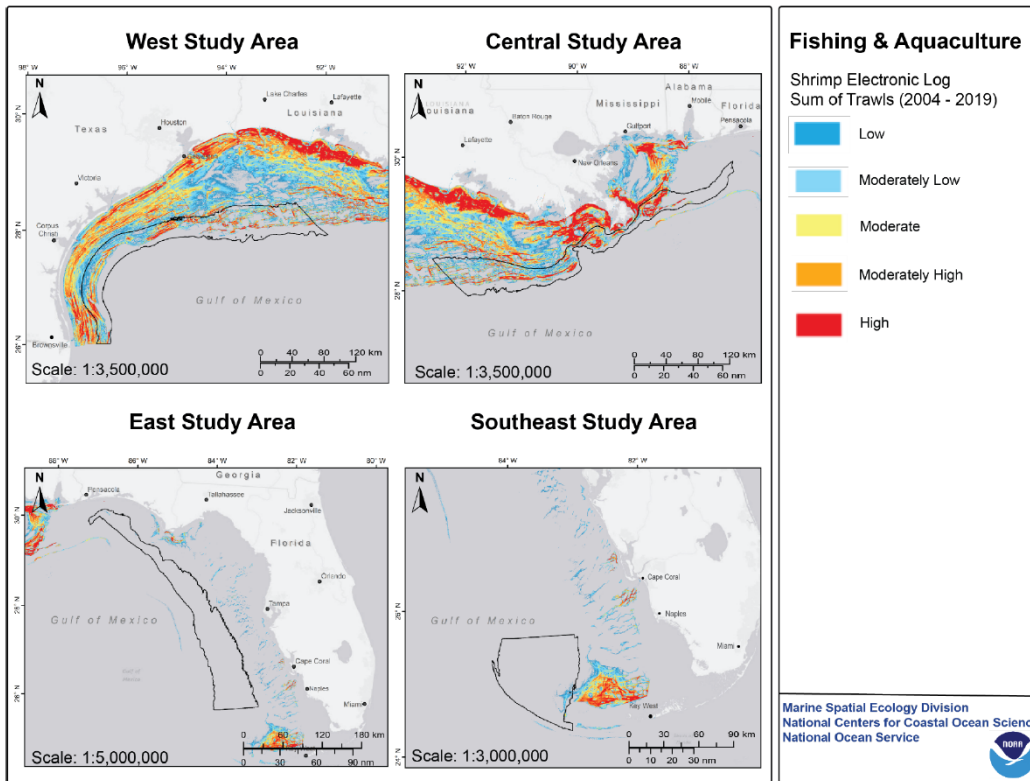


Figure 31. Geographic distribution of the GoM commercial shrimping effort based on ELB data from 2004-2019 for the four geographic study regions. Blue colors represent less effort in the time period examined, while orange and red colors represent relatively higher trawling effort. Data and maps reflect the resolution at which data can be displayed to the public to ensure protection of confidential data components. Source: Riley *et al.*, 2021⁵⁵⁷

Regeneration ability of these soft bottom habitats

Impacts of trawling disturbance on the on benthic invertebrate communities have been widely studied.

For example, Jennings *et al.* 2001²¹⁹ reported on changes in trophic structure following long term trawling disturbance. Their findings highlighted that suggest that chronic trawling disturbance led to dramatic reductions in the biomass of infauna and epifauna, but these reductions were not reflected in changes to the mean trophic level of the community, or the relationships between the trophic levels of different sizes of epifauna.

More recently, Hiddink *et al.* 2017²²⁰ in a global analysis of depletion and recovery of seabed biota after bottom trawling disturbance that used 24 comparative and 46 experimental studies in north-western Europe and the north-eastern United States, calculated that trawl gears removed 6–41% of faunal biomass per pass, and recovery times post trawling were 1.9–6.4 y depending on fisheries and environmental context. Recovery rates were estimated from changes in the biomass and numbers of biota across fishing grounds, and therefore, estimates are likely applicable to trawled shelf seas in general (at least in temperate waters where most of the studies were carried out). Their estimates of biomass recovery times are similar to empirical measurements of recovery taken in three areas where commercial trawling was stopped (4–5 y) but longer than estimates from small-scale experimental studies, which are on the order of 25–500 days.

Sciberras *et al.* (2018)²²¹ also conducted a meta-analysis, with data from 122 experimental gear impact studies employed in their study, including those that addressed impacts from otter trawling and beam trawling. As with the Hiddink *et al.* (2017) study, the

3.1.2. There shall be management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration’s essential habitats, and on habitats that are highly vulnerable to damage by the unit of certification’s fishing gear.

majority of the studies included in this meta-analysis were from north-western Europe and north-eastern United States, including those that addressed impacts from otter trawling and beam trawling. A gear pass reduced benthic invertebrate abundance by 26% and species richness by 19%. Community recovery to control conditions was faster for communities’ subject to fishing by gears that penetrated less into the sediment (i.e., beam and otter trawling) than by gears that penetrated deeper in the sediment and killed a larger fraction of biota (i.e., dredging, raking and hydraulic dredge). Sediment composition (% mud and presence of biogenic habitat) and the history of fishing disturbance prior to an experimental fishing event were also important predictors of depletion, with communities in areas that were not previously fished, predominantly muddy or biogenic habitats being more strongly affected by fishing. Sessile and low mobility biota with longer lifespans such as sponges, soft corals and bivalves took much longer to recover after fishing (>3 year) than mobile biota with shorter lifespans such as polychaetes and malacostracans (<1 year). Recovery times in the studies included by Sciberras *et al.* (2018) were determined to be generally faster because the experimental manipulations generally involved disturbance of smaller areas of seabed.

Accordingly, taking into account information on substratum, geomorphology and biota, the Assessment team has defined commonly encountered habitats and minor habitats as follows:

Commonly encountered habitats		
Substratum	Geomorphology	Biota
Sand to muddy sand and mud to sandy mud (primarily found in the western GOM, but not restricted to this region).	Flat/ Low relief substrate.	Dominated by crustaceans, polychaetes, and bivalves and other meiofaunal organisms.
Mixed sediments containing sand and gravel (primarily found in the eastern GOM, but not restricted to this region).	Low relief substrate with seafloor dunes/ sand waves.	Dominated by crustaceans, polychaetes, and bivalves and other meiofaunal organisms.
Minor habitats		
Substratum	Geomorphology	Biota
Soft bottom habitats with small rocky reefs.	Flat/ Low relief substrate Scattered outcrops not intentionally fished.	Dominated by crustaceans, polychaetes, and bivalves and other meiofaunal organisms.

Vulnerable Marine Ecosystems

In the GOM, the VMEs that are granted some level of protection by state and federal agencies include: (i) coastal seagrass beds, (ii) corals and coral reef habitat, (iii) deep sea coral and associated habitat, and (iv) mangroves (not relevant for this fishery and are not considered any further). Based on the information illustrated previously, and taking into account information on substratum, geomorphology and biota, the Assessment team defines VMEs as follows:

²¹⁸ Scott-Denton, E., Cryer, P.F., Duffin, B.V., Duffy, M.R., Gocke, J.P., Harrelson, M.R., Whatley, A.J. and Williams, J.A., 2020. Characterization of the US Gulf of Mexico and South Atlantic Penaeidae and Rock Shrimp (Sicyoniidae) Fisheries through Mandatory Observer Coverage, from 2011 to 2016. *Marine Fisheries Review*, 82(1-2), pp.17-47.

²¹⁹ Jennings, S., Pinnegar, J.K., Polunin, N.V. and Warr, K.J., 2001. Impacts of trawling disturbance on the trophic structure of benthic invertebrate communities. *Marine Ecology Progress Series*, 213, pp.127-142. <https://www.jstor.org/stable/24864207?seq=1>

²²⁰ Hiddink, J. G., Jennings, S., Sciberras, M., Szostek, C. L., Hughes, K. M., Ellis, N., Rijnsdorp, A. D., McConnaughey, R. A., Mazor, T., Hilborn, R., Collie, J. S., Pitcher, C. R., Amoroso, R. O., Parma, A. M., Suuronen, P., & Kaiser, M. J. 2017. Global analysis of depletion and recovery of seabed biota after bottom trawling disturbance. *Proceedings of the National Academy of Sciences of the United States of America*, 114(31), 8301–8306. <https://doi.org/10.1073/pnas.1618858114>

²²¹ Sciberras, M., Hiddink, J.G., Jennings, S., Szostek, C.L., Hughes, K.M., Kneafsey, B., Clarke, L.J., Ellis, N., Rijnsdorp, A.D., McConnaughey, R.A., Hilborn, R., Collie, J.S., Pitcher, C.R., Amoroso, R.O., Parma, A.M., Suuronen, P. & M.J. Kaiser (2018). Response of benthic fauna to experimental bottom fishing: a global meta-analysis. *Fish and Fisheries*, V. 19, pp. 698–715. <https://onlinelibrary.wiley.com/doi/full/10.1111/faf.12283>

3.1.2. There shall be management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration’s essential habitats, and on habitats that are highly vulnerable to damage by the unit of certification’s fishing gear.

Vulnerable Marine Ecosystem			
No.	Substratum	Geomorphology	Biota
1	General mixed rocky and sandy substrate.	Low relief and scattered rocky outcrops.	Dominated by shallow water corals and coral reef associated habitat.
2	General mixed rocky and sandy substrate.	Low to medium relief and scattered rocky outcrops.	Dominated by deep sea coral, reef builders and associated habitat.
3	Mixed sediments containing sand and mud.	Low relief substrate.	Dominated by coastal seagrass beds.

Seagrass habitats

Seagrass ecosystems are among the most productive and valuable benthic habitats found in the in the waters of the Gulf of Mexico region (Figure 32). They support a diverse array of ecological and habitat functions, as well as various human activities along the Gulf Coast. Maintaining and improving the health of seagrass ecosystems and all coastal and marine ecosystems are essential for ensuring the ecological and economic health of the Gulf of Mexico region.

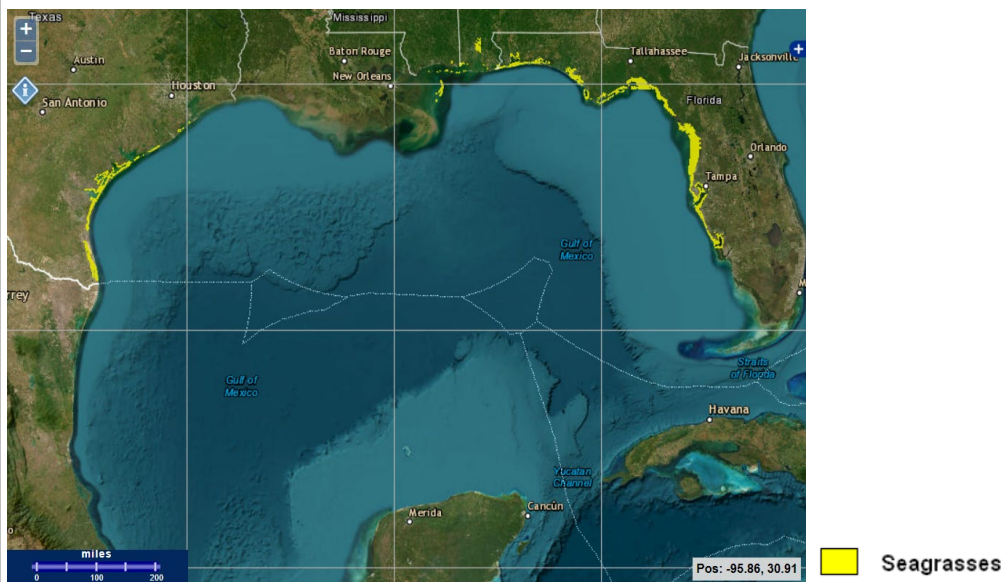


Figure 32. Spatial distribution of seagrass beds in the Gulf of Mexico (Source: Handley 2011²²²).

Seagrass habitats provide nursery areas for extensive recreationally and commercially significant marine life by providing spawning and foraging habitat for many species of finfish, shellfish, and crustaceans. Smaller species and juveniles find protection from predation in seagrass canopy cover. Seagrasses provide food and feeding habitat for wintering waterfowl and other water birds. Seagrasses also support many threatened and endangered species, such as sea turtles, manatees, and bottlenose dolphins, which eat seagrass leaves and/or feed on smaller animals found in seagrass habitats. Epiphytes and benthic organisms attach to and colonize seagrasses, providing food for many marine animals. The extensive plant biomass of seagrass beds feeds bacteria and microscopic animals at the base of a complex food web.

Seagrass roots and rhizomes form an intricately interwoven, underground mat that stabilizes the shallow bottom sediment on the seafloor, while simultaneously contributing to water clarity and decreasing wave energy by trapping sediment through waves and

²²² Handley L. Submerged Aquatic Vegetation in Gulf of Mexico Data Atlas [Internet]. Stennis Space Center (MS): National Centers for Environmental Information; 2011. [1 screen]. Available from: <https://gulfatlas.noaa.gov/>

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currents in their leaves. Trapping sediment cleanses the water from fine particles, and uptake of dissolved nutrients by seagrass will reduce the overgrowth of algae as well, thereby significantly improving water quality.

Summaries of seagrass distribution across the Gulf are provided below.

Texas distribution

Seagrasses are very unevenly distributed along the Texas coast in the following systems: Laguna Madre, Texas Coastal Bend Region, and Galveston Bay. Human-induced effects include (1) nutrient loading causing water-quality degradation and light attenuation from phytoplankton blooms, epiphyte growth, or macroalgae accumulation; (2) suspended sediments from dredging or boat traffic; and (3) direct physical disturbances, including dredged material deposition, removal by channelization and waterfront construction, boat propeller scarring, and effects of ship traffic. Stresses included dredging, boating traffic, nutrient loading, subsidence processes, and altered freshwater inflow cycles.

Louisiana distribution

At present, Louisiana seagrasses are limited to shoals west of the Chandeleur Islands, east of the Mississippi River. Loss of submerged vegetation west of the Mississippi River may be due in part to the natural deterioration of deltaic marshes and shores; however, these natural processes have been exacerbated by the activities of humans such as dredging of navigation canals; land reclamation; flood control; subsurface withdrawal of oil, gas, and water; and ironically in some instances, restoration. For instance, deposition of dredged material as a method to restore western barrier islands causes increased turbidity and may have been a significant cause of seagrass decline.

Mississippi and Alabama distribution

The primary body of water within the Alabama and Mississippi boundaries that supports seagrasses is Mississippi Sound, which covers 175,412 hectares at mean low tide. This body of water is immediately bounded by the coast of Mississippi to the north; Mobile Bay, Alabama, to the east; a series of barrier islands that make up most of the Gulf Islands National Seashore to the south; and Lake Borgne, LA., to the west. The primary vector for the historical disappearance of seagrasses is thought to be a combination of physical disturbances associated with tropical weather systems, depressed local salinities associated with flood events, dredging and filling operations and from increased turbidity caused by shoreline development, and an overall decline in water quality, which may have a deleterious effect on certain species of seagrasses.

Florida distribution

Along this coast, Florida State waters and adjacent Federal waters include the two largest contiguous seagrass beds in the continental United States: the Florida Keys and the Florida Big Bend regions. It is estimated that Florida State waters contained approximately 1,076,500 hectare of seagrass, of which 55% (587,600 hectares) occurred in the Florida Keys and Florida Bay. An additional 334,600 hectares, 31% of statewide total seagrass area) occurred in the Big Bend region. The remaining seagrass area of 154,300 hectares was distributed in estuaries and lagoons throughout the State. Human impacts over the past 100 years have caused significant seagrass losses in all of the estuaries. Significant amounts of seagrass were lost in many Florida estuaries as the result of dredging operations in the 1950s and 1960s. Propeller scarring impacts by commercial boats has been recorded (e.g., circling schools of fish) but commercial fishing effort has declined, while recreational boats impacts are the most notable - the number of recreational boats has increased to almost 1 million, making recreational boaters responsible for most propeller scars. The greatest single cause of seagrass loss to date in Florida, in the GOM, and throughout the world, however, has been water-quality degradation. Along the west coast of Florida, the principal cause of water-quality degradation has been eutrophication resulting from domestic, agricultural, and industrial wastes. At present, coastal development, nutrient loads caused by humans, and hydrological modifications threaten estuarine and nearshore seagrass beds along the entire Florida Gulf coast.

3.1.2. There shall be management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration's essential habitats, and on habitats that are highly vulnerable to damage by the unit of certification's fishing gear.

Effects of the GOM shrimp fishery on seagrass beds

Because the analysis by Handley *et al.* (2002)²²³ has not identified commercial fishing and more specifically shrimping effort as a significant driver or threat to seagrass habitat health, abundance or decline across Gulf of Mexico state waters from Texas to Florida it is unlikely that effects on these habitats are significant.

However, in a study of the inshore bait shrimp fishery along the Florida coast, where the most significant seagrass beds are located, Stallings *et al.* 2014²²⁴ argue that although the inshore shrimp fishery (using roller frame trawl, a modified trawl gear) has been largely overshadowed by the much higher historical efforts on the offshore grounds, the amount of effort in seagrass beds is not trivial (i.e. >20% of total effort during months of peak productivity) and appears to increase when many species are using this nursery habitat as juveniles. Moreover, they continue to say that the proportion of total effort in seagrass beds increased sharply in recent years (up to 2014). They note however that the gear employed in the study (i.e., roller frame trawls) do not cause physical damage to seagrass habitats since they roll over the seabed (Meyer *et al.* 1999).²²⁵ Nonetheless, despite fishing risks not appearing to be the main threat to seagrass beds, there are potential risks from otter trawl (and potentially skimmer trawl fishing) on these habitats, if indeed there is some overlap. The direct ploughing and scraping of the otter trawl gear on seagrass could cause mortality from a single pass of an otter trawl. The penetration depth of light otter trawl gear components ranges from 2-10 cm in sand sediments and 2-35 cm in muddier sediment (Eigaard *et al.*, 2016²²⁶), and could remove the upper layers of sediment on which the seagrasses are reliant for anchoring and nutrient uptake. A single pass of light otter trawl gear could remove the feature and its root structures and further passes could remove the nutrient rich sediment, reducing the likelihood of recolonisation.²²⁷

Skimmer nets are supported by a tubular metal frame on three sides (top and sides) or L shaped frame that skims over the bottom on a weighted skid, holding the net along the bottom, and are usually used in shallower nearshore areas of 10 ft or less. A chained footrope and the tickler chain are used to stir up the bottom and raise the catch into nets ranging from 25 to 72 ft across. While skimmers may have more potential to damage nursery habitats and submerged aquatic vegetation in shallower water, they are expected to impact the bottom less than otter trawls since there are no trawl doors (Barnette 2001, Nelson 1993, Steele 1993).²²⁸

Representatives from TPWD, LDFW, MDMR, and ADCNR have stated that the fishery (otter or skimmer) does not overlap with any known seagrass distributions. In the case of Texas, Louisiana, and Alabama, management has stated that shrimping does not occur at depths where seagrass beds exist. The seagrass depth distribution is very shallow, typically less than 3 meters, because of the organism's requirement for high sunlight for photosynthesis.²²⁹ In the case of Mississippi, all seagrass bed location in Mississippi state waters are areas closed for fishing. There is a ½ mile buffer from the coastline that prohibits shrimping as well as a 1-mile buffer around the barrier islands. There is little concern that the GoM shrimp industry has any interaction with seagrass habitats.

Butterfly nets are used in Louisiana in shallow water mainly at night when the shrimp are near the surface of the water and/or jumping above the water surface. Butterfly nets are not considered to be a risk because they are designed to fish the upper portion of the water column and are for a good part operated/lowered passively from boats and pontoons, without being towed, hence their effect on seagrass and other submerged habitats is considered unlikely and for the most part negligible.

²²³ Handley, L., Altsman, D., and DeMay, R., eds., 2007, Seagrass Status and Trends in the Northern Gulf of Mexico: 1940–2002: U.S. Geological Survey Scientific Investigations Report 2006–5287, 267 p. <https://pubs.usgs.gov/sir/2006/5287/>

²²⁴ Stallings, C. D., Brower, J. P., Loch, J. M. H., & Mickle, A. 2014. Commercial trawling in seagrass beds: bycatch and long-term trends in effort of a major shrimp fishery. *Marine Ecology Progress Series*, 513, 143–153. <https://www.jstor.org/stable/24894762>

²²⁵ Meyer DL, Fonseca MS, Murphey PL, McMichael RH and others. 1999. Effects of live-bait shrimp trawling on seagrass beds and fish bycatch in Tampa Bay, Florida. *Fish Bull* 97: 193–199 <https://spo.nmfs.noaa.gov/sites/default/files/18meyerf.pdf>

²²⁶ Eigaard, O.R., Bastardie, F., Breen, M., Dinesen, G.E., Hintzen, N.T., Laffargue, P., Mortensen, L.O., Nielsen, J.R., Nilsson, Hans C., O'Neill, F.G., Polet, H., Reid, D.G., Sala, A., Skold, M., Smith, C., Sorensen, T.K., Tully, O., Zengin, M. & Rijnsdorp, A.D. (2016). Estimating seabed pressure from demersal trawls, seines, and dredges based on gear design and dimensions. – *ICES Journal of Marine Science*, 73: i27–i43. https://academic.oup.com/icesjms/article/73/suppl_1/i27/2573989

²²⁷ GW. 2022. Light Otter Trawl on Seagrass (SACs). Welsh Government. https://www.gov.wales/sites/default/files/publications/2022-05/light-otter-trawl-on-seagrass-sacs_0.pdf

²²⁸ Audubon. Habitat Impacts – Skimmer Trawls – AL Shrimp. <https://www.audubongulf.org/projects/alabama/alabama-shrimp/skimmer-trawls/#:~:text=While%20skimmers%20may%20have%20more,Nelson%201993%2C%20Steele%201993.>

²²⁹ Onuf, C.P., Phillips, R.C., Moncreiff, C.A., Raz-Guzman, A. and Herrera-Silveira, J.A., 2003. The seagrasses of the Gulf of Mexico.

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Corals

The GOM is home to many coral reefs growing along coastal Texas, Louisiana, Florida, and Mexico in the upper ~1,500 m, and houses a wide array of deep-sea coral species (as well as other reef builders, such as sponges) found along the continental shelf and slope. Most of these reefs are within managed areas including Dry Tortugas National Park and Veracruzano Coral Reef System National Park, Flower Garden Banks and Florida Keys National Marine Sanctuaries, and Florida's John Pennekamp Coral Reef State Park. Other coral reefs include Campeche Bank, Tuxpan, Tuxtlas, Yucatan Shelf, Florida Middle Grounds, and Pulley Ridge, the deepest stony coral reef in the US.²³⁰

Gil-Agudelo *et al.* (2020)²³¹ also notes that shallow reefs in the GOM are calculated to occupy 2,640 km² (<0.2%) while the extent of mesophotic corals, defined as light-dependent corals living at depths between 30–150 m, and deep-sea corals - by comparison - are largely unknown, although recent studies are helping to close this gap. The largest distribution of shallow corals happens on the Florida coast (Florida Keys and Dry Tortugas), and Cuba, with roughly 85% of shallow corals of the GOM, but the uniqueness and singularity of reefs throughout the gulf makes them particularly important for this region. The reefs within the GOM are also highly variable, having both some of the lowest (Florida Keys, just above 10%), and the highest coral cover (Flower Garden Banks, almost 60%) in the Wider Caribbean region (GOM + Caribbean).

Deep-sea corals occur in many shapes and forms and are sessile invertebrates in the Phylum Cnidaria that occur deeper than 50 m in the marine environment. Structure-forming corals have an upright orientation and a rigid, complex branching structure of calcium carbonate, or horn-like protein. The group includes black corals (*Antipatharia*), stony corals (Scleractinia such as *Lophelia pertusa* and *Madrepora oculata*), and octocorals (including sea fans and sea pens), among others. Corals are well adapted to life in the deep sea, where they grow in cold darkness and feed on particles that rain down from above. The coral colonies grow slowly because food is scarce. Colonies may live to be hundreds or thousands of years old, and they are vulnerable to bottom-contact fishing gear. Coral diversity is actually highest in deep water, where 66% of 5,080 species are known to occur (Cairns, 2007). Deep-sea corals form important habitat for fish, shrimp, crabs, and sea stars, which are often considered a proxy for biodiversity in the deep sea (Hourigan *et al.*, 2016).²³²

Data contained in the NOAA National Database of Deep-Sea Corals and Sponges (as of August 2016) is shown in Figure 33. The database aggregates historical records from samples archived in state and federal museums, research institutions, and reported in the scientific literature. These records are augmented by observations collected by submersible vehicles during deep-water benthic surveys conducted by NOAA and other research institutions.

Assessment team's note

During our July 2023 site visits to all five GOM states, we heard a clear and consistent message from all sectors of the shrimp industry that the low level/absence of overlap between fishing effort and closures is a clear indication that harvesters are aware of hard bottom habitats where nets can hang up and they actively avoid these areas. The collection, storage and sharing of "hang location" knowledge by and between harvesters makes the probability that habitats have very low encounter rates.

²³⁰ Dee et. al. 2019. The Future of Reef Ecosystems in the Gulf of Mexico: Insights From Coupled Climate Model Simulations and Ancient Hot-House Reefs <https://www.frontiersin.org/articles/10.3389/fmars.2019.00691/full>

²³¹ Gil-Agudelo, Diego L., Carlos E. Cintra-Buenrostro, Jorge Brenner, Patricia González-Díaz, William Kiene, Caitlin Lusic, and Horacio Pérez-España. 2020. "Coral Reefs in the Gulf of Mexico Large Marine Ecosystem: Conservation Status, Challenges, and Opportunities." *Frontiers in Marine Science* 6 (January). <https://doi.org/10.3389/fmars.2019.00807>.

²³² Hourigan, T. F., P. J. Etnoyer, R. P. McGuinn, C. Whitmire, D.S. Dorfman, M. Dornback, S. Cross, D. Sallis. Deep-Sea Corals in Gulf of Mexico Data Atlas [Internet]. Stennis Space Center (MS): National Centers for Environmental Information; 2016. [1 screen]. Available from: <https://gulfatlas.noaa.gov/>

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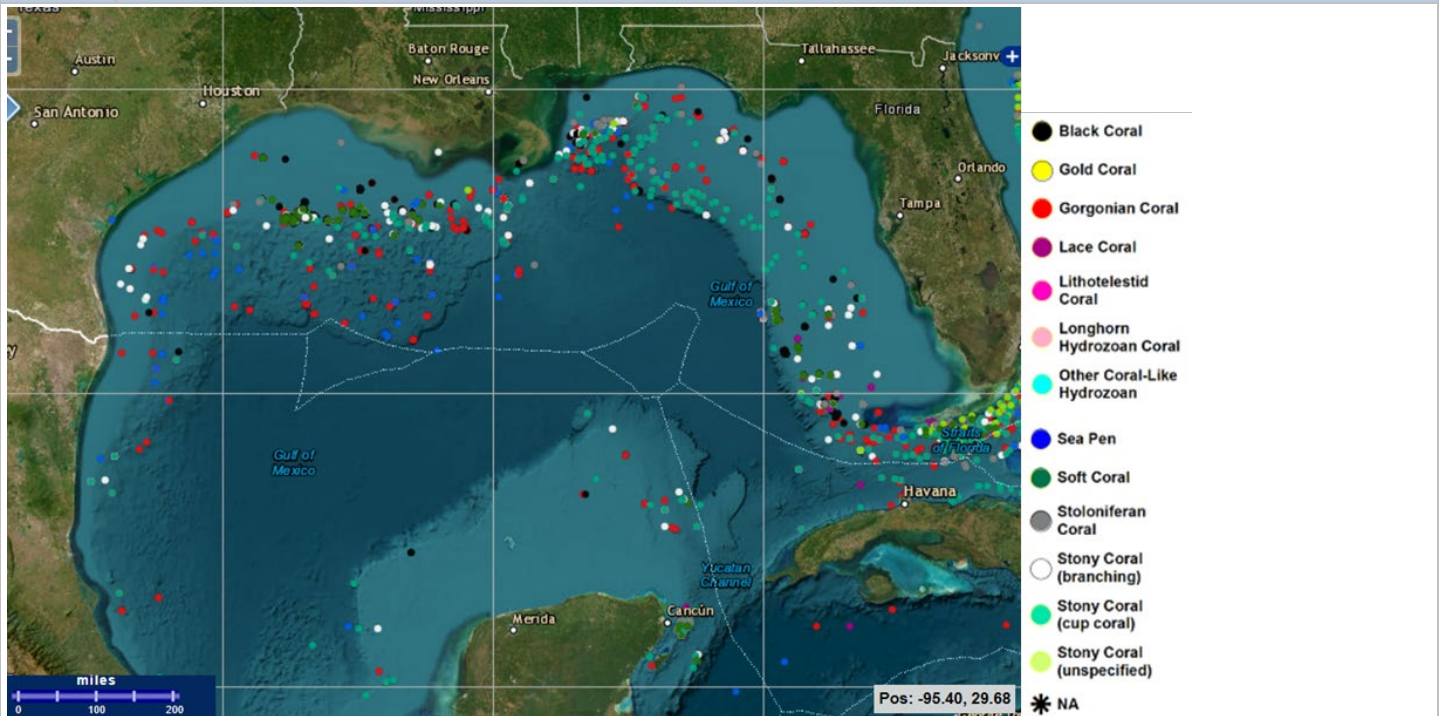


Figure 33. Spatial distribution of known deep-sea coral locations in the Gulf of Mexico (top) with zoomed in area of Key West (bottom). Source: Hourigan *et al.*, 2016²³² (Note dots are not to scale, they get smaller as zooming in occurs in the map.)

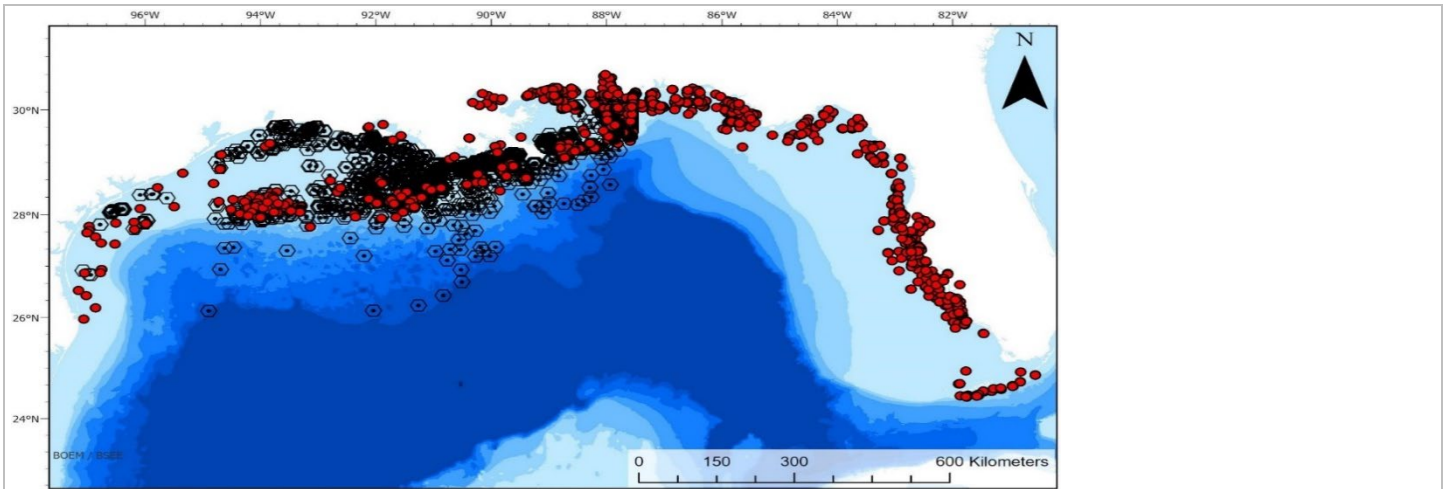
Natural and Artificial reefs

Natural and artificial reefs are interspersed with each other in the Northern GOM (nGOM). This network of habitable ‘islands’ separated by stretches of uninhabitable (or less preferred) ground, provides unprecedented opportunities for organismal movement between these two habitat types. The artificial structure communities in the GOM are not identical to, and not entirely different from, adjacent natural habitats. Shallower coral assemblages are often present on artificial structures. Some of the deep -sea coral locations noted in Figure 34 are in fact records from artificial structures not currently used for oil or gas extraction, including ‘reefed’ oil and gas platforms, submerged vessels, reef balls and others. In 2016, the total number of artificial reefs in the nGOM (including active and inactive) amounted to 4,176.²³³

These habitats are actively being taken into account by managers. For examples the edge of the continental slope off the coasts of Texas and Louisiana support natural reefs. The best known of these are the East and West Flower Garden Banks, which constitute the core of the Flower Garden Banks National Marine Sanctuary (FGBNMS). The Flower Garden Banks are not only the northernmost coral reefs of the greater Caribbean but also the most isolated and among the healthiest with regard to coral cover. The FGBNMS Advisory Board recently voted to expand the sanctuary boundaries to include 14 additional banks. Approximately 150 platforms are located within 25 miles of the current sanctuary borders.

The distribution of shallow reefs across the GOM are illustrated in Figure 35.

²³³ Schulze A., Erdner D. L., Grimes C. J., Holstein D. M. Miglietta M. M. 2020. Artificial Reefs in the Northern Gulf of Mexico: Community Ecology Amid the Ocean Sprawl. *Frontiers in Marine Science*, 7, 1-15. Volume 7 - 2020 | <https://doi.org/10.3389/fmars.2020.00447>



Legend

- Artificial Reefs
 - OCS Drilling Platforms
- | | | | | |
|-----------------------|--|-----------------|--|-----------------|
| Bathymetry (m) | | -200 - -499 | | -2,000 - -2,499 |
| | | -1 - -49 | | 2,500 - -3,999 |
| | | -50 - -99 | | ≤ -4,000 |
| | | -100 - -199 | | |
| | | -1,000 - -1,499 | | |
| | | -1,500 - -1,999 | | |

Figure 34. Artificial reefs and OCS drilling platforms in the Gulf of Mexico. Schulze *et al.* 2020.

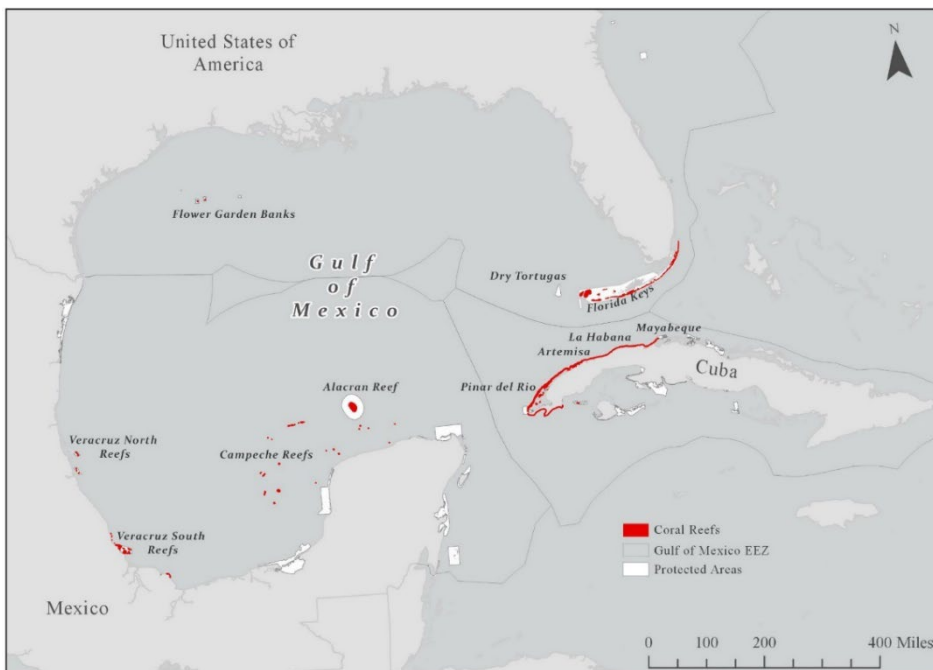


Figure 35. Distribution of shallow coral reefs (red) in the Gulf of Mexico (GOM). Exclusive Economic Zone = EEZ. Also shown are managed areas within the GOM, which tend to be focused on fisheries management. Gil-Agudelo *et al.* 2020.

Bottom protrusions and net hang locations

Harvesters are well aware of bottom protrusions and actively avoid these locations to prevent damage to their gear. These bottom protrusions include, but aren't limited to, natural & artificial reefs, sunken debris (vessels or other anthropogenic discard), derelict oil equipment, etc. All these types of substrates, including natural reefs, can provide the necessary habitat for corals to grow and form biogenic structure. The avoidance of these habitats and structures by the shrimping industry is critical to the long term health of coral and other biogenic habitats.

3.1.2. There shall be management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration's essential habitats, and on habitats that are highly vulnerable to damage by the unit of certification's fishing gear.

During the site visit, numerous stakeholders made the assessment team aware of a database of “hang locations” which was originally organized by Mr. Gary Graham (Texas Sea Grant). The purpose of this database was to promote a collaborative effort between harvesters to share locations where fishing gear could get caught (or hang up) on bottoms with hard protrusions. Stakeholders noted that the origins of this database began from reef fishermen (targeting finfish) eventually sharing it with other fishers such as those targeting shrimp. The incentive for the harvesters to participate is to gain and share information that prevents themselves and others away from costly repairs that results from being torn on protrusions. As the assessment team understands it, these “hang locations” can be downloaded from one harvesters ELB to a thumb drive and transferred to another harvester/vessel. As each harvester transfers the database to another, it grows as it adds the hang locations from each new vessel. This database is essentially a living database that grows each year as it is shared and expanded as it shared and updated among fishermen across the GoM.

During creation and implementation process for Coral Amendment 9 to the FMP, 13 new habitat areas of particular concern were established.²³⁴ During the process, the proposed (at the time) habitat areas were compared against historic ELB data (2004-2013) from the shrimping industry.²³⁴ For example, in the Pulley Ridge South Portion HAPC, ELB data returned one data point from one shrimping vessel.²³⁴ In the West Florida Wall HAPC, there were no historical points recorded in the geographic extent of the HAPC.²³⁴ At a stakeholder meeting during the site visit, Ms. Leann Bosarge (former Gulf Council Chair) stated that prior to HAPC implementation, looking at the historical ELB tracks from the shrimp fleet would identify coral habitat because the harvesters are aware of their location (though generational knowledge and the “hang location” database) and actively avoid these habitats to prevent financial loss due to net damage.²³⁵

In fact, a comparison between ELB data from 2014-2021 and known coral locations shows very low overlap between reefs and effort (Figure 36). The data shown are aggregate data over a 0.04° by 0.04° grid cell (approx. 4.5 sq Km), thus where there is overlap does not implicate that trawls occurred over coral reef, simply that it occurs within the same grid cell/in the vicinity of a live bottom.

HAPCs created by Coral Amendment 9 (2020) shows there is an absence or very low fishing effort over those protected areas (Figure 37).²³⁴ The amendment created six HAPCs off the eastern tip of Louisiana in 2020.²³⁴ The trawl effort largely predates the creation of these coral HAPCs in 2020 and these sensitive areas are and have been avoided by the shrimp harvesters. It is important to note that per the Coral Amendment 9 Final Rule, Gulf Royal Red shrimp fleet are permitted to have their gear deployed in Viosca Knoll 862/906, so long as it is not in contact with the bottom (Figure 37).²³⁴ The fishing overlap in this closure is not the fleet under assessment, nor is it contacting the bottom. The overlap in effort that can be observed on Alabama Alps Reef and Viosca Knoll 826 HAPCs predates the formation of those closures, however natural reefs never form perfect quadrilateral shapes (despite closures being defined as such) and the overlap in the corners is highly likely not coral habitat (Figure 37). Avoidance of sensitive habitat can also be seen around longer standing HAPCs such as Sonnier Bank, Bouma Bank, and Alderice Bank on the edge of the Flower Garden Banks NMS (Figure 37).

The low/absence of overlap between effort and closures supports the claim that harvesters are aware of hard bottom habitats where nets can hang up and actively avoid these areas. The use of “hang location” database for onboard ELBs and the collaborative effort to share this knowledge translates in a very low probability of encounter. There is evidence that the shrimp fleet avoids known coral locations since prior to the implementation of HAPCs which would indicate that coral reef habitat that is not currently protected by a closure is not being fished by the fleet.

²³⁴ GMFMC. 2023. Amendment 9 to the Fishery Management Plan for Coral and Coral Reef Resources in the GOM U.S. waters (Amendment 9). <https://portal.gulfcouncil.org/coral9/>

²³⁵ Leann Bosarge (former Gulf Council Chair), personal communication, 13 July 2023.

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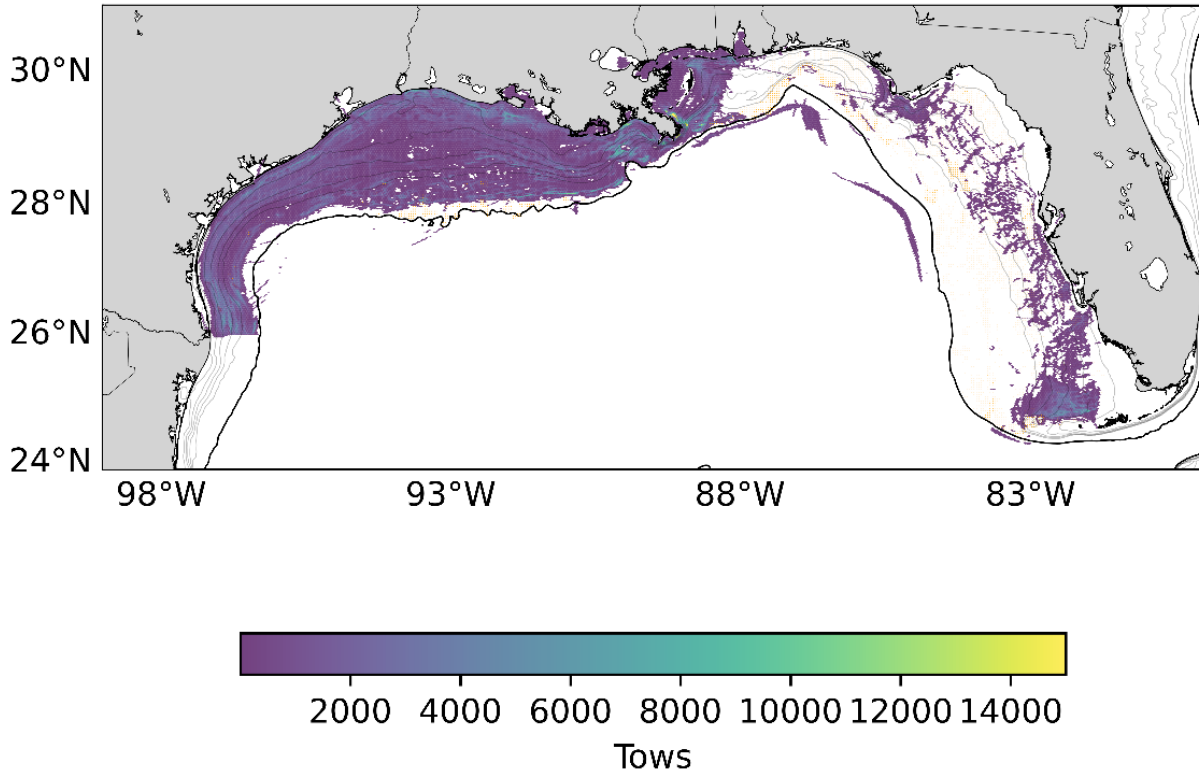


Figure 36. Geographic distribution and intensity of trawl effort (from 2014-2021) in the Gulf of Mexico shrimp fishery given estimated number of tows in a given 0.04° latitude by 0.04° longitude grid cell. Orange points represent known natural reef habitat. Light orange represents grid cells with <math><1\text{km}^2</math> of reef area and dark orange represent cells with >math>>1\text{km}^2</math> reef area. Dark black line demarcates the 200m depth contour which indicates the continental shelf margin and the grey lines show 10, 20, 30, 40, 50 meters depth.

Source: Produced by LGL Ecological Research Associates for the purpose of this assessment.

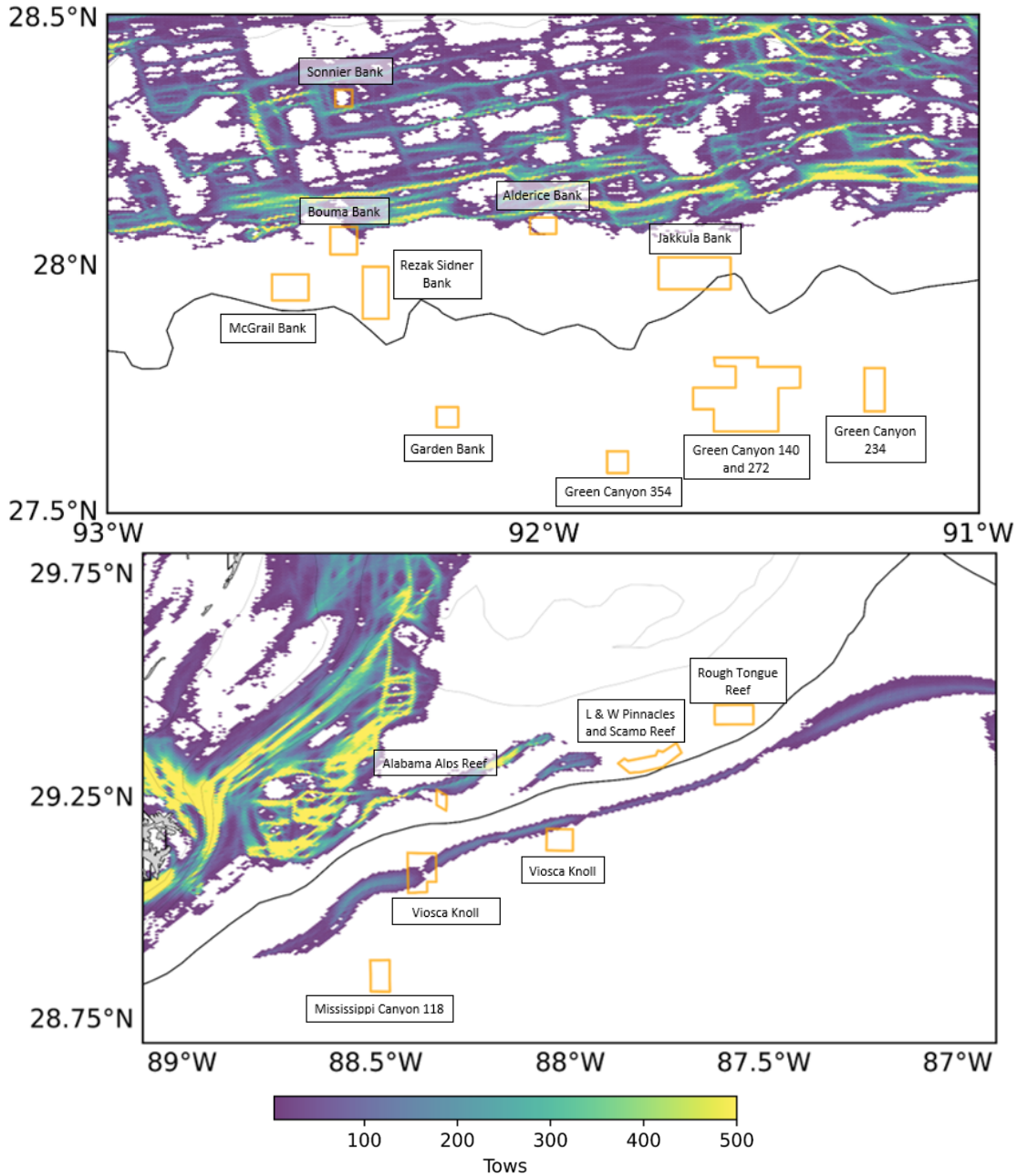


Figure 37. Trawl effort (from 2014-2021) off the south of Louisiana (A; upper panel) and eastern tip of Louisiana (B; lower panel). Coral HAPCs (including six newly created HAPCs from Coral Amendment 9; lower panel B) are marked by the orange lines and tow intensity is given by colors ranging from purple (low) to yellow (high). Cells without at least three points are excluded to comply with confidentiality requirements.

Source: Produced by LGL Ecological Research Associates for the purpose of this assessment.

MPAs and protected areas in the Gulf of Mexico

In the United States, coastal waters are controlled by the state and federal governments.²³⁶ The power to implement closures falls on the governments that control those waters. Individual states have jurisdictional power up to three nautical miles from shore and the federal government retains power beyond state waters to the extent of the EEZ.²³⁷ There are exceptions to this standard. For example, state waters extend to 9 nautical miles from the coastline of Texas and Florida’s gulf coast.

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Below is a map of all the various closures that currently exist in the Gulf of Mexico (Figure 38).

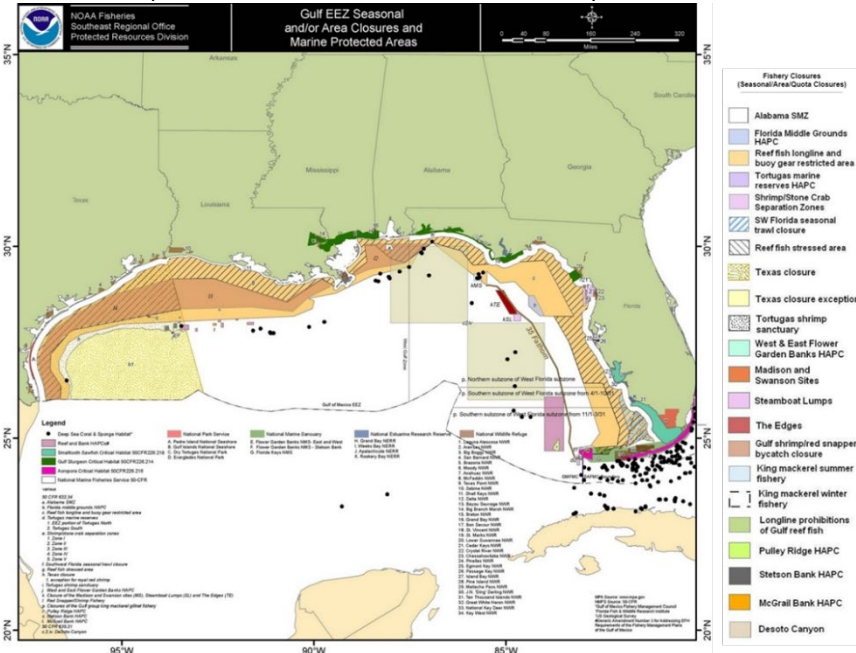


Figure 38. Existing seasonal, areal, and quota-based closures in the Gulf of Mexico: NOAA Southeast 2021.

There are various habitats that are closed to protect species listed under the ESA as these habitats are considered essential habitat for these species. The dark green areas in coastal waters of Louisiana, Mississippi, Alabama and Florida coastal were created to protect Gulf sturgeon habitat and the teal-colored areas (South Florida) is to protect smalltooth sawfish critical habitat. There is also a large seasonal closure off the coast of Texas to promote brown shrimp growth in order to reach a larger and more profitable size.²³⁸

Closer inshore there are 34 National Wildlife Refuges (marked in brown near the coast) where commercial fishing of any species is prohibited year round, and where important habitat for most of GOM’s most common species can be found.²³⁹ There are also numerous year-round closure to protect coral habitats, where bottom contact gear is prohibited.²⁴⁰ There are many smaller and widespread coral closures on the central and western half of the GOM and these closures align with the coral aggregations found on the margin of the continental shelf and slope. The eastern GOM (Florida) has much larger closures to protect large rocky reefs with hardbottom coral reefs off southern Florida and the Keys (aimed at the protection of various species).²⁴¹ There is another closure called the southwest Florida middle grounds that is a closure to also protect coral aggregations. Finally, there is the Edges closure that closes annually in the winter and spring to protect grouper spawning grounds.²⁴² There is also the two-year round (large pale green squares) DeSoto canyons closures for pelagic longline gear which are designed for general bycatch reduction, bycatch fishing

²³⁶ OCS. 2023. U.S. Maritime Limits & Boundaries. Office of Coast Survey National Ocean Service <https://nauticalcharts.noaa.gov/data/us-maritime-limits-and-boundaries.html#:~:text=The%20territorial%20sea%20is%20a,nautical%20miles%20from%20the%20baseline.>

²³⁷ PRIMER ON OCEAN JURISDICTIONS: DRAWING LINES IN THE WATER https://govinfo.library.unt.edu/oceancommission/documents/full_color_rpt/03a_primer.pdf

²³⁸ NOAA. 2022. FB22-026, May 11, 2022: Gulf of Mexico Fishery Bulletin. Federal Waters off Texas Close to Shrimping on May 15, 2022. <https://www.fisheries.noaa.gov/bulletin/federal-waters-texas-close-shrimping-may-15-2022>

²³⁹ FWS. 2023. National Wildlife Refuge System. U.S. Fish & Wildlife Service <https://www.fws.gov/program/national-wildlife-refuge-system>

²⁴⁰ GMFMC. 2023. Amendment 9 to the Fishery Management Plan for Coral and Coral Reef Resources in the GOM U.S. waters (Amendment 9). <https://portal.gulfcouncil.org/coral9/>

²⁴¹ NOAA. 2023. Fishing Regulations and Seasonal Closures - Gulf of Mexico <https://www.fisheries.noaa.gov/southeast/rules-and-regulations/fishing-regulations-and-seasonal-closures-gulf-mexico>

²⁴² NOAA. 2023. Fishing Regulations and Seasonal Closures - Gulf of Mexico <https://www.fisheries.noaa.gov/southeast/rules-and-regulations/fishing-regulations-and-seasonal-closures-gulf-mexico>

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mortality, and incidental catch of undersized swordfish, billfish, and other overfished and protected species within the US pelagic longline fishery.²⁴³

Recent Management Action to Protect VMEs

In November 2020, 21 new Habitat Areas of Particular Concern (HAPC) were established in the Gulf of Mexico. Thirteen of these areas, covering 787 km², include regulations to protect deep-sea corals from damaging fishing gear. Boundaries include the first coral habitats deeper than 200 m to be protected in the Gulf.²⁴⁴

In March 2021, the Flower Garden Banks National Marine Sanctuary expanded to protect 14 new reefs and banks, and adjusted boundaries of its original three banks in 2021 to encompass more than an additional 260 km². Vulnerable habitats and protected areas as identified by Coral Amendment 9 by the GOM Fishery Management Council are shown in (Figure 39).

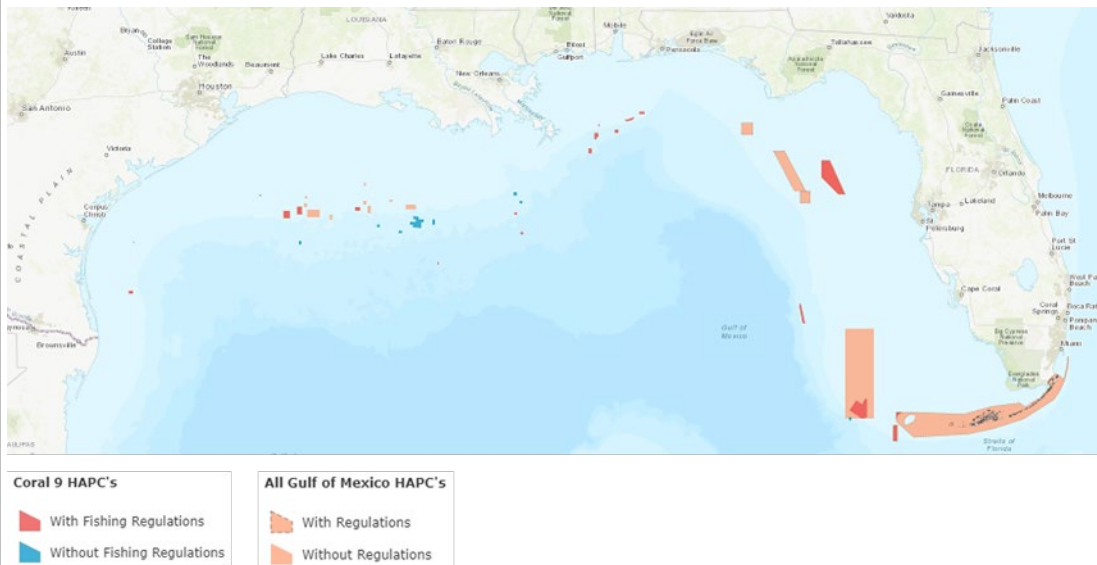


Figure 39. Vulnerable habitats and protected areas as identified by Coral Amendment 9 by the GOM Fishery Management Council (Source: GMFMC 2020).

Effects on Corals and associate reef building biota/habitat

There is considerable knowledge on the spatial distribution of corals and corals reefs around south Florida.^{245,246} As their locations are well known, these warm water coral reefs are protected by spatial closures and/or fishing practices to avoid gear damage. In the northern and western parts of the GOM, there are large but patchy distributions of deep-sea corals.²⁴⁷ These deep-sea corals are

²⁴³ NOAA. 2019. Issues and Options for Research and Data Collection in Closed and Gear Restricted Areas in Support of Spatial Fisheries Management.

https://media.fisheries.noaa.gov/dam-migration/closed_area_research_issues_and_options_paper_61019.pdf

²⁴⁴ Gulf Council. 2020. Coral Amendments Plans Implemented. Gulf of Mexico Fishery Management Council <https://gulfcouncil.org/fishery-management-2/implemented-plans/coral/>

²⁴⁵ Spalding, M., Burke, L., Wood, S.A., Ashpole, J., Hutchison, J. and Zu Ermgassen, P., 2017. Mapping the global value and distribution of coral reef tourism. *Marine Policy*, 82, pp.104-113. <https://www.sciencedirect.com/science/article/pii/S0308597X17300635>

²⁴⁶ Guest, J.R., Edmunds, P.J., Gates, R.D., Kuffner, I.B., Andersson, A.J., Barnes, B.B., Chollett, I., Courtney, T.A., Elahi, R., Gross, K. and Lenz, E.A., 2018. A framework for identifying and characterizing coral reef “oases” against a backdrop of degradation. *Journal of Applied Ecology*, 55(6), pp.2865-2875.

<https://besjournals.onlinelibrary.wiley.com/doi/pdfdirect/10.1111/1365-2664.13179>

²⁴⁷ Etnoyer, P.J., Wagner, D., Fowle, H.A., Poti, M., Kinlan, B., Georgian, S.E. and Cordes, E.E., 2018. Models of habitat suitability, size, and age-class structure for the deep-sea black coral *Leiopathes glaberrima* in the Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography*, 150, pp.218-228.

<https://www.sciencedirect.com/science/article/pii/S0967064517301820>

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very slow growing, are not resistant to disturbances, and live to be upwards of 600 years old.²⁴⁸ Protecting these deep-sea corals is a priority for the GMFMC, but while the extent of their known spatial distribution is growing, many locations remain unknown. As the knowledge on known locations continues to increase by either survey or observer coverage, protected areas are designated to protect as many of these VMEs as possible while having the lowest economic impact as possible.

The primary concern with the GOM shrimp fishery, specifically the otter trawl fishery, is interaction with shallow water and deep-water corals and associated reef builders/habitat. Furthermore, considering that a) the shrimp habitat is one of mixed sandy and muddy bottoms, that b) fishermen will attempt to primarily fish those habitats to catch shrimp, while avoiding avoid potential damage on the gear from fishing rocky substrate and outcrops (where these VMEs tend to be found for the most part), and c) that key coral habitats in the Gulf are already protected, the GOM otter trawl fleet is unlikely to have an impact on these ecosystem, although the exact extent of the impact is unknown.

Skimmer trawl fish at an average 3.5 m depth and are designed to fish the entire water column (near the bottom to above the surface to prevent white shrimp from jumping over the top of the net). Based on effort maps and occurrence of corals habitats and taking into account that skimmer trawl effort occurs in shallow waters very close inshore (within a mile or two) in Louisiana and a few area in Mississippi/Alabama, there does not appear to be any immediate or significant overlap and therefore risk from this gear type.

Current status/Appropriateness/Effectiveness:

There is evidence that the objectives described above are in place, and that effective management measures relative to those have been implemented.



EVIDENCE:

The regulations and management plans reviewed by the Assessment team for all GOM management agencies contained various references to management objectives directed at avoiding, minimizing, or mitigating impacts to the GOM’s various habitats as described. The impacts of the most prominent fishing gears in use (trawls and nets) are also described. Of significance in the furtherance of evidence is the established practice of shrimp harvesters to capture and share “hang locations” data on their vessel-based plotting units as an effective tool for avoiding contact with important and/or vulnerable marine benthic habitats.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration’s essential habitats and on habitats that are highly vulnerable to damage by the unit of certification’s fishing gear. Examples may include various regulations, fishery management plans, data, and reports.



EVIDENCE:

The availability, quality, and adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration’s essential habitats and on habitats that are highly vulnerable to damage by the unit of certification’s fishing gear. Please see supported evidence in the references

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²⁴⁸ Prouty, N.G., Fisher, C.R., Demopoulos, A.W. and Druffel, E.R., 2016. Growth rates and ages of deep-sea corals impacted by the Deepwater Horizon oil spill. *Deep Sea Research Part II: Topical Studies in Oceanography*, 129, pp.196-212. <https://www.sciencedirect.com/science/article/am/pii/S0967064514002987>

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	Starting score	Number of EPs <u>NOT</u> met		Overall score
Numerical score:	All agencies – 10	Federal - 0 Texas - 0 Louisiana - 0 Mississippi - 0 Alabama - 0 Florida - 0) - (x 3 =	Federal - 10 Texas - 10 Louisiana - 10 Mississippi - 10 Alabama - 10 Florida - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)				All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)				All agencies - Full
Non-conformance Number (if applicable):				NA

3.1.3. There shall be management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement) on the structure, and function of the ecosystems that are likely to be irreversible or very slowly reversible.

The Gulf has a broad, shallow continental shelf, which generally extends 100 to 200 km (62 to 124 miles) offshore (Henderson & Varner, 2011). The shelf is narrowest off Louisiana and widest of Florida and the Yucatán Peninsula. Some river-derived canyons, most notably the Mississippi and DeSoto Canyons, incise the continental shelf in the northern Gulf. The continental shelf descends to the deep abyssal plain via the continental slope. Geologic features of the slope include rises that formed from ancient reefs, and salt diapirs and sediment fans that are extensions of river deltas. The deepest portion of the Gulf is the Sigsbee Deep, a canyon-like triangular area in the west-central Gulf, which is more than 4,000 meters (>13,120 ft) below sea level. The shapes of undersea basins, ridges and canyons influence ocean circulation and thereby the flow of heat, nutrients and pollutants.

Gulf of Mexico food web

A 2015 publication by Ainsworth *et al.* (2015) detailed the results for an Atlantis Ecosystem model for the GOM supporting integrated ecosystem assessment.²⁵¹ NOAA published a notice in January 2023²⁵² to highlight that the model had undergone a rigorous Center for Independent Experts (CIE) review and that the public portion with an open session for public comment would be held in March 2023. The next step in the process is to use the peer-reviewed GOM Atlantis model to run Gulf Penaeid shrimp simulations (e.g., habitat loss) and strategically evaluate the long-term biological, economic and ecosystem-level trade-offs.

The following information about the ecosystem food web in the GOM is taken from Ainsworth *et al.* 2015.²⁵³

GOM biological diversity

The GOM supports a high biological diversity and biomass of fish, seabirds, and mammals; in this region, multiple commercial and recreational fishing fleets operate providing economic resources for local populations. The Gulf is also the site of important oil and gas production and tourism. As a result of intensive human use, the Gulf is subject to various impacts, including oil spills, habitat degradation, and anoxia. Management of this Large Marine Ecosystem requires an ecosystem-based management approach that provides a holistic approach to resource management. The Gulf is managed as part of NOAA's Integrated Ecosystem Assessment Program (IEA). This program considers the development of ecosystem models as a tool for ecosystem-based fisheries management (EBFM) and to support the different stages in the IEA process, particularly testing the effects of alternative management scenarios. As part of this program, we have parametrized an Atlantis ecosystem model for the Gulf, including major functional groups, physiographic dynamics, and fishing fleets. The Gulf Atlantis model represents a collaboration between the University of South Florida, the University of Miami, the Southeast Fisheries Science Center, the National Coastal Data Development Center, and other contributors.

Circulation and productivity

Circulation within the GOM is driven primarily by the Loop Current which enters the Gulf through the Yucatan Strait, heads towards the north-western center of the Gulf and loops back towards Cuba to the east, exiting through the Florida Straits; the exact position and orientation of the Loop Current is variable (Vukovich, 2007). The shallow depths of both the Straits of Yucatan (1900m) and Florida (800 m) limit the movement of deep water in and out of the system. The Loop Current intrudes on to the northern shelf off Mississippi and on to the West Florida Shelf and it can form eddies which move large parcels of water westward. The influence of the Loop Current and associated features plays an important role in the advection of nutrients, larvae and plankton determining the distribution of primary and secondary production in the system (Biggs and Müller-Karger, 1994; Bakun, 1996; Zimmerman and Biggs, 1999), and the related distribution of higher trophic levels (Drexler and Ainsworth, 2013). The Mississippi River contributes 64% of the freshwater stream flow to the Gulf and is the main driver of the high productivity seen in the area from the Florida-Mississippi border extending west to Texas (Darnell and Defenbaugh, 1990); this area has been referred to as the fertile fisheries crescent (Gunter, 1963). Over this same region, the nutrient rich Mississippi River water causes a seasonal phytoplankton bloom which results

²⁵¹ Ainsworth, C. H., Schirripa, M. J., and Morzaria-Luna, H. (eds.) 2015. An Atlantis Ecosystem Model for the Gulf of Mexico Supporting Integrated Ecosystem Assessment. NOAA Technical Memorandum NMFS-SEFSC-676, 149 p.

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²⁵² NOAA. 2023. CIE Review of the Atlantis Ecosystem Model in Support of Ecosystem-Based Fishery Management in the Gulf of Mexico Large Marine Ecosystem. FR Doc. 2023-01223 <https://www.federalregister.gov/documents/2023/01/24/2023-01223/cie-review-of-the-atlantis-ecosystem-model-in-support-of-ecosystem-based-fishery-management-in-the>

²⁵³ Ainsworth, Cameron. et al. 2015. An Atlantis Ecosystem Model for the GOM supporting Integrated Ecosystem Assessment: NOAA Technical Memorandum NMFS-SEFSC-676: https://digitalcommons.usf.edu/cimage_pubs/98/

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in a hypoxic zone of variable size occurring west of the Mississippi Delta to Texas (Turner *et al.* 2006). In addition to the Mississippi river, there are 20 river systems; 85% of the total water flow into the Gulf comes from the United States (Moretzsohn *et al.*, 2014).

Atlantis model

Atlantis is an ‘end-to-end’ model which represents trophic dynamics from apex predators to primary producers, fisheries, nutrient dynamics, microbial cycles, habitat, and physical oceanography in a three-dimensional, spatially-explicit domain using a modular structure. The Atlantis GOM model represents present-day conditions (c. 2012). The model extent is divided into 66 three-dimensional polygons, each containing up to 7 depth strata. Ainsworth *et al.* 2015 linked the Atlantis GOM model to the Navy Coastal Ocean Model (NCOM) – American Seas model (AMSEAS) to force temperature and salinity fluxes. They simulated food web dynamics using 91 functional groups, including reef fish (11 groups), demersal fish (12), pelagic fish (15), forage fish (4), elasmobranchs (6), shrimp (4), seabirds (2), mammals (4), sea turtles (3), commercial benthos (3), structural species (4), macrobenthos (3), filter feeders (3), primary producers (8), pelagic invertebrates (4), and nutrient cyclers (4), and recreated biomass, catch, and effort trends in the GOM from 1980 to 2010 based on historical catch and biomass data. The model also includes fisheries fleet dynamics representing the main fishing fleets in the US, Mexico, and Cuba, and evaluated the ability of the model to represent historical fishing pressure from 1980 to 2010. The preliminary assessment shows that the Atlantis GOM can reasonably approximate historical catch time series and spatial distributions for most functional groups and fisheries in the GOM. The Atlantis GOM will allow addressing ecological hypotheses, test ecosystem indicators, assess the effects of climate change, and evaluate the trade-offs of alternate management scenarios.

Defining predator-prey interactions

To characterize the trophic interactions occurring between groups of species in the Atlantis-GOM model, Ainsworth *et al.* (2015) first performed a laboratory analysis of stomach samples to better understand the trophic interactions of data-deficient fish species within the GOM study area, and then expounded on laboratory results through the assimilation of available diet data sets. Following the methodology of Ainsworth *et al.* (2010), the authors used a maximum likelihood estimate (MLE) to aggregate these data sets and provide a probabilistic representation of major predator-prey linkages for the Gulf of Mexico ecosystem.

The results are presented in Masi *et al.* (2014)²⁵⁴ in Figure 41. Using the normalized mode values obtained from the MLE distribution, the authors were able to construct a food web diagram, linking the 35 functional groups analyzed in the GOM study area. Figure 41 depicts the predator-prey interactions (modes >23.0%) for the consumer functional groups analyzed using the MLE method, where the size of the box represents the Atlantis model biomass estimates, on a logarithmic scale. However, the carnivorous macrobenthos (including the shrimp species under assessment), infaunal meiobenthos, and bivalve groups are not to scale because their biomass is too large to show the actual log biomass. The solid lines represent interactions between groups with modes greater than 40.0%, whereas the dashed lines represent linkages of 23.0 to 40.0% between predators and their prey. The predator groups flatfish, jacks, large reef fish, other demersal fish, pinfish, red drum, seatrout, skates and rays, small demersal fish, small reef fish and snook only show dashed linkages, which probably indicates generalist feeding habits.

Prey items and predators of shrimp

The 2004 Gulf Council EFH EIS²⁵⁵ review highlighted that that larvae of shrimp feed on phytoplankton and zooplankton. Postlarvae feed on epiphytes phytoplankton, and detritus. Juveniles and adults prey on polychaetes, amphipods and chironomid larvae but also detritus and algae. The habitat of these prey is essentially the same as required by shrimp. Prey and predators of shrimp have been reproduced below from the 2004 Gulf Council EFH EIS.

²⁵⁴ Masi, M.D. & Ainsworth, C.H. & Chagaris, D., 2014. A probabilistic representation of fish diet compositions from multiple data sources: A Gulf of Mexico case study. *Ecological Modelling*, Elsevier, vol. 284(C), pages 60-74. <https://doi.org/10.1016/j.ecolmodel.2014.04.005>

²⁵⁵ GMFMC. 2004. Final EIS for EFH for the Gulf of Mexico FMPs. Gulf of Mexico Fishery Management Council <https://gulfcouncil.org/wp-content/uploads/March-2004-Final-EFH-EIS.pdf>

3.1.3. There shall be management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement) on the structure, and function of the ecosystems that are likely to be irreversible or very slowly reversible.

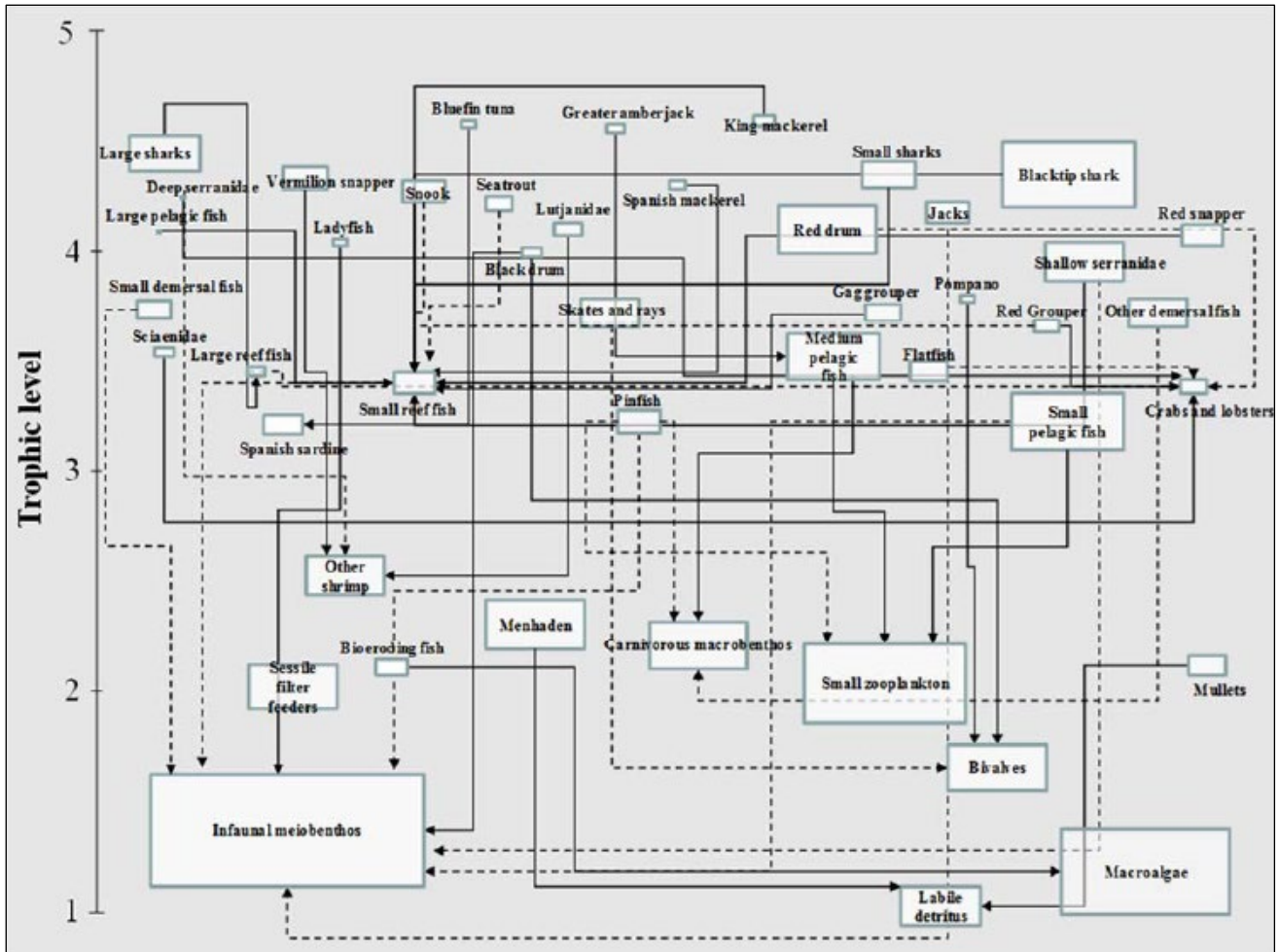


Figure 41. Food web diagram showing the predator-prey interactions. The area of each box is directly proportional to the log biomass concentration averaged over all areas in the Gulf of Mexico; solid lines show prey contributions > 40%; dashed lines show 23–40% connection; linkages < 23% not shown. Carnivorous macrobenthos, infaunal meiobenthos, and bivalves are not to scaled. (Source: Masi *et al.*, 2014).

Current status/Appropriateness/Effectiveness:

There are management measures in place to achieve the objectives described in the process parameter. Such objectives may be outlined in overarching fisheries legislation, regulations, or management plans.



EVIDENCE:

The regulations and management plans reviewed by the Assessment team for all GOM management agencies contained various references to management objectives directed at avoiding, minimizing, or mitigating impacts to the GOM’s ecosystem as described. The impacts of the most prominent fishing gears in use (trawls and nets) are also described. Of significance in the furtherance of evidence is the established practice of shrimp harvesters to capture and share “hang locations” data on their vessel-based plotting units as an effective tool for avoiding contact with important and/or vulnerable marine benthic habitats.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to minimize adverse impacts of the fishery (including any enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Examples may include fishery management plans, other regulatory documents, or laws.



3.1.3. There shall be management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement) on the structure, and function of the ecosystems that are likely to be irreversible or very slowly reversible.

EVIDENCE:

The availability, quality, and adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to minimize adverse impacts of the fishery on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. In addition to the information provided here, the evidence is fully supported by the federal and state regulations, management plans, strategic plans and objectives profiled previously (various Supporting clauses of Fundamental clause 1). Please see supported evidence in the references

References:

1. UNIDO. 2017. Gulf of Mexico Large Marine Ecosystem (GOM-LME). United Nations Industrial Development Organization https://www.unido.org/sites/default/files/2017-05/UNIDO_GulfOfMexico_0.pdf
2. Love, M., Baldera, A., Yeung, C., & Robbins, C. (2013). The Gulf of Mexico Ecosystem: A Coastal and Marine Atlas. New Orleans, LA: Ocean Conservancy, Gulf Restoration Center. <https://oceanconservancy.org/wp-content/uploads/2017/05/gulf-atlas.pdf>
3. Ainsworth, C. H., Schirripa, M. J., and Morzaria-Luna, H. (eds.) 2015. An Atlantis Ecosystem Model for the Gulf of Mexico Supporting Integrated Ecosystem Assessment. NOAA Technical Memorandum NMFS-SEFSC-676, 149 p. <http://doi.org/10.7289/V5X63JVH>
4. NOAA. 2023. CIE Review of the Atlantis Ecosystem Model in Support of Ecosystem-Based Fishery Management in the Gulf of Mexico Large Marine Ecosystem. FR Doc. 2023-01223 <https://www.federalregister.gov/documents/2023/01/24/2023-01223/cie-review-of-the-atlantis-ecosystem-model-in-support-of-ecosystem-based-fishery-management-in-the>
5. Ainsworth, C *et al.* 2015. An Atlantis Ecosystem Model for the GOM supporting Integrated Ecosystem Assessment: NOAA Technical Memorandum NMFS-SEFSC-676: https://digitalcommons.usf.edu/cimage_pubs/98/
6. Masi, M.D., Ainsworth, C.H., Chagaris, D. 2014. A probabilistic representation of fish diet compositions from multiple data sources: A Gulf of Mexico case study. Ecological Modelling, Elsevier, vol. 284(C), pages 60-74. <https://doi.org/10.1016/j.ecolmodel.2014.04.005>
7. GMFMC. 2004. Final EIS for EFH for the Gulf of Mexico FMPs. Gulf of Mexico Fishery Management Council <https://gulfcouncil.org/wp-content/uploads/March-2004-Final-EFH-EIS.pdf>

	Starting score	Number of EPs <u>NOT</u> met		Overall score
Numerical score:	All agencies - 10	Federal - 0 Texas - 0 Louisiana - 0 Mississippi - 0 Alabama - 0 Florida - 0	) - ( x 3 =	Federal - 10 Texas - 10 Louisiana - 10 Mississippi - 10 Alabama - 10 Florida - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)				All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)				All agencies - Full
Non-conformance Number (if applicable):				NA

9.2.3.5 Supporting Clause 3.2.

Management measures shall provide, inter alia, that:

9.2.3.6 Supporting Clause 3.2.1.

3.2.1 Excess fishing capacity shall be avoided and exploitation of the stocks shall remain economically viable.	
Relevance:	Relevant.
Evaluation Parameters	Met?
<p>Process:</p> <p><i>There are management measures in place to limit and/or reduce the total fishing capacity of the unit of certification. These measures shall include specific fishing capacity objective(s), which themselves are based on the best scientific evidence available to understand the level of fishing pressure appropriate to ensure the long-term sustainability of the fishery. Please note that assessors should ensure that catches are within limits, and that data from enforcement show an adequate level of compliance with fisheries laws and regulation.</i></p>	<input checked="" type="checkbox"/>
<p>EVIDENCE:</p> <p>Access to the GOM commercial shrimp fishery in both federal and state waters is regulated through a licensing program. The federal permitting function is set out in Title 50, 16 U.S.C, 1801 <i>et seq.</i>, Chapter VI, Part 622 Subpart C (Shrimp Fishery in the Gulf of Mexico).²⁵⁶</p> <p>Federal waters - fishery access</p> <p>a. For a person aboard a vessel to fish for shrimp in the Gulf EEZ or possess shrimp in or from the Gulf EEZ, a commercial vessel permit for Gulf shrimp must have been issued to the vessel and must be on board.</p> <p>b. The only valid commercial vessel permits for Gulf shrimp are commercial vessel moratorium permits for Gulf shrimp. In accordance with the procedures specified in the Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico (Gulf Shrimp FMP), all commercial vessel moratorium permits for Gulf shrimp have been issued. No additional permits will be issued.</p> <p>c. Commercial vessel moratorium permits for Gulf shrimp are fully transferable, with or without the sale of the vessel.</p> <p>d. Renewal of a commercial vessel moratorium permit for Gulf shrimp is contingent upon compliance with the recordkeeping and reporting requirements for Gulf shrimp specified in § 622.51(a)</p> <p>The minimum threshold number of active shrimp permits is 1,072 per Amendment 17B of the Gulf FMP (January 22, 2018). The federal permitting requirement is closely aligned with the federal National Standards. These are principles that must be followed in any FMP to ensure sustainable and responsible fishery management. National Standard 4 (Allocations) stipulates that if it becomes necessary to allocate or assign fishing privileges among various US fishermen, such allocation shall be (a) fair and equitable to all fishermen, (b) reasonably calculated to promote conservation, and (c) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of the privilege.²⁵⁷</p> <p>Texas waters - fishery access</p> <p>A moratorium on the sale of commercial licenses has been in effect for the bay and bait fishery since 1996, and the Gulf shrimp fishery since 2005. To retain eligibility in these fisheries, purchase of the previous year's license is required. A license buyback provision is in place for these fisheries, but not for Gulf shrimp boat licenses. Catch reporting is a mandatory requirement for vessels engaged in any of the state's commercial shrimp fisheries.²⁵⁸</p> <p>An annual Texas shrimp closure is in effect to allow brown shrimp to reach a larger and more valuable size prior to harvest, and to prevent waste of brown shrimp that might otherwise be discarded due to their small size.²⁵⁹ The closing and re-opening dates of the closure are based on the results of biological sampling by the TPWD. This sampling is used to project the closure, which coincides with brown shrimp in Texas bays and estuaries reaching a mean size of 90 mm and beginning strong emigrations out of the bays and estuaries during maximum duration ebb tides.</p>	

²⁵⁶ Code of Federal Regulations: <https://www.ecfr.gov/current/title-50/chapter-VI/part-622/subpart-C?toc=1>

²⁵⁷ NOAA Fisheries – 10 National Standards: <https://www.fisheries.noaa.gov/national/laws-and-policies/national-standard-10-related-resources>

²⁵⁸ Texas Commercial Fishing Regulations Summary 2023-2024: https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_v3400_0074.pdf

²⁵⁹ Texas Closed Waters: <https://www.fisheries.noaa.gov/bulletin/federal-waters-texas-close-shrimping-may-15-2019>

3.2.1 Excess fishing capacity shall be avoided and exploitation of the stocks shall remain economically viable.

Texas re-opens state waters to shrimp trawling based on sampling projections of when brown shrimp reach a mean size of 112 mm, and when maximum duration ebb tides occur. NOAA Fisheries re-opens federal waters off Texas when Texas re-opens its state waters. If there is a need to adjust the 15th of July date for the re-opening, notification of the revised date is published in the *Federal Register* and announced in a subsequent fishery bulletin.

Louisiana waters - fishery access

According to Title 56, Chapter 1, Part 1 of the Louisiana Revised Statutes²⁶⁰ the responsibility to “protect, conserve, and replenish the natural resources of the state, the wildlife of the state, including all aquatic life is placed under the supervision and control of the Louisiana Wildlife and Fisheries Commission. One of the goals strategies is to “monitor fish populations, evaluate current regulations, and make appropriate management recommendations.”

The state’s commercial shrimp fishery is not a limited entry one. The goals and objectives of its Fisheries Program are detailed in the LDWF’s Strategic Plan FY 2023-24 to 2027-2028.²⁶¹ Specifically, the goal is to “sustainably manage and conserve living aquatic resources and their habitats, and to provide access, opportunity and knowledge of aquatic resources to Louisiana residents and other beneficiaries of these resources; provide trusted, effective, and responsible fisheries management.” One of the objectives of its Fisheries Extension program is to “support a sustainable and economically viable fisheries environment.”

The state’s Shrimp Task Force is responsible for studying and monitoring the shrimp industry and for making recommendations to LDWF, the Commission, and other state agencies on improving production and the economic sustainability of the industry²⁶². Specifically, the Task Force is charged in part to:

- Coordinate efforts to increase shrimp production and marketability.
- Provide for the study of the decline in shrimp marketability and market price, provide for the study of the impacts of imported shrimp on the domestic market, assist in the development of a state shrimp inspection program, and assist in the development of a Louisiana shrimp certification and branding program.
- Develop markets and marketing strategies for the development and expansion of markets for shrimp harvested from Louisiana waters.

The state’s commercial shrimp fishery includes a variety of licences depending on the activity being pursued i.e., commercial fishermen licence, gear licence, vessel licence, wholesale/retail seafood dealer licence, and a fresh products licence.

Mississippi waters - fishery access

According to § 49-15-2 of the *Mississippi Code*²⁶³ any fishery management plan, and any regulation promulgated to implement that plan or promulgated under the state seafood laws, shall be consistent with the following standards for fishery conservation and management:

- Conservation and management measures shall be based upon the best scientific information available.
- If it becomes necessary to allocate or assign fishing privileges among various fishermen, that allocation shall be (i) fair and equitable to those fishermen, (ii) reasonably calculated to promote conservation, and (iii) carried out in a manner that no particular individual, corporation or other entity acquires an excessive share of the privileges.
- Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, but no measure shall have economic allocation as its sole purpose.
- Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.
- Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.
- Conservation and management measures shall, consistent with the conservation requirements of this state (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (i) provide for the sustained participation of the communities, and (ii) to the extent practicable, minimize adverse economic impacts on those communities.

²⁶⁰ Louisiana Revised Statutes, Title 56 (Wildlife and Fisheries): https://www.legis.la.gov/legis/Laws_Toc.aspx?folder=75&level=Parent

²⁶¹ Louisiana Wildlife and Fisheries Strategic Plan: <https://www.wlf.louisiana.gov/assets/Footer/Files/2022-Strategic-Plan.pdf>

²⁶² Louisiana Revised Statutes RS56:494: <https://legis.la.gov/Legis/Law.aspx?d=105348>

²⁶³ Mississippi Code, Title 49, Chapter 15, Article 1: <https://law.justia.com/codes/mississippi/2018/title-49/chapter-15/article-1/section-49-15-2/>

3.2.1 Excess fishing capacity shall be avoided and exploitation of the stocks shall remain economically viable.

- Conservation and management measures shall, to the extent practicable, (i) minimize bycatch, and (ii) to the extent bycatch cannot be avoided, minimize the mortality of that bycatch.
- Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

The Department of Marine Resources' Shrimp (and Crab) Bureau is responsible for conserving and revitalizing the state's shrimp (and crab) resource, supporting habitat to ensure balanced and sustained utilization, and maintaining stewardship of living marine resources for commercial and recreational fisheries at optimal levels as modified by social, economic and biological factors²⁶⁴.

The Department is the authorizing entity that issues commercial licences and permits, and it does so on the basis of established regulations and policies. These include (i) commercial shrimp vessel based on length, (ii) live bait shrimp dealer, (iii) live bait shrimp boat, and (iv) fresh product permit.

Alabama waters - fishery access

Like other GOM states, access to the commercial shrimp fishery in state waters is not managed through a limited entry scheme. The Department of Conservation and Natural Resources (DCNR) and its Advisory Board are jointly involved in managing most facets of the state's commercial fisheries. Licensing provisions in respect of commercial shrimp harvesters and vessels are mandated by the *Alabama Code*, Title 9 (Conservation and Natural Resources), Chapter 12 (Marine Resources), Article 2 (Seafood).²⁶⁵

Florida waters - fishery access

While the state's commercial shrimp fishery is not a limited entry one, its policy and standards in respect of the management of marine fisheries is enshrined in Chapter 379 of the *Florida Statutes (ss.379.2401)*.²⁶⁶ It reads:

1. The Legislature hereby declares the policy of the state to be management and preservation of its renewable marine fishery resources, based upon the best available information, emphasizing protection and enhancement of the marine and estuarine environment in such a manner as to provide for optimum sustained benefits and use to all the people of this state for present and future generations.
2. The commission is instructed to make recommendations annually to the Governor and the Legislature regarding marine fisheries research priorities and funding. All administrative and enforcement responsibilities which are unaffected by the specific provisions of this act are the responsibility of the commission.
3. All rules relating to saltwater fisheries adopted by the commission shall be consistent with the following standards:
 - The paramount concern of conservation and management measures shall be the continuing health and abundance of the marine fisheries resources of this state.
 - Conservation and management measures shall be based upon the best information available, including biological, sociological, economic, and other information deemed relevant by the commission.
 - Conservation and management measures shall permit reasonable means and quantities of annual harvest, consistent with maximum practicable sustainable stock abundance on a continuing basis.
 - When possible and practicable, stocks of fish shall be managed as a biological unit.
 - Conservation and management measures shall assure proper quality control of marine resources that enter commerce.
 - State marine fishery management plans shall be developed to implement management of important marine fishery resources.
 - Conservation and management decisions shall be fair and equitable to all the people of this state and carried out in such a manner that no individual, corporation, or entity acquires an excessive share of such privileges.
 - Federal fishery management plans and fishery management plans of other states or interstate commissions should be considered when developing state marine fishery management plans. Inconsistencies should be avoided unless it is determined that it is in the best interest of the fisheries or residents of this state to be inconsistent.

The State's commercial licensing regulations are detailed in Rule Chapter 68B-31 of the *Florida Administrative Code*.²⁶⁷ The FFWC oversees the administration of the state's commercial licensing requirements for saltwater products. These are defined as any marine

²⁶⁴ Mississippi Shrimp and Crab Bureau: <https://dmr.ms.gov/shrimp-crab/>

²⁶⁵ Alabama Code: <https://law.justia.com/codes/alabama/2022/title-9/chapter-12/article-2/division-2/>

²⁶⁶ Florida Statutes (2023): <https://www.flsenate.gov/Laws/Statutes/2023/0379.2401>

²⁶⁷ Florida Administrative Code – FFWC, Marine Fisheries: <https://www.flrules.org/gateway/ChapterHome.asp?Chapter=68B-31>

3.2.1 Excess fishing capacity shall be avoided and exploitation of the stocks shall remain economically viable.

fish, shellfish, clam, invertebrate, sponge, jellyfish, coral, crustacean, lobster, crab, shrimp, snail, marine plant, echinoderm, sea star, brittle star or urchin, etc.; except non-living shells and salted, cured, canned or smoked seafood.

Harvesters are required to hold a Saltwater Products Licence (SPL) to commercially harvest and sell saltwater products and can only sell only to a licensed Florida wholesale dealer. An SPL may be issued in the name of an individual or a valid commercial vessel registration number issued in the name of the license applicant. Any vessel used to harvest commercial quantities of saltwater products must have a commercial vessel registration. This license is not transferable or refundable if the vessel is sold. Licenses are valid for a license year (July 1- June 30) and are not prorated.

Current status/Appropriateness/Effectiveness:

The fishing capacity of the unit of certification is at or below the level of the specific fishing capacity objective(s).



EVIDENCE:

Fishing capacity is not specifically measured across the UoCs of the fishery; hence, fishery capacity objectives (typically defined in terms of maximum number of permitted vessels, and/or restrictions on vessel lengths, and/or maximum vessel break horse power [BHP], and/or maximum number of trips) are not in use in the fishery. Are capacity objectives necessary or needed? The Assessment team's view is "not at this time" as other measures are in play that allow all jurisdictions to monitor the performance of their fishery and to adjust existing management measures if/when fishing capacity is determined to be excessive in relation to the resource.

That said, there are undertakings by all jurisdictions to ensure the fishery remains economically viable through various management measures (reported previously). More importantly, the latest fishery assessment has concluded that the GOM shrimp resource is not overfished nor is overfishing occurring. Evidence of the enforcement activities and outcomes for the fishery (see Fundamental Clauses 10 and 11) demonstrates that harvester compliance with rules and regulations is relatively high, and there is no evidence of systemic non-compliance.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that excess fishing capacity is avoided and exploitation of the stocks remains economically viable. Examples may include fishery reports on harvest recommendation or fleet reports.



EVIDENCE:

Stakeholders and representatives of the key management agencies that met with the Assessment team in July 2023 all maintained that the resource remains economically viable, although challenging. While there is significant frustration that the ex-vessel price harvesters are getting (reportedly 50% less than a few years ago) is impacting their bottom lines, operating costs are higher year-over-year, and foreign imported shrimp are being dumped onto the US market, there is no evidence that Gulf harvesters have responded by fishing harder and more often in an effort to increase catches and revenues.

References:

1. Code of Federal Regulations: <https://www.ecfr.gov/current/title-50/chapter-VI/part-622/subpart-C?toc=1>
2. NOAA Fisheries - 10 National Standards: <https://www.fisheries.noaa.gov/national/laws-and-policies/national-standard-10-related-resources>
3. Texas Commercial Fishing Regulations Summary 2023-2024: https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_v3400_0074.pdf
4. Texas Closed Waters: <https://www.fisheries.noaa.gov/bulletin/federal-waters-texas-close-shrimping-may-15-2019>
5. Florida Statutes (2023): <https://www.flsenate.gov/Laws/Statutes/2023/0379.2401>
6. Florida Administrative Code - FFWC, Marine Fisheries: <https://www.flrules.org/gateway/ChapterHome.asp?Chapter=68B-31>
7. Louisiana Revised Statutes, Title 56 (Wildlife and Fisheries): https://www.legis.la.gov/legis/Laws_Toc.aspx?folder=75&level=Parent
8. Louisiana Wildlife and Fisheries Strategic Plan: <https://www.wlf.louisiana.gov/assets/Footer/Files/2022-Strategic-Plan.pdf>
9. Louisiana Revised Statutes RS56:494 : <https://legis.la.gov/Legis/Law.aspx?d=105348>
10. Mississippi Code, Title 49, Chapter 15, Article 1: <https://law.justia.com/codes/mississippi/2018/title-49/chapter-15/article-1/section-49-15-2/>

Numerical score:

Starting score

–

Number of EPs NOT met

x 3

=

Overall score

3.2.1	Excess fishing capacity shall be avoided and exploitation of the stocks shall remain economically viable.				
	All agencies - 10	(	Federal - 0 Texas - 0 Louisiana - 0 Mississippi - 0 Alabama - 0 Florida - 0	)	Federal - 10 Texas - 10 Louisiana - 10 Mississippi - 10 Alabama - 10 Florida - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)					All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					All agencies - Full
Non-conformance Number (if applicable):					NA

9.2.3.7 Supporting Clause 3.2.2.

3.2.2. The economic conditions under which fishing industries operate shall promote responsible fisheries.	
Relevance:	Relevant.
Evaluation Parameters	Met?
<p>Process:</p> <p><i>There are management measures in place to limit and/or reduce the total fishing capacity of the unit of certification. These measures shall include specific fishing capacity objective(s), which themselves are based on the best scientific evidence available to understand the level of fishing pressure appropriate to ensure the long-term sustainability of the fishery. Please note that assessors should ensure that catches are within limits, and that data from enforcement show an adequate level of compliance with fisheries laws and regulation.</i></p>	<input checked="" type="checkbox"/>
<p>EVIDENCE:</p> <p>The most recent science-based and peer-reviewed assessments of the GOM's white, pink and brown shrimp stocks took place in 2017-2018 (Hart 2018a²⁶⁸, b²⁶⁹ and c²⁷⁰) and they concluded that the stocks were not overfished, and overfishing was not occurring. At a site visit meeting with GMFMC officials in July 2023, confidence was expressed that these determinations remain valid despite issues with the model (described below) and the absence of stock assessments in recent years.</p> <p>In the case of pink shrimp, spawning biomass over the 1984-2017 time series was quite high in relation to B_{LIM} and F was relatively low over the recent past compared to during the mid-1990s and well below F_{MSY} over the time series (Hart 2018a).</p> <p>In the case of brown shrimp, spawning biomass was very high during ~ 2007-2012, dropped sharply from 2013 to 2016, but was well above B_{LIM} over the time series. F was well below F_{MSY} over the time series, but increased from ~2011 to 2016, coincident with declining recruitment over that period (Hart 2018b).</p> <p>In the case of white shrimp, spawning biomass was around B_{LIM} from the late-1980s to 2003, but increased rapidly to a high peak in 2011, after which it declined but remained above B_{LIM}. F was well below F_{MSY} over the time series. F was low during 2008-2011, compared to the earlier part of the time series, but increased subsequently as spawning biomass declined (Hart 2018c).</p> <p>Trifonova <i>et al.</i> (2019)²⁷¹ demonstrated significant interactions between ecosystem components (e.g. increase in shrimp abundance) and their environment (i.e., specifically temperature, SST, zooplankton abundance) for the GOM and show how sensitive these relationships are to climate perturbations. Furthermore, Tsai <i>et al.</i> (2023)²⁷² showed that GOM shrimp's high variability in abundance is mostly attributed to environmental processes (especially bottom temperature) underlying recruitment. This has been recognised for GOM shrimp stocks from the earliest stages of their management.</p> <p>These points are further underlined by the new stock assessment model being developed for these shrimp species, which uses Empirical dynamic models (EDMs), that essentially predict shrimp abundance based on a previous year index and show that stock dynamics are characterized by nonlinear density-dependent interaction and vary by and large with temperature. A peer review of these models is ongoing as part of the SEDAR 87²⁷³ research track.</p>	

²⁶⁸ Hart, R.A. 2018a. Stock Assessment Update for Pink Shrimp (*Farfantepenaeus duorarum*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4c-Pink-Assess_Rpt-2018_CPT.pdf

²⁶⁹ Hart, R. A. 2018b. Stock Assessment Update for Brown Shrimp (*Farfantepenaeus aztecus*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4b-Brown-Assess_Rpt_2018-CPT.pdf

²⁷⁰ Hart, R. A. 2018c. Stock Assessment Update for White Shrimp (*Litopenaeus setiferus*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4d-White-Assess_Rpt_2018_CPT.pdf

²⁷¹ Trifonova, N., Karnauskas, M. and Kelble, C. 2019. Predicting ecosystem components in the Gulf of Mexico and their responses to climate variability with a dynamic Bayesian network model. PLoS ONE 14(1): e0209257. <https://doi.org/10.1371/journal.pone.0209257>

²⁷² Tsai, C-H., Munch, S.B., Masi, M.D., and Pollack, A.G. 2023. Predicting nonlinear dynamics of short-lived penaeid shrimp species in the Gulf of Mexico. Can. J. Fish. Aquat. Sci. 80: 57–68. [dx.doi.org/10.1139/cjfas-2022-0029](https://doi.org/10.1139/cjfas-2022-0029)

²⁷³ SEDAR. 2023. SEDAR 87 Gulf of Mexico White, Pink, and Brown Shrimp. SouthEast Data, Assessment, and Review <https://sedarweb.org/assessments/sedar-87-gulf-of-mexico-white-pink-and-brown-shrimp/>

3.2.2. The economic conditions under which fishing industries operate shall promote responsible fisheries.

The generally favorable stock outcomes are evidence, in and of themselves, that total fishing capacity within the unit of certification is being managed effectively by all Gulf agencies for the waters within their jurisdiction. The current suite of management measures are also effective in promoting responsible fishing by (i) minimizing bycatch, (ii) avoiding or minimizing ETP species, and (iii) protecting sensitive habitats. These measures remain in play even at a time when the fishery’s economics are worrisome to participants who, during the Assessment team’s July 2023 site visits, spoke about crew recruitment and retention issues, high operating costs, low shore prices (fewer fishing trips), and foreign imports flooding the US market.

Current status/Appropriateness/Effectiveness:
The fishing capacity of the unit of certification is at or below the level of the specific fishing capacity objective(s).

EVIDENCE:
 Fishing capacity is not specifically measured across the UoCs of the fishery; hence, fishery capacity objectives (typically defined in terms of maximum number of permitted vessels, and/or restrictions on vessel lengths, and/or maximum vessel break horse power [BHP], and/or maximum number of trips) are not in use in the fishery. Are capacity objectives necessary or needed? The Assessment team’s view is “not at this time” as other measures are in play that allow all jurisdictions to monitor the performance of their fishery and to adjust existing management measures if/when fishing capacity is determined to be excessive in relation to the resource.

That said, there are undertakings by all jurisdictions to ensure the fishery remains economically viable through various management measures (reported previously). More importantly, the latest fishery assessment has concluded that the GOM shrimp resource is not overfished nor is overfishing occurring. Evidence of the enforcement activities and outcomes for the fishery (see Fundamental Clauses 10 and 11) demonstrates that harvester compliance with rules and regulations is relatively high, and there is no evidence of systemic non-compliance.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that excess fishing capacity is avoided and exploitation of the stocks remains economically viable. Examples may include fishery reports on harvest recommendation or fleet reports.

EVIDENCE:
 Stakeholders and representatives of the key management agencies that met with the Assessment team in July 2023 all maintained that the resource remains economically viable, although challenging. While there is significant frustration that the ex-vessel price harvesters are getting (reportedly 50% less than a few years ago) is impacting their bottom lines, operating costs are higher year-over-year, and foreign imported shrimp are being dumped onto the US market, there is no evidence that Gulf harvesters have responded by fishing harder and more often in an effort to increase catches and revenues.

References:

1. Hart, R.A. 2018a. Stock Assessment Update for Pink Shrimp (*Farfantepenaeus duorarum*) in the US Gulf of Mexico for the 2017 Fishing Year. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551. https://gulfcouncil.org/wp-content/uploads/D-4c-Pink-Assess_Rpt-2018_CPT.pdf
2. Hart, R. A. 2018b. Stock Assessment Update for Brown Shrimp (*Farfantepenaeus aztecus*) in the US Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551. https://gulfcouncil.org/wp-content/uploads/D-4b-Brown-Assess_Rpt_2018-CPT.pdf
3. Hart, R. A. 2018c. Stock Assessment Update for White Shrimp (*Litopenaeus setiferus*) in the US Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551. https://gulfcouncil.org/wp-content/uploads/D-4d-White-Assess_Rpt_2018_CPT.pdf
4. Trifonova, N., Karnauskas, M. and Kelble, C. 2019. Predicting ecosystem components in the Gulf of Mexico and their responses to climate variability with a dynamic Bayesian network model. PLoS ONE 14(1): e0209257. <https://doi.org/10.1371/journal.pone.0209257>
5. Tsai, C-H., Munch, S.B., Masi, M.D., and Pollack, A.G. 2023. Predicting nonlinear dynamics of short-lived penaeid shrimp species in the Gulf of Mexico. Can. J. Fish. Aquat. Sci. 80: 57–68. [dx.doi.org/10.1139/cjfas-2022-0029](https://doi.org/10.1139/cjfas-2022-0029)

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x 3	)	=	Overall score
	All agencies - 10			Federal - 0				Federal - 0

3.2.2.	The economic conditions under which fishing industries operate shall promote responsible fisheries.		
		Texas - 0 Louisiana - 0 Mississippi - 0 Alabama - 0 Florida - 0	Texas - 10 Louisiana - 10 Mississippi - 10 Alabama - 10 Florida - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			All agencies - Full
Non-conformance Number (if applicable):			NA

9.2.3.8 Supporting Clause 3.2.3.

3.2.3. The interests of fishers, including those engaged in subsistence, small-scale, and artisanal fisheries shall be taken into account.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is a system or process in place that identifies the interests of small-scale fishers, either through stakeholder engagement or social research, in a way, which permits the utilization of the information during the management measure development process.</i>	<input checked="" type="checkbox"/>
EVIDENCE: <p>The fisheries management programs across all GOM jurisdictions are inclusive of all stakeholders with interests in commercial, recreational, and for-hire shrimp fisheries. The key federal and states agencies have longstanding public consultation and engagement processes that are set out in statutes and supplemented by internal procedures such as those included in the <i>Administrative Procedure Act</i>²⁷⁴ and the <i>Open Meetings Act</i>.²⁷⁵ Key organisations at the federal level include the Gulf of Mexico Fishery Management Council (GMFMC)²⁷⁶, NOAA Fisheries (NMFS)²⁷⁷, and the US Coast Guard. The primary state-level organisations include the Texas Department of Parks and Wildlife (TPWD)²⁷⁸, the Florida Fish and Wildlife Conservation Commission (FFWC)²⁷⁹, the Louisiana Wildlife and Fisheries Commission (LWFC)²⁸⁰, the Mississippi Department of Marine Resources (MDMR)²⁸¹, and the Alabama Department of Conservation and Natural Resources (ADCNR).²⁸²</p> <p>These organisations have mature consultation processes that are directly tied to and defined by their statutory authorities and obligations. The dates and venues of meetings of the various management committees with accompanying meeting agendas and discussion documents are web-posted and scheduled well in advance, both of which allow affected parties and the general public time to properly prepare their input. Consideration of information received is reflected in meeting minutes, many of which are reported verbatim.</p> <p>These same organisations have public affairs divisions that make extensive use of traditional and electronic media outlets to inform affected and interested parties on a broad cross-section of information sources related to their management systems. There is evidence from meeting minutes to indicate that explanations are generally provided when information is used in support of changes to the management systems, including when information is not used. Participation by affected and interested persons is also regularly solicited, encouraged, and facilitated by means of numerous social media platforms where persons can seek information, raise concerns, and offer suggestions. Individuals can also register to receive email alerts and newsletters covering a broad range of fishery management topics.</p> <p>The work of these organizations is facilitated through a network of committees and subcommittees, and, in some case, task forces (such as for shrimp in Louisiana)²⁸³ that, with few exceptions, is open to the public and stakeholders, thereby being transparent and responsive. When work involves regulatory amendment, there is a formal process that agencies are required to follow (e.g., NOAA Fisheries).²⁸⁴ Agencies maintain a proactive approach to community relations and outreach relations (e.g., FFWC's Community Relations Office). The GOM's shrimp industry is also well position to advocate on behalf of their members, and to proactively initiate communications on important issues (e.g., the Southern Shrimp Alliance, the American Shrimp Processors Association, the Texas Shrimp Association, the Louisiana Shrimp Association, and the Organized Seafood Alliance of Alabama).</p>	

²⁷⁴ Administrative Procedure Act: <https://www.archives.gov/federal-register/laws/administrative-procedure/553.html>

²⁷⁵ Open Meeting Act (Louisiana): https://parlouisiana.org/wp-content/uploads/2016/03/Open_Meetings_Law.pdf

²⁷⁶ Gulf of Mexico Fishery Management Council - Statement of Organization Practices and Programs (2023): https://gulfcouncil.org/wp-content/uploads/Gulf-Council-SOPPs_February-2023.pdf

²⁷⁷ NOAA Fisheries Consultations: <https://www.fisheries.noaa.gov/topic/consultations>

²⁷⁸ TPWC Public Meetings: <https://tpwd.texas.gov/business/feedback/meetings/>

²⁷⁹ FFWC Meeting Protocol: <https://myfwc.com/about/commission/meeting-protocol/>

²⁸⁰ LWFC Meetings: <https://www.lafisheriesforward.org/events-page/louisiana-wildlife-and-fisheries-commission-meeting-2/>

²⁸¹ Mississippi Code – Title 25, Chapter 41 (Open Meetings): <https://law.justia.com/codes/mississippi/2020/title-25/chapter-41/>

²⁸² Alabama Conservation Advisory Board: <https://www.outdooralabama.com/conservation-advisory-board/conservation-advisory-board-minutes>.

²⁸³ Louisiana Shrimp Task Force:

https://www.wlf.louisiana.gov/assets/Fishing/Commercial_Fishing/Files/Commercial-Shrimp/shrimp_task_force_bylaws.pdf

²⁸⁴ NMFS Policy on Regulatory Process (2019): <https://media.fisheries.noaa.gov/dam-migration/01-123.pdf>

3.2.3. The interests of fishers, including those engaged in subsistence, small-scale, and artisanal fisheries shall be taken into account.

The subsistence fishery for those who seek food [personal consumption] is specifically protected by statutes in US federal waters and inshore waters of Texas and Florida. For the other Gulf states, their respective Constitutions include provisions in relation to the right to fish [and hunt]. A recreational fishery for residents is also permitted, including with various management measures such as a prohibition against selling or offering to sell any seafood caught, and certain licensing, gear and reporting requirements.

Current status/Appropriateness/Effectiveness:
There is evidence that the interests of small-scale fishers are effectively taken into account during the development of management measures, and there is no evidence that small-scale fisheries are adversely impacted by any management measures currently in place.



EVIDENCE:
 The fisheries management processes for developing measures for the small-scale fisheries are not materially different than those for the large-scale commercial fisheries in all GOM jurisdictions, other than scale. Equally, the Assessment team found no evidence that the small-scale fisheries were adversely impacted by any management measures currently in place.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the interests of fishers, including those engaged in subsistence, small-scale, and artisanal fisheries are taken into account. Examples may include dedicated quotas, public meeting records, laws, and regulations.



EVIDENCE:
 The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the interests of fishers, including those engaged in subsistence, small-scale, and artisanal fisheries are taken into account. Please see supported evidence in the references

References: Examples include:

5. Administrative Procedure Act: <https://www.archives.gov/federal-register/laws/administrative-procedure/553.html>
6. Open Meeting Act (Louisiana): https://parlouisiana.org/wp-content/uploads/2016/03/Open_Meetings_Law.pdf
7. Gulf of Mexico Fishery Management Council - Statement of Organization Practices and Programs (2023): https://gulfcouncil.org/wp-content/uploads/Gulf-Council-SOPPs_February-2023.pdf
8. NOAA Fisheries Consultations: <https://www.fisheries.noaa.gov/topic/consultations>
9. TPWC Public Meetings: <https://tpwd.texas.gov/business/feedback/meetings/>
10. FFWC Meeting Protocol: <https://myfwc.com/about/commission/meeting-protocol/>
11. LWFC Meetings: <https://www.lafisheriesforward.org/events-page/louisiana-wildlife-and-fisheries-commission-meeting-2/>
12. Mississippi Code – Title 25, Chapter 41 (Open Meetings): <https://law.justia.com/codes/mississippi/2020/title-25/chapter-41/>
13. Alabama Conservation Advisory Board: <https://www.outdooralabama.com/conservation-advisory-board/conservation-advisory-board-minutes>.
14. Louisiana Shrimp Task Force: https://www.wlf.louisiana.gov/assets/Fishing/Commercial_Fishing/Files/Commercial-Shrimp/shrimp_task_force_bylaws.pdf
15. NMFS Policy on Regulatory Process (2019): <https://media.fisheries.noaa.gov/dam-migration/01-123.pdf>

	Starting score		Number of EPs NOT met		Overall score
Numerical score:	All agencies - 10	-	Federal - 0 Texas - 0 Louisiana - 0 Mississippi - 0 Alabama - 0 Florida - 0	) x 3 =	Federal - 10 Texas - 10 Louisiana - 10 Mississippi - 10 Alabama - 10 Florida - 0

Corresponding Confidence Rating:
 (10 = High; 4 or 7 = Medium; 1 = Low)

All agencies - High

3.2.3.	The interests of fishers, including those engaged in subsistence, small-scale, and artisanal fisheries shall be taken into account.
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	All agencies -Full
Non-conformance Number (if applicable):	NA

9.2.3.9 Supporting Clause 3.2.4.

3.2.4. Biodiversity of aquatic ecosystems shall be conserved and ETP species shall be protected. Where relevant, there shall be management objectives, and as necessary, management measures.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There are management measures in place specifically designed to ensure that the biodiversity of aquatic ecosystems are conserved and ETP species are protected. This shall reflect the existence of specific management objectives and measures, which are based on the best scientific evidence available.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Federal waters <p>Three federal statutes – the <i>Endangered Species Act (1973)</i>, the <i>Marine Mammal Protection Act</i>, and the <i>Magnusen-Stevens Fishery Conservation and Management Act</i> – are the primary regulatory instruments that are relied upon to ensure ETP species are protected throughout their range in the GOM.</p> <p>The stated purposes of the ESA are “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section.”²⁸⁵ Moreover, all Federal agencies are required to cooperate with State and local agencies to resolve water resource issues in concert with conservation of endangered species.</p> <p>The stated purpose of the MMPA, all marine mammals are protected. With some exceptions, the MMPA prohibits the “take” of marine mammals—including harassment, hunting, capturing, collecting, or killing—in U.S. waters [and by U.S. citizens on the high seas]. The act also makes it illegal to import marine mammals and marine mammal products into the United States without a permit.²⁸⁶</p> <p>And the stated purpose of the M-SFCMA is to (i) preventing overfishing, (ii) rebuilding overfished stocks, (iii) increasing long-term economic and social benefits, (iv) ensuring a safe and sustainable supply of seafood, and (v) protecting habitat that fish need to spawn, breed, feed, and grow to maturity. The act was amended in 1996 with the passage of the <i>Sustainable Fisheries Act</i> that (i) strengthened requirements to prevent overfishing and rebuild overfished fisheries, (ii) set standards for fishery management plans to specify objective and measurable criteria for determining stock status, (iii) added three new national standards to address fishing vessel safety, fishing communities, and bycatch, (iv) established new requirements for fishery management councils to identify and describe Essential Fish Habitat and to protect, conserve, and enhance EFH for the benefit of fisheries including to designate Habitat Areas of Particular Concern, specific areas within EFH that have extremely important ecological functions and/or are especially vulnerable to degradation, and (v) established a federal EFH consultation process that advises federal agencies to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH.</p> <p>The ESA is operationalized through a number of regulatory provisions. For example, Section 4 includes (i) the listing, delisting, and reclassifying of species, (ii) the designation of critical habitat, (iii) the development of protective regulations for threatened species, (iv) the development and implementation of recovery plans for listed species, and (v) the monitoring and evaluation of the status of listed species. Sections 6, 7, 8, and 9 include (i) providing grants to states and grants to tribes for species conservation, (ii) consulting on federal actions that may affect a listed species or its designated critical habitat to minimize possible adverse effects, (iii) entering bilateral and multilateral agreements with other nations to encourage conservation of listed species, and (iv) investigating violations of the ESA. And finally Section 10 includes (i) cooperating with non-federal partners to develop conservation plans, safe harbor agreements, and candidate conservation agreements with assurances for the long-term conservation of species, (ii) issuing permits that authorize scientific research to learn more about listed species, or activities that enhance the propagation or survival of listed species, and (iii) designating experimental populations of listed species to further the conservation and recovery of those species.</p>	

²⁸⁵ <https://www.fws.gov/laws/endangered-species-act/section-2>

²⁸⁶ <https://www.fisheries.noaa.gov/topic/marine-mammal-protection>

3.2.4. Biodiversity of aquatic ecosystems shall be conserved and ETP species shall be protected. Where relevant, there shall be management objectives, and as necessary, management measures.

The **MMPA is operationalized** in a number of ways. For example, (i) by managing the take of marine mammals through permits and authorizations (sections 101 and 104), (ii) by investigating and prosecuting violations of the MMPA (section 107), (iii) by evaluating the status of marine mammals to determine whether they should be designated as depleted and developing conservation plans for depleted species or stocks (section 115), (iv) by developing stock assessment reports—with scientific information on a species' or stock's geographic range, population structure, abundance, and threats—to evaluate stock status (section 117), (v) by managing incidental marine mammal interactions with commercial fisheries through authorization and reporting, by assessing the level of mortality and injury in commercial fisheries, and by developing take reduction plans (section 118), (vi) by coordinating a national network to respond to marine mammal strandings (section 403), and (vii) by investigating and responding to marine mammal unusual mortality events (section 404).

The **M-SFMCA is operationalized** through 8 U.S. Regional Fishery Management Councils, including the GOM Fishery Management Council whose Shrimp Fishery Management Plan²⁸⁷ is obligated to consider the Federal Government's 10 National Standards to promote sustainable fisheries management. The plan has been revised and amended several times including by Amendment 12 (2002) which established two marine reserves in the exclusive economic zone (EEZ) in the vicinity of the Dry Tortugas, Florida known as Tortugas North and Tortugas south, in which fishing for coastal migratory pelagic species is prohibited. This action complements previous actions taken under the *National Marine Sanctuaries Act*.

The Council's ecosystem approaches are led by its **Ecosystem Technical Committee** whose mandate is to incorporate ecological interactions into stock assessments and management goals based on objectives set forth by the Council. The Ecosystem Technical Committee will work with Council staff to support the development and implementation of the Council's ecosystem-based fishery management plan. This plan will accommodate regional needs in the GOM while considering the existing National Ecosystem Plan and Regional Ecosystem Roadmap guiding principles. At its September 2023 meeting, the Committee reviewed the draft **Fishery Ecosystem Plan (FEP)** for the Gulf that was prepared by the consulting firm LGL. Work is ongoing on operationalizing the FEP, revisiting the Fishery Ecosystem Issue (FEI) loop, developing prioritization metrics for FEI, and reviewing FEI recommendations.

The Council's has overseen the **Fishery Management Plan (FMP) for Coral habitat and Coral species** of the GOM [and the South Atlantic] since its inception in 1982. The Plan has been amended at least 8 times between 1990 and 2013. The Council's **Habitat Management Plan (HMP)** incorporates the habitat constitution for each life history stage of 26 representative species, and which results in most of the landings from the GOM. It describes the habitat types and distribution, threats to these habitats, predator-prey relationships, factors resulting in Essential Fish Habitat (EFH) losses, conservation and enhancement measures for EFH, and recommendations to minimize impacts from non-fishing threats.

Title 50, Chapter VI, Part 622 of the CFR, specifically § 622.74 (**Area closures to protect Gulf corals**)²⁸⁸ limits or prohibits the use of specific fishing gear in protecting 20 sensitive habitats, such as (i) the Florida Middle Grounds HAPC, (ii) the Tortugas marine reserves HAPC, (iii) the Pulley Ridge South HAPC, (iv) the Pulley Ridge South Portion A HAPC, (v) the West Florida Wall HAPC, (vi) the Alabama Alps Reef HAPC, (vii) the L&W Pinnacles and Scamp Reef HAPC, (viii) the Mississippi Canyon 118 HAPC, (ix) the Roughtongue Reef HAPC, (x) the Viosca Knoll 826 HAPC, (xi) the Viosca Knoll 826/906 HAPC, (xii) the McGrail Bank HAPC, (xiii) the AT 047 HAPC, (xiv) the AT 357 HAPC, (xv) the Green Canyon 852 HAPC, (xvi) the West Flower Garder Bank HAPC, (xvii) the East Flower Garden Bank HAPC, (xviii) the Stetson Bank HAPC, (xix) the Harte Bank HAPC, and (xx) the Southern Bank HAPC.

In addition, § 622.73 (**Prohibited species**) stipulates that coral taken as incidental catch in the Gulf EEZ must be returned immediately to the sea in the general area of fishing. In fisheries where the entire catch is landed unsorted, such as the scallop and groundfish fisheries, unsorted prohibited coral may be landed ashore; however, no person may sell or purchase such prohibited coral. Wild live rock may not be harvested or possessed in or from the Gulf EEZ.

²⁸⁷ Gulf of Mexico Shrimp Fishery Management Plan: <https://gulfcouncil.org/fishery-management-2/implemented-plans/shrimp/>

²⁸⁸ Code of Federal Regulations: <https://www.ecfr.gov/on/2023-10-23/title-50/chapter-VI/part-622/subpart-D/section-622.74>

3.2.4. Biodiversity of aquatic ecosystems shall be conserved and ETP species shall be protected. Where relevant, there shall be management objectives, and as necessary, management measures.

A total of 10 GOM ETP species are recognized by federal and Gulf state legislations (Texas²⁸⁹, Louisiana²⁹⁰, Mississippi²⁹¹, Alabama²⁹², and Florida²⁹³). The protection listing and associated statutes were compiled by the team and are shown below. Note: IUCN Red list codes include: LC (least concern), VU (vulnerable), EN (endangered), CR (critically endangered).

Common name	Scientific name	Type	CITES (Appendix I, II, or III)	Unites States ESA191	United States MMPA197	Texas ESA192	Louisiana ESA193	Mississippi ESA194	Alabama ESA195	Florida ESA196	IUCN REDLIST
Green turtle	<i>Chelonia mydas</i>	Reptile	Appx. 1	X		X	X	X		X	EN
Hawksbill turtle	<i>Eretmochelys imbricata</i>	Reptile	Appx. 1	X		X	X	X		X	CR
Kemp's Ridley turtle	<i>Lepidochelys kempii</i>	Reptile	Appx. 1	X		X	X	X		X	CR
Leatherback turtle	<i>Dermochelys coriacea</i>	Reptile	Appx. 1	X		X	X	X		X	VU
Loggerhead Turtle	<i>Caretta caretta</i>	Reptile	Appx. 1	X		X	X	X		X	VU
Bottlenose Dolphin	<i>Tursiops truncatus</i>	Mammal			X						LC
Brown Pelican	<i>Pelecanus occidentalis</i>	Bird						X			LC
Smalltooth sawfish	<i>Pristis pectinata</i>	Chondrichthyan	Appx. 1	X		X	X			X	CR
Giant manta ray	<i>Manta birostris</i>	Chondrichthyan	Appx. 2	X							EN
Gulf Sturgeon	<i>Acipenser oxyrinchus</i>	Fish	Appx. 2	X			X	X	X	X	VU

Scott-Denton et al. (2012 & 2020)^{294,295} describes the impact of all gear types on all the groups of ETP species encountered. The GOM shrimp fishery has been known for its large proportionality of bycatch (included ETP species) for a long time, but industry and scientists have developed **strategies and devices over the years to help reduce these effects**. The implementation of Bycatch Reduction Devices (BRDs) and Turtle Excluder Devices (TEDs) have helped in achieving reduced ETP bycatch. BRDs are required in federal waters and waters of the states of Texas and Florida, not in Louisiana, Mississippi or Alabama. Currently, TEDs are required on all otter and skimmer trawl gears over 40 ft as mandated by the Federal ESA. They became required for offshore otter trawls in 1987 and for inshore waters in 1993. The regulation for TEDs by the skimmer trawl fleet was implemented in 2021. Prior to 2021, gear without TEDs were restricted by tow times to promote turtle survivability; skimmer trawl vessels <40 ft are still subject to tow time limits. Price and Gearhart (2011) reported an average of 5% shrimp loss associated with TED usage and bycatch reduction of greater than 27%.²⁹⁶ The federal at-sea observer program that remains active in this fishery to document total fishery bycatch also document the effectiveness of TEDs and BRDs.

²⁸⁹ TPWD. 2023. Listed species Texas. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/listed-species/

²⁹⁰ LDWF. 2023. Rare species and natural communities by parish <https://www.wlf.louisiana.gov/page/rare-species-and-natural-communities-by-parish>

²⁹¹ MDWFP. 2018. Mississippi listed species 2018. <https://www.mdwfp.com/media/255911/ms-listed-species-2018.pdf> <https://www.mdwfp.com/media/255911/ms-listed-species-2018.pdf>

²⁹² OA. Nongame fishes, protected species Alabama regulations Outdoor Alabama. <https://www.outdooralabama.com/hunting-wildlife-regulations/nongame-fishes-protected-alabama-regulations>

²⁹³ FWC. 2023. Threatened and Endangered Species. Fish and Wildlife Service <https://myfwc.com/media/1945/threatened-endangered-species.pdf>

²⁹⁴ Scott-Denton, E., Cryer, P.F., Duffy, M.R., Gocke, J.P., Harrelson, M.R., Kinsella, D.L., Nance, J.M., Pulver, J.R., Smith, R.C. and Williams, J.A., 2012. Characterization of the US Gulf of Mexico and South Atlantic penaeid and rock shrimp fisheries based on observer data. <https://aquadocs.org/bitstream/handle/1834/30409/mfr7441.pdf?sequence=1>

²⁹⁵ Scott-Denton, E., Cryer, P.F., Duffin, B.V., Duffy, M.R., Gocke, J.P., Harrelson, M.R., Whatley, A.J. and Williams, J.A., 2020. Characterization of the US Gulf of Mexico and South Atlantic Penaeidae and Rock Shrimp (Sicyoniidae) Fisheries through Mandatory Observer Coverage, from 2011 to 2016. *Marine Fisheries Review*, 82(1-2), pp.17-47.

²⁹⁶ Price, B. and Gearhart, J., 2011. Evaluations of turtle excluder device (TED) performance in the US southeast Atlantic and Gulf of Mexico skimmer trawl fisheries. https://repository.library.noaa.gov/view/noaa/3988/noaa_3988_DS1.pdf

3.2.4. Biodiversity of aquatic ecosystems shall be conserved and ETP species shall be protected. Where relevant, there shall be management objectives, and as necessary, management measures.

The effectiveness of these devices is considered to be very high for commercial trawl gear, and Putman et al. (2023) describes the recreational fishing industry as the largest contributor to turtle bycatch in the southeastern United States.²⁹⁷ The modeled bycatch of Kemp's Ridley and Green turtles shows a 10-fold greater bycatch risk by recreation fishers compared to shrimp trawling. The model, however, does not account for the severity of bycatch, such as mortality, individual stress level, or physical damage. Although bycatch rates for the recreational fishery is increasing in recent years, the mortality rate of these interactions is low if appropriate handling is used.^{298,299} The observed mortality of turtles in the GOM shrimp fishery is between 20% and 30%.

In all, there are five species of **turtle interactions** with the skimmer and otter trawl fleets: green, hawksbill, Kemp's ridley, loggerhead, and leatherback. The most commonly encountered turtle was the Kemp's Ridley at 45%, followed by loggerhead (30%) and green (13%). Leatherback (1.6%) and hawksbill (0.5%) turtles had very low encounter rates and the remaining turtles captured were not identified to species. In addition to confirming that Kemp's Ridley, loggerhead, and green sea turtles are the most encountered turtle species by the GOM shrimp fishery, Epperly et al., 2002, found higher catch rates of these three species on the eastern side of the Gulf.³⁰⁰ There is largely no difference between CPUE between time of year, which indicates that the seasonality of fishing effort has no impact on the capture of ETP turtles.

Marine mammal interactions also occur in the GOM shrimp fishery but are much less common. Based on observer coverage from July 2007 to December 2016, only 10 **dolphin interactions** were documented. Of those 10 interactions, 7 were confirmed to be the common bottlenose dolphin and the other three were unidentified. Only one of these individuals was released alive and two of the three unidentified dolphins were previously dead when captured and had already begun the decomposition process. There are 8 stock groups of bottlenose dolphins in the GOM ranging from offshore (shelf), to coastal (west, north, east), and state controlled areas of bays, sounds, and estuaries (BSE; Texas, Louisiana, MS/AL, and Florida). Of these, all are below the 10% PBR except the western coastal, and the Louisiana and MS/AL BSEs.³⁰¹ The western coastal stock has decreasing bycatch mortality since 2011 and has likely continued to decrease with decreasing shrimp effort over that time period. The northern and eastern coastal stocks are well below "insignificant levels" (10% PBR) for bottlenose dolphin mortality. It is important to note that the three coastal stocks of bottlenose dolphin are where the majority of shrimping effort is concentrated for their respective regions.

There are three fish ETP species that interact with the GOM shrimp fishery: **Gulf sturgeon, giant manta ray, and smalltooth sawfish**. Gulf sturgeon and giant manta ray are not frequently encountered in the fishery. In the observer data, there was a single gulf sturgeon capture of this species between July 2007 and December 2010 and no recorded catch between January 2011 and December 2016. The **capture of these species is very low** and although there are not many quantifiable bycatch mortality rates, the Atlantic sturgeon had no records of immediate mortality when captured via otter trawl from a study conducted from Atlantic fisheries observer data.³⁰²

Much like the gulf sturgeon, the **giant manta ray** has very low observed interactions with all observed interactions coming in 2019 off the coast of Louisiana. The federal observer program did not record any manta interactions with giant mantas in the data spanning from 2007 to 2010 and from 2011 to 2016. Giant mantas have appeared in historical datasets. Beyea et al. (2022) presented observer

²⁹⁷ Putman, N.F., Richards, P.M., Dufault, S.G., Scott-Denton, E., McCarthy, K., Beyea, R.T., Caillouet Jr, C.W., Heyman, W.D., Seney, E.E., Mansfield, K.L. and Gallaway, B.J., 2023. Modeling juvenile sea turtle bycatch risk in commercial and recreational fisheries

<https://www.sciencedirect.com/science/article/pii/S2589004223000548/pdf?md5=1bd26d9c1c2454c4738004b10a497063&pid=1-s2.0-S2589004223000548-main.pdf>

²⁹⁸ Rose, S.A., Bates, E.B., McNaughton, A.N., O'Hara, K.J. and Barco, S.G., 2022. Characterizing Sea Turtle Bycatch in the Recreational Hook and Line Fishery in Southeastern Virginia, USA. *Chelonian Conservation and Biology: Celebrating 25 Years as the World's Turtle and Tortoise Journal*, 21(1), pp.63-73. <https://doi.org/10.2744/CCB-1476.1>

²⁹⁹ NOAA. 2019. Careful Release Protocols for Sea Turtle Release with Minimal Injury <https://www.fisheries.noaa.gov/resource/document/careful-release-protocols-sea-turtle-release-minimal-injury>

³⁰⁰ Epperly, S., Avens, L., Garrison, L., Henwood, T., Hoggard, W., Mitchell, J., Nance, J., Poffenberger, J., Sasso, C., Scott-Denton, E. and Yeung, C., 2002. Analysis of sea turtle bycatch in the commercial shrimp fisheries of southeast US waters and the Gulf of Mexico.

https://aquadocs.org/bitstream/handle/1834/19958/Fish_TM_490.pdf?sequence=1&isAllowed=y

³⁰¹ Soldevilla, M.S., Garrison, L.P., Scott-Denton, E. and Primrose, J., 2021. Estimated bycatch mortality of marine mammals in the Gulf of Mexico shrimp otter trawl fishery during 2015 to 2019. https://repository.library.noaa.gov/view/noaa/30721/noaa_30721_DS1.pdf

³⁰² Stein, A.B., Friedland, K.D. and Sutherland, M., 2004. Atlantic sturgeon marine bycatch and mortality on the continental shelf of the northeast United States. *North American Journal of Fisheries Management*, 24(1), pp.171-183. https://www.researchgate.net/profile/Andrew-Stein-2/publication/233003531_Atlantic_Sturgeon_Marine_Bycatch_and_Mortality_on_the_Continental_Shelf_of_the_Northeast_United_States/links/54adae660cf24aca1c6f6ab2/Atlantic-Sturgeon-Marine-Bycatch-and-Mortality-on-the-Continental-Shelf-of-the-Northeast-United-States.pdf

3.2.4. Biodiversity of aquatic ecosystems shall be conserved and ETP species shall be protected. Where relevant, there shall be management objectives, and as necessary, management measures.

data from 1992-1994 and *Manta birostris* appeared with a catch rate of 1 individual every 1.5 million hours of effort and contributed to 0.00% of the average total catch for those years. In the 2021 bycatch data, Beyea et al. (2022) recorded no interaction with mantas. Carlson (2020) used federal observer data from 2007 to 2019 to estimate the take of giant mantas by the southeastern shrimp fishery (includes GoM and Atlantic fisheries), the only year where interactions were observed and documented to the species level were in 2019 (n=8).³⁰³

All **smalltooth sawfish** catch records (n=10) in the GOM are from south Florida recorded in shrimp unit 2, except for one instance in unit 4. The toothed rostra make it nearly impossible to be excluded from catch via TEDs or BRDs as they typically become entangled in the nets.³⁰⁴ The mortality rate for sawfish is very high in the shrimp fisheries because of entanglement and long tow times.

Finally, the **brown pelican** is the only ETP bird species captured by the GOM shrimp fishery. There were four instances of capture in observer coverage from 2007 to 2016. Two out of four were released alive. The brown pelican was formerly protected by the United States ESA, but was delisted in 2009 as a result of significant recovery and expansion following the ban of DDT in 1972.³⁰⁵ It still remains federally protected under the Migratory Bird Treaty Act and the Mississippi Natural Heritage Program (ESA equivalent).

Current status/Appropriateness/Effectiveness:

The management measures currently in place have been successful in meeting the management objectives. Such objectives may be outlines in overarching fisheries legislation, regulations, or management plans. There is no evidence that the fishery is currently having a significant adverse impact on aquatic ecosystems, and it is not putting any ETP species at risk of extinction.



EVIDENCE:

There is appropriate federal and state legislation currently in effect to provide for the protection of the GOM's protected ETP species. Management measures include the obligatory installations of BRDs and TEDs on the more common gear types and a significant number of marine sanctuaries where fishing is either banned or severely restricted by season and gear exclusions. Mandatory catch reporting supported by federal at-sea observer coverage and regular enforcement patrols by all GOM enforcement agencies are effective in monitoring interactions between the directed shrimp fishery and ETP species

Evidence Basis:

Evidence Basis: The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that biodiversity of aquatic ecosystems is conserved and ETP species are protected. Where relevant, there are management objectives, and as necessary, management measures. Examples may include laws and regulations, fisheries management plans, and species status reports.



EVIDENCE:

The availability, quality, and adequacy of the evidence is sufficient to substantiate that biodiversity of aquatic ecosystems is conserved and ETP species are protected. Please see supported evidence in the references

References:

1. U.S. Endangered Species Act: <https://www.fisheries.noaa.gov/topic/laws-policies#endangered-species-act>
2. U.S. Marine Mammal Protection Act: <https://www.fisheries.noaa.gov/topic/marine-mammal-protection/overview>
3. U.S. Magnusen-Stevens Fishery Conservation and Management Act: <https://media.fisheries.noaa.gov/dam-migration/msa-amended-2007.pdf>

³⁰³ Carlson, J.K. 2020.. Estimated Incidental Take of Smalltooth Sawfish (*Pristis Pectinata*) and Giant Manta Ray (*Manta Birostris*) in the South Atlantic and Gulf of Mexico Shrimp Trawl Fishery. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Panama City, Florida. Panama City Laboratory Contribution Series 20-03.

³⁰⁴ Graham, J., Kroetz, A.M., Poulakis, G.R., Scharer, R.M., Carlson, J.K., Lowerre-Barbieri, S.K., Morley, D., Reyier, E.A. and Grubbs, R.D., 2022. Commercial fishery bycatch risk for large juvenile and adult Smalltooth sawfish (*Pristis pectinata*) in Florida waters. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 32(3), pp.401-416. https://www.researchgate.net/profile/Jasmin-Graham-3/publication/358639112_Commercial_fishery_bycatch_risk_for_large_juvenile_and_adult_smalltooth_sawfish_Pristis_pectinata_in_Florida_waters/links/6210033c08bee946f38b3685/Commercial-fishery-bycatch-risk-for-large-juvenile-and-adult-smalltooth-sawfish-Pristis-pectinata-in-Florida-waters.pdf

³⁰⁵SNZCBB1. Species Profile: Brown Pelican. Smithsonian's National Zoo & Conservation Biology Institute <https://nationalzoo.si.edu/migratory-birds/species-profile-brown-pelican#:~:text=In%201972%2C%20the%20United%20States,pelicans%20have%20recovered%20and%20expanded.>

3.2.4. Biodiversity of aquatic ecosystems shall be conserved and ETP species shall be protected. Where relevant, there shall be management objectives, and as necessary, management measures.

4. Ten National Standards of sustainability: <https://www.fisheries.noaa.gov/national/laws-and-policies/national-standard-guidelines>
5. Gulf of Mexico Shrimp Fishery Management Plan: <https://gulfcouncil.org/fishery-management-2/implemented-plans/shrimp/>
6. Code of Federal Regulations: <https://www.ecfr.gov/on/2023-10-23/title-50/chapter-VI/part-622/subpart-D/section-622.74>
7. Scott-Denton, E., Cryer, P.F., Duffy, M.R., Gocke, J.P., Harrelson, M.R., Kinsella, D.L., Nance, J.M., Pulver, J.R., Smith, R.C. and Williams, J.A., 2012. Characterization of the US Gulf of Mexico and South Atlantic penaeid and rock shrimp fisheries based on observer data. <https://aquadocs.org/bitstream/handle/1834/30409/mfr7441.pdf?sequence=1>
8. Scott-Denton, E., Cryer, P.F., Duffin, B.V., Duffy, M.R., Gocke, J.P., Harrelson, M.R., Whatley, A.J. and Williams, J.A., 2020. Characterization of the US Gulf of Mexico and South Atlantic Penaeid and Rock Shrimp (Sicyoniidae) Fisheries through Mandatory Observer Coverage, from 2011 to 2016. *Marine Fisheries Review*, 82(1-2), pp.17-47.
9. Price, B. and Gearhart, J., 2011. Evaluations of turtle excluder device (TED) performance in the US southeast Atlantic and Gulf of Mexico skimmer trawl fisheries. https://repository.library.noaa.gov/view/noaa/3988/noaa_3988_DS1.pdf
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11. Rose, S.A., Bates, E.B., McNaughton, A.N., O'Hara, K.J. and Barco, S.G., 2022. Characterizing Sea Turtle Bycatch in the Recreational Hook and Line Fishery in Southeastern Virginia, USA. *Chelonian Conservation and Biology: Celebrating 25 Years as the World's Turtle and Tortoise Journal*, 21(1), pp.63-73. <https://doi.org/10.2744/CCB-1476.1>
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13. Epperly, S., Avens, L., Garrison, L., Henwood, T., Hoggard, W., Mitchell, J., Nance, J., Poffenberger, J., Sasso, C., Scott-Denton, E. and Yeung, C., 2002. Analysis of sea turtle bycatch in the commercial shrimp fisheries of southeast US waters and the Gulf of Mexico. https://aquadocs.org/bitstream/handle/1834/19958/Fish_TM_490.pdf?sequence=1&isAllowed=y
14. Soldevilla, M.S., Garrison, L.P., Scott-Denton, E. and Primrose, J., 2021. Estimated bycatch mortality of marine mammals in the Gulf of Mexico shrimp otter trawl fishery during 2015 to 2019. https://repository.library.noaa.gov/view/noaa/30721/noaa_30721_DS1.pdf
15. Stein, A.B., Friedland, K.D. and Sutherland, M., 2004. Atlantic sturgeon marine bycatch and mortality on the continental shelf of the northeast United States. *North American Journal of Fisheries Management*, 24(1), pp.171-183. https://www.researchgate.net/profile/Andrew-Stein-2/publication/233003531_Atlantic_Sturgeon_Marine_Bycatch_and_Mortality_on_the_Continental_Shelf_of_the_Northeast_United_States/links/54adae660cf24aca1c6f6ab2/Atlantic-Sturgeon-Marine-Bycatch-and-Mortality-on-the-Continental-Shelf-of-the-Northeast-United-States.pdf
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3.2.4. Biodiversity of aquatic ecosystems shall be conserved and ETP species shall be protected. Where relevant, there shall be management objectives, and as necessary, management measures.

[3/publication/358639112_Commercial_fishery_bycatch_risk_for_large_juvenile_and_adult_smalltooth_sawfish_Pristis_pectinata_in_Florida_waters/links/6210033c08bee946f38b3685/Commercial-fishery-bycatch-risk-for-large-juvenile-and-adult-smalltooth-sawfish-Pristis-pectinata-in-Florida-waters.pdf](https://www.fishbase.org/publication/358639112_Commercial_fishery_bycatch_risk_for_large_juvenile_and_adult_smalltooth_sawfish_Pristis_pectinata_in_Florida_waters/links/6210033c08bee946f38b3685/Commercial-fishery-bycatch-risk-for-large-juvenile-and-adult-smalltooth-sawfish-Pristis-pectinata-in-Florida-waters.pdf)

18. SNZCBBI. Species Profile: Brown Pelican. Smithsonian's National Zoo & Conservation Biology Institute <https://nationalzoo.si.edu/migratory-birds/species-profile-brown-pelican#:~:text=In%201972%2C%20the%20United%20States,pelicans%20have%20recovered%20and%20expanded.>

	Starting score	Number of EPs <u>NOT</u> met	Overall score
Numerical score:	All agencies - 10	Federal - 0 Texas - 0 Louisiana - 0 Mississippi - 0 Alabama - 0 Florida - 0	Federal - 10 Texas - 10 Louisiana - 10 Mississippi - 10 Alabama - 10 Florida - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	$10 - (0 + 0 + 0 + 0 + 0 + 0) \times 3 = 10$		All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			All agencies - Full
Non-conformance Number (if applicable):			NA

9.3 Section B: Science & Stock Assessment Activities, and the Precautionary Approach

9.3.1 Fundamental Clause 4. Fishery data

There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.

9.3.1.1 Supporting Clause 4.1.

4.1.	<p>All significant fishery removals and mortality of the target species (shall be considered by management. Specifically, reliable and accurate data required for assessing the status of fishery(ies) and ecosystems—including data on retained catch, bycatch, discards, and waste—shall be collected. Data can include relevant traditional, fisher, or community knowledge, provided their validity can be objectively verified. These data shall be collected, at an appropriate time and level of aggregation, by relevant management organizations connected with the fishery, and provided to relevant States regional, and international fisheries organizations.</p>	
Relevance:	<p>Relevant.</p> <p>Note: The provision of data to relevant States and, regional, and international fisheries organizations is dependent on the nature of the stock (i.e., transboundary, shared, straddling, highly migratory and high seas stock) and the type or arrangement in place for co-management (i.e., commission, council, etc.). This part of the clause does not apply in cases where stocks occur entirely in one State’s EEZ or jurisdiction, and co-management with another country is not required. The U.S. GOM shrimp stocks under consideration occur entirely within the U.S. EEZ. Therefore, the kind of international co-management envisioned in the last sentence of the supporting clause is not required.</p>	
Evaluation Parameters		Met?
<p>Process:</p> <p><i>There is a process or system that allows for effective data collection (including data on retained catch, bycatch, discards and waste) on the status of fisheries and ecosystems for management purposes. In the case of stocks fished by more than one State, this includes a system or agreement with other States to ensure mortality and removals data are available for the entirety of the biological stock. Some fisheries and/or fish stock are hard to monitor for various reasons, including remoteness of operation/distribution and complexity of fishing operations—posing particular challenges with the collection and maintenance of adequate, reliable, and current data and/or other information. Assessors shall acknowledge and explain these challenges, data collection, and maintenance to cover all stages of fishery development in accordance with applicable international standards and practices. For salmon, the assessors shall describe and present the enumeration methods (i.e., peak aerial survey, feet survey, weir count, tower, mark–recapture, sonar, etc.) utilized for all the major stocks managed by formal escapement goal in Alaska. Such summary data can be found in the annually released ADF&G document Summary of Pacific salmon escapement goals in Alaska with a review of escapements from [year] to [year]. The document generally reviews the latest 9–10 years of salmon escapements, enumeration, goal development methods, and the relative escapement goal performance.</i></p>		<input checked="" type="checkbox"/>
<p>EVIDENCE: All fishery removals and mortality of the target stocks of pink, brown and white shrimp in the US GOM fishery are considered by management. NOAA and each of the five States involved in the fishery undertake comprehensive, annual monitoring programs within their respective jurisdictions to collect data on retained catch, bycatch/discards in all directed shrimp fisheries as well as shrimp bycatch/discards in fisheries targeting other species. Within each jurisdiction there is also ongoing annual monitoring of ecosystem/environmental conditions that provides a basis for evaluation of impacts on recruitment to these stocks of factors other than fishing. These data are reviewed and analysed annually to determine trends and status of stocks. These assessments provide the basis for determining appropriate fisheries management measures and for assessing the effectiveness of those measures after they are enacted.</p>		
<p>Current status/Appropriateness/Effectiveness:</p> <p><i>There are appropriate and reliable data collection and estimation methods. Reliable and accurate data are collected on retained catch, bycatch, discards, and waste (for targeted and non-targeted fisheries), and the direct and indirect impacts of the fishery on the ecosystem. Such information is disseminated to all relevant fishery management authorities. Overall, the data collection system is considered effective for the purposes of this clause if fishery scientists believe there is a high probability that the total estimated mortality is an accurate reflection of the actual total mortality across the entire biological stock. Fishery data are collected with a frequency and level of aggregation, which allows the effective and</i></p>		<input checked="" type="checkbox"/>

4.1. All significant fishery removals and mortality of the target species (shall be considered by management. Specifically, reliable and accurate data required for assessing the status of fishery(ies) and ecosystems—including data on retained catch, bycatch, discards, and waste—shall be collected. Data can include relevant traditional, fisher, or community knowledge, provided their validity can be objectively verified. These data shall be collected, at an appropriate time and level of aggregation, by relevant management organizations connected with the fishery, and provided to relevant States regional, and international fisheries organizations.

informed management of the stock, The appropriate level of aggregation will often be the stock level, but could also reflect specific habitats, gear types, sub-populations, etc. The requirements for data collection are focused on the need to assess the effects of the unit of certification on non-target stocks. Non-target catches and discards refer to species/stocks that are taken by the unit of certification other than the stock for which certification is being sought. The adequacy of data relates primarily to the quantity and type of data collected (including sampling coverage) and depends crucially on the nature of the systems being monitored and purposes to which the data are being put. Some analysis of the precision resulting from sampling coverage would normally be part of an assessment of adequacy and reliability. The currency of data is important, inter alia, because its capacity for supporting reliable assessment of current status and trends declines as it gets older.

EVIDENCE:

Federal Waters (UoAs 1-6)

NOAA conducts Shrimp/Groundfish Surveys in fall and summer annually. These monitor size structure, abundance and distribution of penaeid shrimp from inshore waters to 60 fathoms. These surveys also collect environmental data to investigate potential relationships between abundance and distribution and environmental parameters as well as the role of environmental variability in driving abundance in these stocks. Information on catch, effort and fishing location are obtained from trip reports after each fishing trip (mandatory for all shrimpers), from electronic logbooks (mandatory if selected), and from observer coverage (mandatory if selected). Information from the fishery is collected throughout each fishing season. The annual processing of all fishery-dependent information also includes consideration of any factors that might contribute to error or bias in estimates derived from the various sources.

Biological and environmental data from all SEAMAP Gulf of Mexico surveys are included in the SEAMAP Information System. Raw data are edited by the collecting agency and verified by the SEAMAP Data Manager prior to entry into the system. A major function of the SEAMAP Information System is the processing of catch data from the Summer Shrimp/Groundfish Survey as near-real-time data. Plots of station locations and catch rates of *Penaeus* shrimp and total catch are prepared and processed by GSMFC for weekly distribution to management agencies, fishermen, processors and researchers. This information is now available at this site. Public users are granted access to non-confidential summaries of the commercial landings data from 1985 to 2022, as well as recreational catch and effort data collected under NOAA MRFSS/Marine Recreational Information Program (MRIP) beginning in 1981. Trip Ticket programs are coordinated through the GSMFC FIN³⁰⁶ program to provide consistency across the Gulf. The Trip Ticket Program is a mandatory reporting program for catch data at the trip level reported by dealers on a monthly basis.

Texas State Waters (UoAs 16-18)

TPWD Coastal Fisheries Division (CFD) conducts both fishery-dependent and fishery-independent data collection, which is reviewed annually to determine trends and status of stocks. Fishery-independent sampling, conducted annually using a variety of gears, seeks to assess the fish community as a whole while providing statistically precise data on species of major interest. Commercial fishery landings are monitored annually through a mandatory self-reporting system for licensed seafood and bait dealers. Regularly scheduled intercept surveys of shrimp and finfish dealers are also conducted to augment commercial landing information. Seafood and bait dealers are required to submit monthly reports listing water body, total weight, and price paid for each purchased species. The annual processing of all data necessarily includes consideration of any factors that might contribute to error or bias in estimates derived from the various sources.

Louisiana State Waters (UoAs 7-15)

Within Louisiana State waters, LDWF biologists conduct trawl surveys each month to monitor the growth, distribution and abundance of shrimp. They sample shallow marsh habitats, the open waters of coastal lakes and bays, and in open Gulf of Mexico waters. They also collect data on hydrological conditions (conductivity, salinity and water temperature) at each sample site. Information from these surveys provides the basis for decisions on season opening/closing within State waters, which is a key component of how the

³⁰⁶ <https://gsmfc.org/fin.php>

4.1. All significant fishery removals and mortality of the target species (shall be considered by management. Specifically, reliable and accurate data required for assessing the status of fishery(ies) and ecosystems—including data on retained catch, bycatch, discards, and waste—shall be collected. Data can include relevant traditional, fisher, or community knowledge, provided their validity can be objectively verified. These data shall be collected, at an appropriate time and level of aggregation, by relevant management organizations connected with the fishery, and provided to relevant States regional, and international fisheries organizations.

harvest is controlled. LDWF also monitors commercial landings and fishing effort through a trip ticket program implemented in 1999. Through this program, LDWF collects commercial shrimp landings data on a trip basis from licensed wholesale/retail seafood dealers and commercial fishermen holding fresh products licenses. LDWF requires that dealers purchasing shrimp from commercial fishermen submit trip tickets to capture information about their catch. The annual processing of all data necessarily includes consideration of any factors that might contribute to error or bias in estimates derived from the various sources.

Mississippi State Waters (UoAs 31-36)

MDMR conducts both fishery-dependent and fishery-independent data collection, collection and these data are used to assess stock abundance, trends, and fisheries impacts. A Trip Ticket Program is in place for fishery-dependent data collection. This is a mandatory reporting program for catch data at the trip level reported by dealers on a monthly basis and minimum data required includes: trip date, trip number, vessel ID number, participant ID number, species, quantity landed, landing condition, market size range, ex-vessel value, location landed, dealer ID, transaction date, gear used, and area fished. In Mississippi, fishery-independent sampling utilizes trawls, seines, and beam plankton nets (BPLs) for monthly surveys. Sampling occurs at fixed locations and all organisms collected are brought to the lab for processing. Data on temperature, salinity, and dissolved oxygen are also recorded for each sample. This research forms the basis of MDMR’s management decisions. The annual processing of all data necessarily includes consideration of any factors that might contribute to uncertainty, error or bias in estimates derived from the various sources.

Alabama State Waters (UoAs 25-30)

The ADCNR MRD conducts both fishery-dependent and fishery-independent data collection and these data are used to assess stock abundance, trends, and fisheries impacts. A Trip Ticket Program is in place for fishery-dependent data collection. This is a mandatory reporting program for catch data at the trip level reported by dealers on a monthly basis. Minimum data required includes: trip date, trip number, vessel ID number, participant ID number, species, quantity landed, landing condition, market size range, ex-vessel value, location landed, dealer ID, transaction date, gear used, and area fished. Fishery-independent sampling is conducted through the Fisheries Assessment and Monitoring Program. Methods include monthly surveys using trawls (16’ otter trawl), seines, gill nets and beam plankton trawls (BPLs). Data processing necessarily includes a consideration of possible sources of bias and uncertainty in sources. This research forms the basis of ADCNR’s management decisions.

Florida State Waters (UoAs 19-24)

The Florida Fish and Wildlife Commission conducts both fishery-dependent and fishery-independent data collection. The Trip Ticket program collects detailed catch and effort data. Data are reviewed annually to determine trends in populations and status of stocks. Management recommendations made to the Florida state agency are based on this scientific evidence. Protocols are reviewed annually as well to ensure that best methods are being utilized. These data and analyses are vital for determining appropriate fisheries management measures and to assess the effectiveness of those measures after they are enacted. The annual processing of all data would necessarily include consideration of any factors that might contribute to error or bias in estimates derived from the various sources.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that all significant fishery removals and mortality of the target species are considered by the fishery management organizations. Specifically, reliable and accurate data required for assessing the status of fishery/ies and ecosystems—including data on retained catch, bycatch, discards, and waste—are collected. Data can include relevant traditional, fisher, or community knowledge, provided their validity can objectively be verified (i.e., the knowledge has been collected and analyzed through a systematic, objective, and well-designed process, and is not just hearsay). Examples may include stock assessment reports, catch data, and observer data.



EVIDENCE:

Data from the annual monitoring described above, including from the most recent fishing season, are updated, and utilized in the annual assessment of the US GOM pink, brown and white shrimp stocks. Any deficiencies in terms of data reliability are identified

4.1. All significant fishery removals and mortality of the target species (shall be considered by management. Specifically, reliable and accurate data required for assessing the status of fishery(ies) and ecosystems—including data on retained catch, bycatch, discards, and waste—shall be collected. Data can include relevant traditional, fisher, or community knowledge, provided their validity can be objectively verified. These data shall be collected, at an appropriate time and level of aggregation, by relevant management organizations connected with the fishery, and provided to relevant States regional, and international fisheries organizations.

and any uncertainties are reflected in the stock assessment modelling as well as in the season opening and area closures decision-making process within each of the six jurisdictions involved in managing the overall fishery.

References: All Gulf States utilize Trip Ticket programs to collect harvest information. The Trip Ticket programs are coordinated through the Gulf States Marine Fisheries Commission (GSMFC) GulfFIN program to provide consistency across the Gulf and details can be found at the link provided.

Numerical score:	Starting score	-	(	Number of EPs NOT met	x 3	)	=	Overall score
	10			0				10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								NA

9.3.1.2 Supporting Clause 4.1.1.

4.1.1.	Timely, complete, and reliable statistics shall be compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices, and in sufficient detail to allow sound statistical analysis for stock assessment. Such data shall be updated regularly and verified through an appropriate system. The use of research results as a basis for setting management objectives, reference points, and performance criteria, as well as for ensuring adequate linkage between applied research and fisheries management (e.g., adoption of scientific advice) shall be promoted. Results of analysis shall be distributed accordingly as a contribution to fisheries conservation, management, and development.
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is a process or system that allows for the production, maintenance, update, and verification of statistical data to international standards. Such standards include the FAO Coordinating Working Party on Fishery Statistics Handbook of Fishery Statistical Standards. Also, there is a process for the use and distribution of research results as a basis for setting management objectives, reference points, and performance criteria, as well as for ensuring adequate linkage between applied research and fisheries management (e.g., adoption of scientific advice). Please note that stock assessment for salmon is intended as the processes that leads to enumeration, escapement goal development, and fishery management activities to meet escapement goals.</i>	<input checked="" type="checkbox"/>
EVIDENCE: There is a process or system that allows for the production, maintenance, update, and verification of statistical data to international standards. The annual resource and fishery monitoring described in supporting clause 4.1 includes compilation of complete and reliable statistics on catch and fishing effort which are subjected to rigorous statistical analysis in each annual stock assessment. Research results are used as a basis for the setting of management objectives, reference points and performance criteria, as well as for annual adjustment of season openings/closings as well as designation of areas closed to fishing.	
Current status/Appropriateness/Effectiveness: <i>There is evidence for the production, maintenance, updating, and review of statistical data on catch and fishing effort in the fishery under assessment. There is evidence that the best scientific evidence available is used to inform the fisheries management process. Where there is a legal requirement for the advice of scientific authorities to be adopted, this shall be viewed as conformance with this evaluation parameter.</i>	<input checked="" type="checkbox"/>
EVIDENCE: NOAA’s Southeast Fisheries Science Center (SEFSC) ³⁰⁷ has conducted shrimp research for decades. Information on catch, effort and fishing location are obtained from trip tickets that are mandatory for all harvesters. The Trip Ticket Program is a mandatory reporting program for catch data at the trip level reported by dealers on a monthly basis. Electronic logbooks and observer coverage are mandatory for selected shrimpers. There is also a requirement for all shrimpers to report annually on gear characterization and annual landings as part of permit renewal. The US Gulf of Mexico has been divided into 21 statistical sub-areas used by scientists, port agents and the state trip ticket system to assign the location of catches and fishing effort expended by the shrimp fleet on a trip-by-trip basis. Recreational catch and effort data are collected under NOAA MRFSS/Marine Recreational Information Program (MRIP). Trip Ticket programs are coordinated through the GSMFC FIN program to provide consistency across the Gulf. This strategy allows monitoring the harvest over the entire US Gulf of Mexico. Lengthy time series of annual catch and effort data are available for each species targeted in the US GOM shrimp fishery. The datasets are updated and utilized, along with other fishery and fishery-independent data, in the annual assessment of each stock/fishery conducted by a team of scientists familiar with and aware of potential inconsistencies in the data or their use in population estimation methods. The annual processing of all fishery-dependent data necessarily includes consideration of any factors that might contribute to error or bias in estimates derived from the various sources. Annual stock assessment is a two-tiered process. The NOAA summer and fall surveys provide the basis for estimation of biomass for each species overall. Estimates from survey data account for estimation error and uncertainty associated with survey methodology as well as the role of environmental variability in driving abundance in these stocks. Each State also conducts both fishery-dependent and fishery-independent data collection, which is reviewed annually to determine trends and status of stocks within State waters. The annual processing of all data would also	

³⁰⁷ <https://www.sefsc.noaa.gov>

4.1.1. Timely, complete, and reliable statistics shall be compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices, and in sufficient detail to allow sound statistical analysis for stock assessment. Such data shall be updated regularly and verified through an appropriate system. The use of research results as a basis for setting management objectives, reference points, and performance criteria, as well as for ensuring adequate linkage between applied research and fisheries management (e.g., adoption of scientific advice) shall be promoted. Results of analysis shall be distributed accordingly as a contribution to fisheries conservation, management, and development.

necessarily include consideration of any factors that might contribute to error or bias in estimates derived from the various sources. Sampling protocols are reviewed annually to ensure that best methods are being utilized. This research forms the basis of management decisions at the State level and also to assess the effectiveness of management measures after they are enacted. These annual assessments provide the basis for setting management objectives and performance criteria and ensure adequate linkages between applied research and fisheries management.

Being part of the US EEZ, management of the shrimp fisheries in Federal waters off the coasts of Texas, Louisiana, Mississippi, Alabama, and the west (Gulf) coast of Florida is the responsibility of the Gulf of Mexico Fisheries Management Council (GMFMC)³⁰⁸, which is empowered via the US Magnuson-Stevens Fishery Conservation Act. The Council prepares fishery management plans consistent with National Standards for fishery conservation and management. In addition, the Gulf States Marine Fisheries Commission (GSMFC)³⁰⁹ provides a scientific advisory arm to the 5 US Gulf States and provides a forum for multi-State discussion on fishery conservation matters. Each state is represented equally as GSMFC Commissioners. GSMFC serves as a discussion centre for marine resource issues, allowing stakeholders to voice concerns and opinions regarding fishery resource management. GSMFC meetings are open to the public and allow for public comment periods. Meeting dates, locations and agendas can be found on the GSMFC website.

While the assessment team is not aware of a legal requirement for the advice of scientific authorities to be adopted, the foregoing is considered to be equivalent in terms of this evaluation parameter.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that timely, complete, and reliable statistics are compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices, and in sufficient detail to allow sound statistical analysis for stock assessment. Such data are updated regularly and verified through an appropriate system. The use of research results as a basis for setting management objectives, reference points, and performance criteria, as well as for ensuring adequate linkage between applied research and fisheries management (e.g., adoption of scientific advice) is promoted. Analysis results are distributed accordingly as a contribution to fisheries conservation, management, and development. Examples may include stock assessment reports and other data.



EVIDENCE:
 See links provided. The annual stock assessment report for each shrimp species reviews and updates all time series of data, including those for catch and fishing effort, used in stock assessment modelling.

References:
 Hart, R.A. 2018a. Stock Assessment Update for Pink Shrimp (*Farfantepenaeus duorarum*) in the US Gulf of Mexico for the 2017 Fishing Year. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551. https://gulfcouncil.org/wp-content/uploads/D-4c-Pink-Assess_Rpt-2018_CPT.pdf
 Hart, R. A. 2018b. Stock Assessment Update for Brown Shrimp (*Farfantepenaeus aztecus*) in the US Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551. https://gulfcouncil.org/wp-content/uploads/D-4b-Brown-Assess_Rpt_2018-CPT.pdf
 Hart, R. A. 2018c. Stock Assessment Update for White Shrimp (*Litopenaeus setiferus*) in the US Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551. https://gulfcouncil.org/wp-content/uploads/D-4d-White-Assess_Rpt_2018_CPT.pdf

Numerical score:	Starting score	–	Number of EPs <u>NOT</u> met	x 3	=	Overall score
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³⁰⁸ <https://gulfcouncil.org/>
³⁰⁹ <https://www.gsmfc.org>

4.1.1.	Timely, complete, and reliable statistics shall be compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices, and in sufficient detail to allow sound statistical analysis for stock assessment. Such data shall be updated regularly and verified through an appropriate system. The use of research results as a basis for setting management objectives, reference points, and performance criteria, as well as for ensuring adequate linkage between applied research and fisheries management (e.g., adoption of scientific advice) shall be promoted. Results of analysis shall be distributed accordingly as a contribution to fisheries conservation, management, and development.		
	10	(0)	10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Full Conformance
Non-conformance Number (if applicable):			NA

9.3.1.3 Supporting Clause 4.1.2.

4.1.2. In the absence of specific information on the stock under consideration, generic evidence based on similar stocks can be used. However, the greater the risk of overfishing, the more specific evidence is necessary to ascertain the sustainability of intensive fisheries.															
Relevance:	<p>Not relevant.</p> <p>Note: If the fishery for the stock under consideration is managed fully using stock-specific information then this clause can be scored with full conformance. All U.S. GOM shrimp stocks are assessed using specific information; therefore, this clause is not relevant.</p>														
Evaluation Parameters															
Process:	Met?														
<p><i>There is a process that allows for the use of generic evidence based on similar stocks for fisheries with low risk. The greater the risk, the more specific evidence is necessary to assess sustainability. In principle, "generic evidence based on similar stocks" should not suffice, but it may be adequate where there is low risk to the stock under consideration. In general, "low risk to that stock under consideration" would suggest that there is very little chance of the stock becoming overfished (e.g., where the exploitation rate is very low and the resilience of the stock is high). However, the evidence for low risk and the justification for using surrogate data shall come from the stock assessment itself.</i></p>	<input type="checkbox"/>														
EVIDENCE:															
Current status/Appropriateness/Effectiveness:	Met?														
<p><i>Information has been utilized from generic evidence based on similar fishery situations. Based on the risk of overfishing, the information utilized is of higher precision to account for higher risks (i.e., intensive fisheries).</i></p>	<input type="checkbox"/>														
EVIDENCE:															
Evidence Basis:	Met?														
<p><i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the absence of specific information on the stock under consideration, generic evidence based on similar stocks can be used for fisheries with low risk to that stock under consideration. However, the greater the risk of overfishing, the more specific evidence is necessary to ascertain the sustainability of intensive fisheries. Examples may include stock assessment reports and other data.</i></p>	<input type="checkbox"/>														
EVIDENCE:															
References:															
Numerical score:	<table border="0"> <tr> <td>Starting score</td> <td align="center">-</td> <td align="center">(Number of EPs <u>NOT</u> met</td> <td align="center">x 3</td> <td align="center">)</td> <td align="center">=</td> <td>Overall score</td> </tr> <tr> <td align="center">10</td> <td></td> <td align="center">[]</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score	10		[]				
Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score									
10		[]													
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High														
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance														
Non-conformance Number (if applicable):															

9.3.1.4 Supporting Clause 4.2.

4.2. An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures shall be established.																			
Relevance:	Relevant.																		
Evaluation Parameters	Met?																		
Process: <i>An observer program is present. There may be cases where collection of accurate data for research and support compliance could be established without the use of observers or a formal observer scheme (i.e., inspection scheme, enforcement, port sampling, at shore inspection, voluntary or compulsory logbooks, e-logbooks or other harvester collected data, electronic monitoring [video], or bycatch surveys). The reliability and accurateness of that system(s) would need to be verified accordingly. Note also that some fisheries observer programs are designed to collect biological data and others serve mainly as a compliance or enforcement tool. This shall be considered accordingly in the overall evaluation of this clause. Assessors shall question primarily whether the required data for fisheries management are collected or if there are important data gaps (e.g., because of the absence of an observer program).</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: A scheme of at-sea observers is established to collect accurate data for research and support compliance with applicable fishery management measures.																			
Current status/Appropriateness/Effectiveness: <i>The data collected by the observer program is considered accurate and useful.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: Information on catch, effort and fishing location are obtained from electronic logbooks that are required for all shrimpers, from mandatory trip reports after each fishing trip (for select shrimpers), and from mandatory observer coverage (if selected) that provides details of catch and catch composition. The observer system in place conducts periodic surveys of the shrimp fishery that aims to achieve a 2% level of coverage. Estimates indicate that bycatch in the shrimp fishery has decreased ^{310 311 312 313} .																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that an observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures is established. Examples may include stock assessment, survey, observer, or other reports.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: See links provided.																			
References:																			
Numerical score:	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Starting score</td> <td>–</td> <td>(</td> <td>Number of EPs NOT met</td> <td>x</td> <td>3</td> <td>)</td> <td>=</td> <td>Overall score</td> </tr> <tr> <td>10</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>10</td> </tr> </table>	Starting score	–	(Number of EPs NOT met	x	3)	=	Overall score	10			0					10
Starting score	–	(Number of EPs NOT met	x	3)	=	Overall score											
10			0					10											
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance																		
Non-conformance Number (if applicable):	NA																		

³¹⁰ Scott-Denton, E. et al. 2020. Characterization of the U.S. Gulf of Mexico and South Atlantic Penaeidae and Rock Shrimp (Sicyoniidae) Fisheries through Mandatory Observer Coverage, from 2011 to 2016. Marine Fisheries Review 82: 17-40. doi: <https://doi.org/10.7755/MFR.82.1-2.2>

³¹¹ Pulver, J.R. et al. 2012. Characterization of the U.S. Gulf of Mexico Skimmer Trawl Fishery Based on Observer Data. NOAA Technical Memorandum NMFS-SEFSC-636.

³¹² Pulver, J.R. et al. 2014. Observer Coverage of the 2013 Gulf of Mexico Skimmer Trawl Fishery. NOAA Technical Memorandum NMFS-SEFSC-654.

³¹³ Cagle, P., and J. West. 2020. Evaluation of Commercial Shrimp Fishery Bycatch in Louisiana Waters. Louisiana Department of Wildlife and Fisheries, Report. https://www.wlf.louisiana.gov/assets/Resources/Publications/Commercial_Fishing_Seafood/Evaluation-of-Bycatch-in-the-Louisiana-Shrimp-Fishery_final.pdf

9.3.1.5 Supporting Clause 4.2.1.

4.2.1. Where necessary, fisheries management organizations and regional fisheries management organizations and other such arrangements should strive to achieve a level and scope of observer programs sufficient to provide quantitative estimates of total catch, discards, and incidental takes of living aquatic resources.													
Relevance:	Relevant.												
Evaluation Parameters	Met?												
Process: <i>There is a clear system that allows the observer program, or any other appropriate data gathering system as appropriate, to provide sufficient quantitative estimates of total catch, discards, and incidental takes of living aquatic resources.</i>	<input checked="" type="checkbox"/>												
EVIDENCE: The monitoring programs conducted by NOAA and each of the 5 State jurisdictions, as described in 4.1, 4.1.1 and 4.2, provide a basis for quantitative estimates of catch, bycatch, and discards in the US GOM shrimp fisheries.													
Current status/Appropriateness/Effectiveness: <i>The data collected by the observer program is considered accurate and useful, especially for providing quantitative estimates of total catch, discards, and incidental takes of living aquatic resources.</i>	<input checked="" type="checkbox"/>												
EVIDENCE: Data sets from observer programs are updated and utilized, along with other fishery and fishery-independent data, in the annual assessment of each stock/fishery conducted by a team of scientists familiar with and aware of potential inconsistencies in the data or their use in population estimation methods. Stock assessment reports note any deficiencies in data and identify any gaps which need to be filled by new research.													
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the observer program is established and able to provide quantitative estimates of total catch, discards, and incidental takes of living aquatic resources. Examples may include stock assessment, observer, survey, or other reports.</i>	<input checked="" type="checkbox"/>												
EVIDENCE: See links provided in supporting clauses 4.1, 4.1.1 and 4.2.													
References:													
Numerical score:	<table border="0"> <tr> <td>Starting score</td> <td></td> <td>Number of EPs <u>NOT</u> met</td> <td>x 3</td> <td>=</td> <td>Overall score</td> </tr> <tr> <td align="center">10</td> <td align="center">-</td> <td align="center">(0)</td> <td align="center">x 3</td> <td align="center">=</td> <td align="center">10</td> </tr> </table>	Starting score		Number of EPs <u>NOT</u> met	x 3	=	Overall score	10	-	(0)	x 3	=	10
Starting score		Number of EPs <u>NOT</u> met	x 3	=	Overall score								
10	-	(0)	x 3	=	10								
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High												
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance												
Non-conformance Number (if applicable):	NA												

9.3.1.6 Supporting Clause 4.3.

4.3. A fisheries management organization, regional fisheries management organizations or arrangements shall compile data and make them available, in a manner consistent with any applicable confidentiality requirements, in a timely manner and in an agreed format to all members of these organizations and other interested parties in accordance with agreed procedures.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is a system within the regional body structure that allows for data distribution in line with confidentiality requirements.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Policies and procedures are prescribed at the Federal and State levels to protect the confidentiality of data submitted to and collected by employees and contractors. Only authorized users have access to confidential data to perform an official duty.	
Current status/Appropriateness/Effectiveness: <i>There is evidence proving that confidentiality requirements are satisfied when data is distributed to the various parties.</i>	<input checked="" type="checkbox"/>
EVIDENCE: NOAA administrative order 216-100 ³¹⁴ prescribes policies and procedures for protecting the confidentiality of data submitted to and collected by NOAA/NMFS. Confidential data are those identifiable with a person. Before release to the public, data must be aggregated to protect individual identities. For fisheries data, this requires at least 3 entities contributing to any level of aggregated data. Only authorized users have access to confidential data, they must have a need to collect or use these data in the performance of an official duty, and they must sign a statement of nondisclosure affirming their understanding of NMFS obligations with respect to confidential data and the penalties for unauthorized use and disclosure. Confidential data must be maintained in secure facilities. Data collected by a contractor, such as an observer, must be transferred timely to authorized Federal employees; no copies of these data may be retained by the contractor. NMFS may permit contractors to retain aggregated data. A data return clause shall be included in the agreement. All procedures applicable to Federal employees must be followed by contractors collecting data with Federal authority. Each Fisheries Management Council is required to establish appropriate procedures for ensuring the confidentiality of the statistics that may be submitted to it by Federal or State authorities and may be voluntarily submitted to it by private persons. In the case of statistics submitted to the Council by a State, the confidentiality laws and regulations of that State apply. All requests for confidential data shall be referred to the agency of data origin. The States of Texas, Louisiana, Mississippi, Alabama, and Florida, GSMFC and the NMFS have adopted a policy which expresses their intent to cooperate in the collection, management, and protection of fisheries data. All maintain the confidentiality of commercial data in accordance with the Magnuson-Stevens Fishery Conservation and Management Act of 1996 ^{315 316 317} .	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that a fisheries management organization, regional fisheries management organizations or arrangements compile data and make them available, in a manner consistent with any applicable confidentiality requirements, in a timely manner and in an agreed format to all members of these organizations and other interested parties in accordance with agreed procedures. Examples may include reports where confidentiality requirements have been effected.</i>	<input checked="" type="checkbox"/>
EVIDENCE: See links provided.	
References:	
Numerical score:	Starting score – Number of EPs <u>NOT</u> met x 3 = Overall score

³¹⁴ https://www.st.nmfs.noaa.gov/st1/recreational/documents/Intercept_Appendices/Appendix%M%20031408%20NOAA%20administrative%20order%20216-100.pdf

³¹⁵ 50 C.F.R. § 600.130 <http://www.gpo.gov/fdsys/pkg/CFR-2010-title50-vol8/pdf/CFR-2010-title50-vol8-sec600-130.pdf>

³¹⁶ 50 C.F.R. § 600.405 <https://www.law.cornell.edu/cfr/text/50/600.405>

³¹⁷ 50 C.F.R. § 600.425 <https://www.law.cornell.edu/cfr/text/50/600.425>

4.3.	A fisheries management organization, regional fisheries management organizations or arrangements shall compile data and make them available, in a manner consistent with any applicable confidentiality requirements, in a timely manner and in an agreed format to all members of these organizations and other interested parties in accordance with agreed procedures.		
	10	(0)	10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Full Conformance
Non-conformance Number (if applicable):			NA

9.3.1.7 Supporting Clause 4.4.

4.4. States shall stimulate the research required to support policies related to fish as food.																			
Relevance:	Not relevant. Note: The U.S. GOM shrimp resource is fished and used for direct human consumption. Therefore, this clause is not relevant.																		
Evaluation Parameters	Met?																		
Process: <i>There is research to support policies related to fish as food.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Current status/Appropriateness/Effectiveness: <i>There is evidence of this research.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State stimulates the research required to support policies related to fish as food.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
References:																			
Numerical score:	<table border="1"> <tr> <td>Starting score</td> <td>-</td> <td>(</td> <td>Number of EPs <u>NOT</u> met</td> <td>x</td> <td>3</td> <td>)</td> <td>=</td> <td>Overall score</td> </tr> <tr> <td>10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score	10								
Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score											
10																			
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																		
Non-conformance Number (if applicable):																			

9.3.1.8 Supporting Clause 4.5.

4.5. There shall be sufficient knowledge of the economic, social, marketing, and institutional aspects of fisheries collected through data gathering, analysis, and research, as well as comparable data generated for ongoing monitoring, analysis, and policy formulation.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is a system in place for collecting economic, social, marketing, and institutional knowledge of the fisheries.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The MSA's National Standard 8 mandates that conservation and management measures shall, consistent with the conservation requirements of the Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to A) provide for the sustained participation of such communities, and B) to the extent practicable, minimize adverse economic impacts on such communities. There is strong promotion of research into all aspects of seafood use by Federal and State agencies and industry organizations that support national policies related to fish as food. State and national policies regarding seafood are guided and driven by the Food and Drug Administration (FDA), Department of Agriculture (USDA), the National Institute of Health (NIH) and many others. GSMFC serves as a discussion centre for marine resource issues, allowing stakeholders to voice concerns and opinions regarding fishery resource management. There are several industry-led organizations representing shrimpers, processors, other segments of the US domestic wild-caught shrimp industry and the general public. These advocate for the shrimping industry by identifying industry issues, obtaining fisheries input, engaging federal and local officials in order to voice industry concerns and work to ensure the continued vitality and existence of the U.S shrimp industry.	
Current status/Appropriateness/Effectiveness: <i>These data are used for ongoing monitoring, analysis, and policy formulation.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Extensive knowledge of the economic, social, marketing, and institutional aspects of the US GOM shrimp fishery has been acquired through dedicated research. Annual collection and analysis of relevant data provide the basis for ongoing monitoring, analysis and policy formulation related to these aspects of the fisheries. Various NOAA agencies conduct economic and socio-cultural research to ensure that all of the communities that depend on those resources are considered ³¹⁸ . This can include fishermen, indigenous communities, whale watching operators, and other members of coastal communities that interact with marine resources in different ways. This includes a wide range of commercial fisheries economic analyses and related activities which assess both the magnitude of fisheries management decisions, as well as the costs and benefits, such as: research to better understand the impacts of management decisions on fishing communities; research to evaluate the benefits and costs of alternative management actions for commercial fisheries, prioritize management needs, and design policies that sustainably maximize societal benefits from ocean and coastal resources; an annual survey of all seafood processors which provides data to calculate US seafood consumption and the value of fish and fish products derived from commercial fishing and to assess the impacts of changes in fishery management plans. This socio-economic research informs management decision making aimed at maximizing societal benefits from ocean and coastal resources while ensuring the long-term sustainability of all living marine resources ^{319 320} . Also see supporting clause 3.2.2 for further discussion of the economic conditions under which the fishing industry operates.	
Evidence Basis:	<input checked="" type="checkbox"/>

³¹⁸ www.fisheries.noaa.gov/topic/socioeconomics

³¹⁹ National Marine Fisheries Service. 2022. Fisheries Economics of the United States, 2020. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-236A, 231 p.

<https://www.fisheries.noaa.gov/national/sustainable-fisheries/fisheries-economics-united-states>

³²⁰ Liese, C. 2014. Economics of the Federal Gulf Shrimp Fishery - 2012. NOAA Technical Memorandum NMFS-SEFSC-668, 26 p. doi:10.7289/V5SB43QV Available at: <http://www.sefsc.noaa.gov/socialscience/shrimp.htm>

4.5. There shall be sufficient knowledge of the economic, social, marketing, and institutional aspects of fisheries collected through data gathering, analysis, and research, as well as comparable data generated for ongoing monitoring, analysis, and policy formulation.

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is sufficient knowledge of the economic, social, marketing, and institutional aspects of fisheries, that they are adequately researched, and that comparable data are generated for ongoing monitoring, analysis, and policy formulation. Examples may include reports on social/cultural/economic value of the resource.

EVIDENCE:

Links provided demonstrate considerable knowledge of the economic, social, marketing, and institutional aspects of the GOM shrimp fishery as well as data generation for ongoing monitoring, analysis, and policy formulation.

References:

	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
Numerical score:	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									NA

9.3.1.9 Supporting Clause 4.6.

4.6		The fisheries management organization shall investigate and document traditional fisheries knowledge and technologies—in particular those applied to small-scale fisheries—in order to assess their application to sustainable fisheries conservation, management, and development.	
Relevance:	Relevant.		
Evaluation Parameters			Met?
Process: <i>Traditional fisher knowledge has been investigated. Note that for highly developed fisheries that knowledge may already have been integrated into fisheries management.</i>			<input checked="" type="checkbox"/>
EVIDENCE: The US GOM shrimp fishery is a well-developed, large-scale fishery in which fishing practices have been established for many decades. Traditional fisher knowledge has been incorporated over time into the present-day fishery and how it is managed.			
Current status/Appropriateness/Effectiveness: <i>There are records of the documentation of small-scale fisher practices.</i>			<input checked="" type="checkbox"/>
EVIDENCE: Executive Order 12898 requires that federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The main focus of Executive Order 12898 is to consider “the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories...” This executive order is generally referred to as environmental justice (EJ) ³²¹ . The economic and socio-cultural research conducted by NOAA (see supporting clause 4.5) specifically includes indigenous communities among those that depend on these resources to ensure their ongoing consideration. There is a constitutional right to fish for all citizens and there is no specific provision for subsistence fishing or for native tribe access. All fishery participants fish in the same manner and have to follow current licensing requirements that apply to all citizens. NOAA Fisheries partners with federal agencies and federally-recognized tribes. Tribal consultations are undertaken on a government-to-government basis. Typically, the consultations are undertaken as part of co-management agreements and may include: <ul style="list-style-type: none"> ● Informing tribes of upcoming issues. ● Inviting tribal members to regional fishery management council meetings. ● Providing a forum for them to provide comments. ● Sharing information about how to request a consultation or be involved in the council and decision-making process. ● Participating in informal and formal consultation meetings. ● Documenting the issues discussed in consultation. ● Addressing the concerns raised by the tribes to the degree possible given other laws that apply to a particular resource management decision. 			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fisheries management organization investigates and documents traditional fisheries knowledge and technologies—in particular those applied to small-scale fisheries—in order to assess their application to sustainable fisheries conservation, management, and development. Examples may include various fisheries reports.</i>			<input checked="" type="checkbox"/>
EVIDENCE: See supporting clause 4.5 and link provided.			
References:			
Numerical score:	Starting score	Number of EPs NOT met	Overall score
	10	0	10

³²¹ <https://www.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice>

4.6	The fisheries management organization shall investigate and document traditional fisheries knowledge and technologies—in particular those applied to small-scale fisheries—in order to assess their application to sustainable fisheries conservation, management, and development.
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	NA

9.3.1.10 Supporting Clause 4.7.

4.7		If a fisheries management organization is conducting scientific research activities in waters of another State, it shall ensure that their vessels comply with the laws and regulations of that State and international law.	
Relevance:	<p>Not relevant.</p> <p>Note: If the stock is fully managed by one State and there is no need for shared stock research (between two or more States), then this clause is not applicable. The U.S. GOM shrimp fishery is fully managed by the Gulf of Mexico Fisheries Management Council (GMFMC) and the Gulf States Marine Fisheries Commission (GSMFC). Therefore, there is no need for shared stock research and this clause is not relevant.</p>		
Evaluation Parameters			Met?
Process:	<p>There is a system in place to manage the conduct of research vessels operating in waters of other States.</p>		<input type="checkbox"/>
EVIDENCE:			
Current status/Appropriateness/Effectiveness:			<input type="checkbox"/>
<p>If a fisheries management organization is conducting scientific research activities in waters of another State, there is record of such shared research activities and they comply with required regulations.</p>			
EVIDENCE:			
Evidence Basis:			<input type="checkbox"/>
<p>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that if a fisheries management organization is conducting scientific research activities in waters of another State, it ensures that their vessels comply with the laws and regulations of that State and international law. Examples may include survey reports.</p>			
EVIDENCE:			
References:			
Numerical score:	<p>Starting score</p> <p>10</p>	<p>- (</p> <p>Number of EPs <u>NOT</u> met</p> <p>x 3</p> <p>) =</p>	<p>Overall score</p>
Corresponding Confidence Rating:			Low/Medium/High
<p>(10 = High; 4 or 7 = Medium; 1 = Low)</p>			
Corresponding Conformance Level:			Critical NC/Major NC/Minor NC/Full Conformance
<p>(10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)</p>			
Non-conformance Number (if applicable):			

9.3.1.11 Supporting Clause 4.8.

4.8. Adoption of uniform guidelines governing fisheries research conducted on the high seas shall be promoted and, where appropriate, support the establishment of policies that include, inter alia, facilitating research at the international and sharing the research results with affected States.																	
Relevance:	<p>Not relevant.</p> <p>Note: If the stock is fully managed by one State and there is no need for shared stock research (between two or more States), then this clause is not applicable. The U.S. GOM shrimp fishery is fully managed by Gulf of Mexico Fisheries Management Council (GMFMC) and the Gulf States Marine Fisheries Commission (GSMFC). Moreover, the U.S. GOM shrimp fishery does not occur in the High Seas. Therefore, there is no need for shared stock research and this clause is not relevant.</p>																
Evaluation Parameters																	
Process: <i>There is a mechanism in place to allow the development and review of guidelines governing fisheries research conducted on the high seas.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Current status/Appropriateness/Effectiveness: <i>There is a record of uniform high seas research guidelines or a mechanism to create them.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that adoption of uniform guidelines governing fisheries research conducted on the high seas is promoted and, where appropriate, supports the establishment of mechanisms, including, inter alia, adopting uniform guidelines to facilitate research at the international level, and encouraging such research results be shared with affected States. Examples may include survey reports, or high seas guidelines.</i>	<input type="checkbox"/>																
EVIDENCE:																	
References:																	
Numerical score:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs <u>NOT</u> met</td> <td style="text-align: center;">x 3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score	10							
Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score										
10																	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																
Non-conformance Number (if applicable):																	

9.3.1.12 Supporting Clause 4.9.

4.9		If appropriate, the fisheries management organization and relevant international organizations shall promote and enhance the research capacities of developing countries, inter alia, in the areas of data collection and analysis, information, science and technology, human resource development, and provision of research facilities, in order for them to participate effectively in the conservation, management, and sustainable use of living aquatic resources.	
Relevance:	<p>Not relevant.</p> <p>Note: This clause is only applicable when the unit of certification includes a transboundary, shared, straddling, highly migratory or high seas stock, which is fished by one or more developing States. Developing countries do not participate in U.S. GOM shrimp fisheries. Therefore, this clause is not relevant.</p>		
Evaluation Parameters			Met?
Process: <i>There is a mechanism in place by which the research capacities of developing countries can be developed and enhanced. This could include, but is not limited to, the provision of personnel, equipment, funding, or cooperation on data collection and stock assessment.</i>			<input type="checkbox"/>
EVIDENCE:			
Current status/Appropriateness/Effectiveness: <i>There are recognizable examples of instances in the history of the fishery under assessment where actions by the managers of the unit of certification have promoted or enhanced the research capacity of one or more developing nations in the ways described above.</i>			<input type="checkbox"/>
EVIDENCE:			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that if appropriate, the fisheries management organization and relevant international organizations promote and enhance the research capacities of developing States, inter alia, in the areas of data collection and analysis, information, science and technology, human resource development, and provision of research facilities, in order for them to participate effectively in the conservation, management, and sustainable use of living aquatic resources. Examples may include various data or reports.</i>			<input type="checkbox"/>
EVIDENCE:			
References:			
Numerical score:	Starting score	-	(Number of EPs <u>NOT</u> met x 3) = Overall score
	10		
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):			

9.3.1.13 Supporting Clause 4.10.

4.10. Competent national organizations shall, where appropriate, render technical and financial support to States upon request and when engaged in research investigations aimed at evaluating stocks which have been previously unfished or very lightly fished.																	
Relevance:	<p>Not relevant.</p> <p>Note: This criterion does not apply to fully developed fisheries, as defined by the FAO. The FAO definition of a developed fishery is "a fishery which, following a period of rapid and steady increase of fishing pressure and catches, has reached its level of maximum average yearly production. It is usually understood that such a fishery is yielding close to its maximum sustainable yield." The shrimp fisheries of the U.S. GOM are fully developed, industrial fisheries. Therefore, this clause is not relevant.</p>																
Evaluation Parameters																	
Process: <i>There is a mechanism to allow a national organization to render technical and financial support to the State.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Current status/Appropriateness/Effectiveness: <i>There is a record of the provided technical and financial support.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that competent national organizations, where appropriate, render technical and financial support to States upon request and when engaged in research investigations aimed at evaluating stocks which have been previously unfished or very lightly fished. Examples may include various data or reports.</i>	<input type="checkbox"/>																
EVIDENCE:																	
References:																	
Numerical score:	<table border="0" style="width: 100%;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs <u>NOT</u> met</td> <td style="text-align: center;">x 3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score	10							
Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score										
10																	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																
Non-conformance Number (if applicable):																	

9.3.1.14 Supporting Clause 4.11.

4.11. Relevant technical and financial international organizations shall, upon request, support States in their research efforts, devoting special attention to developing countries—in particular the least developed among them and small developing island countries.																			
Relevance:	<p>Not relevant.</p> <p>Note: This clause is relevant where the fishery is within a developing region/small island region and management of the resource is performed through an international organization. Developing countries do not participate in the U.S. GOM shrimp fisheries. Therefore, thus clause is not relevant.</p>																		
Evaluation Parameters																			
Process: <i>The international management component of the fishery is engaged in processes that support the fishery based in developing countries.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Current status/Appropriateness/Effectiveness: <i>There is a record of the provided technical and financial support.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that relevant technical and financial international organizations are, upon request, supporting States in their research efforts, and are devoting special attention of developing countries—in particular the least developed among them and small island developing countries. Examples may include various data or reports.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
References:																			
Numerical score:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs <u>NOT</u> met</td> <td style="text-align: center;">x</td> <td style="text-align: center;">3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score	10								
Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score											
10																			
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																		
Non-conformance Number (if applicable):																			

9.3.2 Fundamental Clause 5. Stock assessment

There shall be regular stock assessment activities appropriate for the fishery, its range, the species biology, and the ecosystem, undertaken in accordance with acknowledged scientific standards to support its optimum utilization.

9.3.2.1 Supporting Clause 5.1.

5.1. An appropriate institutional framework shall be established to determine the applied research required and its proper use (i.e., assess/evaluate stock assessment model/practices) for fishery management purposes.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is an established institutional framework for fishery management purposes that determines applied research needs and use.</i>	<input checked="" type="checkbox"/>
EVIDENCE: <p>A well-organized institutional framework is in place that conducts the research required for fishery management purposes. NOAA's Southeast Fisheries Science Center (SEFSC)³²² has conducted shrimp research for decades. All aspects of the life cycle, movements, growth, survival and ecology of the various life-history stages of all three shrimp species are well known. Studies conducted in the 1960s showed the importance of mangrove estuaries as nursery habitats for shrimp. In the late 90s, research was done to better understand the ecology of shrimp and how their growth and survival is influenced by salinity and temperature. In recent years, information has been gathered on the behaviour and migration of larvae and juvenile shrimp.</p> <p>NOAA also conducts Shrimp/Groundfish Surveys in fall and summer annually. Objectives are to sample the northern Gulf of Mexico to determine abundance and distribution of demersal organisms from inshore waters to 60 fathoms; to obtain length-frequency measurements for major finfish and shrimp species to determine population size structures; and collect environmental data to investigate potential relationships between abundance and distribution of organisms and environmental parameters.</p> <p>Biological and environmental data from all SEAMAP Gulf of Mexico surveys are included in the SEAMAP Information System. Raw data are edited by the collecting agency and verified by the SEAMAP Data Manager prior to entry into the system. A major function of the SEAMAP Information System is the processing of catch data from the Summer Shrimp/Groundfish Survey as near-real-time data. Plots of station locations and catch rates of <i>Penaeus</i> shrimp and total catch are prepared and processed by GSMFC for weekly distribution to management agencies, fishermen, processors and researchers. The foregoing provides the basis for annual assessments of the status of each of the three GOM shrimp stocks under consideration over their broad distribution in the US EEZ.</p> <p>In addition, each of the five Gulf States undertakes annual surveys aimed at evaluating localized distribution and abundance of these resources within its waters.</p>	
Current status/Appropriateness/Effectiveness: <i>There is evidence to substantiate that essential research for fishery management purposes is determined and carried out. This research generally includes routine stock(s) and ecosystem assessment reports. Assessors shall evaluate the specific stock assessment model/practices for each of the species under assessment and verify the technical appropriateness for use. For salmon, the assessors shall present and evaluate the methods for escapement goal development utilized to develop the annual escapement goals in Alaska (about 300). Statewide summary data for Alaska can be found in the annually released ADF&G document Summary of Pacific salmon escapement goals in Alaska with a review of escapements from [year] to [year]. The document generally presents the latest 9–10 years of salmon escapement performance in review.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Federal Waters (UoAs 1-6) <p>NOAA's Southeast Fisheries Science Centre conducts assessments of the status of each of the three shrimp species under consideration. From 2012, stock synthesis-based models were used to estimate F and SSB as a basis for overfished and overfishing</p>	

³²² <https://www.sefsc.noaa.gov>

5.1. An appropriate institutional framework shall be established to determine the applied research required and its proper use (i.e., assess/evaluate stock assessment model/practices) for fishery management purposes.

determinations in these shrimp stocks. The last such assessments were in 2017-2018 (Hart 2018a³²³, b³²⁴ and c³²⁵) and they concluded that the stocks were not overfished, and overfishing was not occurring. In 2019, an assessment model review found several technical concerns among these three penaeid shrimp SS models (e.g., conflicting indices, convergence issues, and residual patterns), prompting the GMFMC to initiate a SEDAR research track process for all three stocks.

Empirical dynamic models (EDMs) have been under consideration as a new candidate model for GOM penaeid shrimp stock assessments. Their background and concept are detailed in Tsai *et al.* (2023)³²⁶. Peer review of these models is underway as part of the part of the SEDAR³²⁷ research track. A workgroup has been convened following a request to the Southeast Fishery Science Center from the Gulf Council following their April 2022 Meeting. Terms of reference for SEDAR 87 were submitted to GMFMC for consideration in February 2023. A workgroup meeting in March 2023³²⁸ reviewed EDM theory/examples in fisheries and laid plans for moving forward. Work has been underway on conceptual model development along with review of data requirements/scoping. A data workshop is planned for September 2023.

In the absence of formal stock assessments, all of the fishery-dependent and fishery-independent monitoring described in supporting clauses 4.1, 4.1.1 and 4.2 that are utilised in the assessments have continued uninterrupted, with data times series updated and reviewed on an ongoing basis.

Texas State Waters (UoAs 16-18)

The Texas Parks and Wildlife Department (TPWD)³²⁹ Coastal Fisheries Division (CFD) manages the shrimp fishery within State waters based on well-established assessment programs and research that inform implementation of coastwide fishing regulations designed to optimize use of stocks.

The Coastal Fisheries Division utilizes a suite of fishery-independent and fishery-dependent assessments to scientifically characterize the status of commercially and recreationally important species. Each type of assessment is designed to give coastwide estimates for target species. The assessments provide trend data on the current status of natural resources and are a factor in the setting of coastwide regulations of commercially and recreationally important species. Management recommendations made to the TPWC are based on this scientific evidence and protocols are reviewed annually to ensure that best methods are being utilized.

Fishery-independent sampling is conducted annually using gill nets, bag seines, bay and Gulf trawls, and oyster dredges. This sampling seeks to assess the fish community as a whole while providing statistically precise data on species of major interest. Sample sites are randomly determined each year within each ecosystem to achieve the desired goal of a coastwide assessment. Sampling frequency has been evaluated to give an efficient mix of acceptable precision requirements and available manpower. Sampling strategy is designed to produce precise coastwide estimates of a few economically important species.

³²³ Hart, R.A. 2018a. Stock Assessment Update for Pink Shrimp (*Farfantepenaeus duorarum*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4c-Pink-Assess_Rpt-2018_CPT.pdf

³²⁴ Hart, R. A. 2018b. Stock Assessment Update for Brown Shrimp (*Farfantepenaeus aztecus*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4b-Brown-Assess_Rpt_2018-CPT.pdf

³²⁵ Hart, R. A. 2018c. Stock Assessment Update for White Shrimp (*Litopenaeus setiferus*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4d-White-Assess_Rpt_2018_CPT.pdf

³²⁶ Tsai, C-H., Munch, S.B., Masi, M.D., and Pollack, A.G. 2023. Predicting nonlinear dynamics of short-lived penaeid shrimp species in the Gulf of Mexico. *Can. J. Fish. Aquat. Sci.* 80: 57–68. [dx.doi.org/10.1139/cjfas-2022-0029](https://doi.org/10.1139/cjfas-2022-0029)

³²⁷ SEDAR. 2023. SEDAR 87 Gulf of Mexico White, Pink, and Brown Shrimp. Southeast Data, Assessment, and Review <https://sedarweb.org/assessments/sedar-87-gulf-of-mexico-white-pink-and-brown-shrimp/>

³²⁸ Gulf of Mexico Shrimp Empirical Dynamic Modeling Workgroup Summary. Presentation to GMFMC SSC: https://gulfcouncil.org/wp-content/uploads/06a-StevensMunch_GulfShrimpEDM_SSCMarch2023.pdf

³²⁹ <https://tpwd.texas.gov>

5.1. An appropriate institutional framework shall be established to determine the applied research required and its proper use (i.e., assess/evaluate stock assessment model/practices) for fishery management purposes.

Louisiana State Waters (UoAs 7-15)

Each month, Louisiana Department of Wildlife and Fisheries (LDWF)³³⁰ biologists conduct surveys to monitor the growth, distribution and abundance of shrimp. They tow 6-foot trawls to sample shallow marsh habitats, 16-foot trawls to sample the open waters of coastal lakes and bays, and 20-foot trawls in open Gulf of Mexico waters. Sample locations and procedures are standardized with 10-minute tow times. They identify and count all species captured and measure up to 50 randomly selected individuals of each species. They sample hundreds of locations, then compile all of the data and plug it into mathematical models to generate an abundance index. Scientists also collect data on hydrological conditions (conductivity, salinity and water temperature) at each sample site. LDWF monitors hydrological conditions, along with shrimp growth, distribution, and abundance, and use these data to develop appropriate management recommendations.

Mississippi State Waters (UoAs 31-36)

The Mississippi Department of Marine Resources (MDMR)³³¹ Marine Fisheries Program includes conservation and overall management of living marine organisms through research and data collection as modified by relevant social, economic and biological factors. This is accomplished through both fishery-dependent and fishery-independent data collection, biological and socioeconomic research. MDMR partners with several organizations and institutions to carry out such research. Mississippi's Fishery-Independent Sampling Program is a collaborative effort between MDMR and the Gulf Coast Research Lab (GCRL) which was established to promote the study and knowledge of science including the natural resources of the State of Mississippi and to provide for the dissemination of research findings from the Gulf Coast area.

Fishery-independent sampling began in 1974 utilizing trawls, seines, and beam plankton nets (BPLs) for monthly surveys. Sampling occurs at fixed locations and all organisms collected are brought to the lab for processing. Data on temperature, salinity, and dissolved oxygen are also recorded for each sample.

Alabama State Waters (UoAs 25-30)

Fishery-independent sampling is conducted through the Fisheries Assessment and Monitoring Program (FAMP). The Alabama Department of Conservation and Natural Resources (ADCNR)³³² began fisheries data collection in 1977, initially for shrimp and crab. Since the start of the data collection program, it has seen several revisions to continue to improve the quality and scope of sampling. In 1980, data collection expanded to include all shrimp, crab, and finfish species and in 1998 the program shifted again to partner with Alabama Department of Environmental Management (ADEM) to include collection of environmental parameters on water quality and moved to sampling on a quarterly basis until 2000, when the program reinitiated monthly sampling collection. In 2010, FAMP protocols were revised to match the current SEAMAP (Southeast Area Monitoring and Assessment Program) data collection methods in recognition of the need for Gulf-wide standardized data collection methods. Survey methods include monthly surveys using trawls (16' otter trawl), seines, gill nets and beam plankton trawls (BPLs) and utilize these data to assess stock abundance, trends, and fisheries impacts. This research forms the basis of ADCNR's management decisions.

Florida State Waters (UoAs 19-24)

The Florida Fish and Wildlife Conservation Commission (FFWC)³³³ conducts both fishery-dependent and fishery-independent data collection, which is reviewed annually to determine trends and status of stocks. Management recommendations are based on this scientific evidence and protocols are reviewed annually to ensure that best methods are being utilized. To provide information on trends in populations, the Fish and Wildlife Research Institute³³⁴ conducts a Fisheries-Independent Monitoring (FIM) program to survey fishery resources in Florida estuaries. FIM conducts stratified-random sampling (SRS) to estimate fish abundance and population trends in seven estuarine regions around Florida. The SRS design distributes sampling effort among habitat types and directs greater sampling effort into habitats with higher variability in catches to reduce variability in the data. A variety of sampling gears are used by the FIM program to ensure that the wide range of species, sizes, and ages necessary for stock management are sampled during each monthly survey. With each gear deployment, FIM program scientists record data that describe the physical

³³⁰ <https://www.wlf.louisiana.gov>

³³¹ <https://www.dmr.ms.gov>

³³² <https://alabama-department-of-conservation-natural-resources-algeohub.hub.arcgis.com/>

³³³ <https://myfwc.com>

³³⁴ <https://myfwc.com/about/inside-fwc/fwri>

5.1. An appropriate institutional framework shall be established to determine the applied research required and its proper use (i.e., assess/evaluate stock assessment model/practices) for fishery management purposes.

features, such as water quality and habitat types, of the sampling site and the fish community collected. Recorded physical features include measurements of the type and quantity of submerged and shoreline habitats at each sampling site. Measured water quality parameters include temperature, pH, salinity, and dissolved oxygen. All species of fish, shrimp and crabs collected in each gear deployment are identified and counted and representative subsamples are measured.

Analyses of the FIM program data are used by resource managers to assess abundance trends for resource species, define essential fish habitat, and describe life-history parameters such as age, growth and age of maturity. Since the FIM program gears and sampling techniques tend to target juvenile and sub-adult fishes, the abundance trends are a valuable forecasting tool for future adult stocks. Fisheries managers use these FIM data as well as other fisheries data to assess the overall well-being of fish populations. The FIM program’s stratified-random sampling design and extensive fisheries surveys provide abundance estimates and population parameters needed to determine stock sizes. These data and analyses are vital for determining appropriate fisheries management measures and to assess the effectiveness of those measures after they are enacted.

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Shrimp that are harvested in State waters are part of the same stock taken in Federal waters. Both inshore and offshore fishermen exploit the same shrimp population at different stages of the life cycle. Analyses of data collected within State inshore waters provide indices representing localized concentrations in the context of the broad distribution of each shrimp species. These are used primarily to make decisions regarding season openings for specific local areas.

Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that an appropriate institutional framework is established to determine the applied research required and its proper use (i.e., assess and evaluate stock assessment models or practices) for fishery management purposes. Examples may include description of the overall process of research assessment and peer review, as well as stock and ecosystem assessment reports.</i>	<input checked="" type="checkbox"/>
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EVIDENCE:
Links provided here and in 4.1, 4.1.1 and 4.5 evidence demonstrate a well-established institutional framework for stock assessment science in support of management of the US GOM shrimp fishery.

References:					
Numerical score:	Starting score 10	-	(Number of EPs <u>NOT</u> met x 3) (0 x 3)	=	Overall score 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)					High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					Full Conformance
Non-conformance Number (if applicable):					NA

9.3.2.2 Supporting Clause 5.1.1.

5.1.1.	<p>Less elaborate stock assessment methods are frequently used for small-scale or low-value capture fisheries resulting in greater uncertainty about the status of the <i>stock under consideration</i>. A more precautionary approach to managing fisheries on such resources shall be required, including, where appropriate, a lower level of resource utilization. A record of good management performance may be considered as supporting evidence of the adequacy of the management system.</p>				
Relevance:	<p style="color: red;">Not relevant.</p> <p style="color: red;">Note: If the fishery for the stock under consideration has sufficient data collected through regular stock assessment activities for its management, then this clause can be scored with full conformance. The fishery for the stocks under consideration have sufficient data collected through regular stock assessment activities for its management.</p>				
Evaluation Parameters			Met?		
Process:	<p><i>There is a process that allows more precautionary approaches to managing fisheries (e.g., lower exploitation rates) on resources assessed through stock assessment methods that result in greater uncertainty about the state of the stock under consideration.</i></p>		<input type="checkbox"/>		
EVIDENCE:					
Current status/Appropriateness/Effectiveness:	<p><i>There is evidence that precautionary approaches are applied to managing fisheries (e.g., lower exploitation rates) on resources assessed through stock assessment methods that result in greater uncertainty about the state of the stock under consideration.</i></p>		<input type="checkbox"/>		
EVIDENCE:					
Evidence Basis:	<p><i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that with less elaborate stock assessment methods frequently used for small-scale or low-value capture fisheries, more precautionary approaches to managing fisheries on such resources are required, including where appropriate, lower level of resource utilization. Examples may include stock assessment reports and other data.</i></p>		<input type="checkbox"/>		
EVIDENCE:					
References:					
Numerical score:	Starting score	- (Number of EPs <u>NOT</u> met	x 3) =	Overall score
	10				
Corresponding Confidence Rating:					Low/Medium/High
(10 = High; 4 or 7 = Medium; 1 = Low)					
Corresponding Conformance Level:					Critical NC/Major NC/Minor NC/Full Conformance
(10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					
Non-conformance Number (if applicable):					

9.3.2.3 Supporting Clause 5.1.2.

5.1.2	The fisheries management organization shall ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, and fishery enhancement. Analysis results shall be distributed in a timely and readily understandable fashion in order that the best scientific evidence available contributes to fisheries conservation, management, and development. The fisheries management organization shall also ensure the availability of research facilities and provide appropriate training, staffing, and institution building to conduct the research.
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There are organizations and processes in place to permit research into the aspects of fisheries listed in the clause.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Well-established institutions with qualified staff are in place that conduct research into all aspects of the US GOM shrimp fisheries. Results are made available as needed to ensure that the best scientific evidence is used for fisheries conservation, management, and development. Being part of the US EEZ, management of the shrimp fisheries in Federal waters off the coasts of the 5 Gulf States is the responsibility of the Gulf of Mexico Fisheries Management Council (GMFMC), which is empowered via the US Magnuson-Stevens Fishery Conservation Act. MSFCMA sets out ten national standards for fishery conservation and management (16 U.S.C § 1851), with which all fishery management plans must be consistent ³³⁵ . The Council prepares fishery management plans consistent with National Standards for fishery conservation and management. In addition, the Gulf States Marine Fisheries Commission (GSMFC) provides a scientific advisory arm to the 5 US Gulf States and provides a forum for multi-State discussion on fishery conservation matters. Each state is represented equally as GSMFC Commissioners. The research basis for management of the pink, brown and white shrimp stocks in US GOM waters is described in supporting clause 5.1.	
Current status/Appropriateness/Effectiveness: <i>Research is conducted into the following aspects of the fisheries: biology, ecology, technology, environmental science, economics, and aquaculture. The described types of research carried out shall result in the fishery being deemed compliant with this evaluation parameter.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Mission statements of some of the Divisions of NOAA's Southeast Fisheries Science Center ³³⁶ demonstrate the broad scope of research conducted in support of resource conservation and fisheries management. The <u>Population and Ecosystems Monitoring Division</u> provides data, analytical products, research, and expertise to support NOAA Fisheries priorities. The division carries out fishery-independent surveys and applied research focused on fisheries and habitat ecology and provides support for ecosystem- and climate-related initiatives in the region. The <u>Fisheries Statistics Division</u> provides extensive support to management and science through the collection, management, and dissemination of commercial and recreational fisheries statistics. The division works extensively with various internal and external partners to collect the fishery dependent information used to support marine resource management in the region. The <u>Sustainable Fisheries Division</u> works in partnership with fisheries managers and constituents to provide reliable scientific advice that enhances the stewardship of living marine resources. The division also strives to advance scientific knowledge and promote diverse and sustainable fisheries through innovative research and development activities, and the use of advanced technologies. The <u>Marine Mammal and Turtle Division</u> supports and conducts science that leads to improved knowledge and meaningful conservation of marine mammals and turtles and their habitats in a changing environment, helping to achieve NOAA Fisheries' mission of implementing the Marine Mammal Protection Act and Endangered Species Act and making a positive impact on society.	

³³⁵ <https://www.fisheries.noaa.gov/resource/document/magnuson-stevens-fishery-conservation-and-management-act>

³³⁶ www.sefsc.noaa.gov

5.1.2 The fisheries management organization shall ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, and fishery enhancement. Analysis results shall be distributed in a timely and readily understandable fashion in order that the best scientific evidence available contributes to fisheries conservation, management, and development. The fisheries management organization shall also ensure the availability of research facilities and provide appropriate training, staffing, and institution building to conduct the research.

Various NOAA agencies also conduct economic and socio-cultural research to ensure that all of the communities that depend on those resources are considered³³⁷ (see supporting clause 4.5). This can include fishermen, indigenous communities, whale watching operators, and other members of coastal communities that interact with marine resources in different ways. This includes a wide range of commercial fisheries economic analyses and related activities which assess both the magnitude of fisheries management decisions, as well as the costs and benefits, such as: research to better understand the impacts of management decisions on fishing communities; research to evaluate the benefits and costs of alternative management actions for commercial fisheries, prioritize management needs, and design policies that sustainably maximize societal benefits from ocean and coastal resources; an annual survey of all seafood processors which provides data to calculate US seafood consumption and the value of fish and fish products derived from commercial fishing and to assess the impacts of changes in fishery management plans. This socio-economic research informs management decision making aimed at maximizing societal benefits from ocean and coastal resources while ensuring the long-term sustainability of all living marine resources.

Details of monitoring programs in place to collect shrimp fishery catch and effort data as well as at-sea observer programs to collect catch composition, bycatch and discard data from the shrimp fishery are included in the evidence for supporting clauses 4.1, 4.1.1 and 4.2.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States are conducting appropriate research into the following aspects of the fisheries: biology, ecology, technology, environmental science, economics, and aquaculture. The research is disseminated accordingly. States also ensure the availability of research facilities and provide appropriate training, staffing, and institution building to conduct the research. Examples may include stock assessment, economic value, fleet reports, and other reports.



EVIDENCE:
 Links provided demonstrate that research has been ongoing over a long period into all aspects of fisheries science. This research provides the basis for annual assessment of stock status, review of ecosystem status, and socioeconomic profiles, that inform all facets of management of the US GOM shrimp stocks.

References:	
Numerical score:	$\text{Starting score} - \left(\text{Number of EPs NOT met} \times 3 \right) = \text{Overall score}$ $10 - \left(0 \times 3 \right) = 10$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	NA

³³⁷ www.fisheries.noaa.gov/topic/socioeconomics

9.3.2.4 Supporting Clause 5.2.

5.2. There shall be established research capacity necessary to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under State jurisdiction, and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>There is a system that establishes the required research capacity needed to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems; (2) the status of the stock under State jurisdiction; and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration. Please note that climate science is complex and evolving, and the system shall recognize the ability to assess and monitor these parameters over time.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The Gulf of Mexico Fisheries Management Council (GMFMC), which prepares fishery management plans consistent with National Standards for fishery conservation and management, along with the Gulf States Marine Fisheries Commission (GSMFC), which provides a scientific advisory arm to the 5 US Gulf States, in collaboration with NOAA constitute a system that establishes the research capacity to assess and monitor the US GOM shrimp stocks in terms of (1) the effects of climate or other environmental change on stocks and aquatic ecosystems; (2) the status of the stock under State jurisdiction; and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration.	
Current status/Appropriateness/Effectiveness: <i>There is evidence to demonstrate that there is sufficient research capacity in place to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under consideration, and (2) the impacts of fishing activity, pollution, or habitat alteration.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The comprehensive research activities that provide the basis for assessment of the US GOM shrimp stocks (as detailed in supporting clause 5.1), along with mission statements of some of the Divisions of NOAA's Southeast Fisheries Science Centre which detail the broad scope of research conducted in support of resource conservation and fisheries management (see supporting clause 5.1.2), provide evidence which demonstrates there is sufficient research capacity in place to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under consideration, and (2) the impacts of fishing activity, pollution, or habitat alteration.	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is established research capacity necessary to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under State jurisdiction, and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration. Examples may include stock, ecosystem, and habitat assessment reports.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Links in 5.1 and 5.1.2 provide evidence to demonstrate established research capacity to access and monitor effects of environmental change on US GOM shrimp stocks as well as stock status and impacts of ecosystem changes resulting from human activities.	
References:	
Numerical score:	$\text{Starting score} - \left(\text{Number of EPs NOT met} \times 3 \right) = \text{Overall score}$ $10 - \left(0 \times 3 \right) = 10$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	NA

9.3.2.5 Supporting Clause 5.3.

5.3 Management organizations shall cooperate with relevant international organizations to encourage research in order to ensure optimum utilization of fishery resources.																			
Relevance:	<p>Not relevant.</p> <p>Note: The U.S. GOM shrimp fishery is managed entirely by U.S. Federal and State agencies who conduct all the necessary research to ensure optimum utilization of these resources.</p>																		
Evaluation Parameters																			
Process: <i>There is cooperation or interaction between international organizations to ensure optimum utilization of resource.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Current status/Appropriateness/Effectiveness: <i>There is evidence available to substantiate that such cooperation or interaction has taken place. There is data available that substantiates cooperation activities.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that management organizations cooperate with relevant international organizations to encourage research in order to ensure optimum utilization of fishery resources. Examples may include outputs resulting from meetings or other research.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
References:																			
Numerical score:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs <u>NOT</u> met</td> <td style="text-align: center;">x</td> <td style="text-align: center;">3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score	10								
Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score											
10																			
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																		
Non-conformance Number (if applicable):																			

9.3.2.6 Supporting Clause 5.4.

5.4. The fishery management organizations shall directly, or in conjunction with other States, develop collaborative technical and research programs to improve understanding of the biology, environment, and status of transboundary, shared, straddling, highly migratory and high seas stocks.																	
Relevance:	<p>Not relevant.</p> <p>Note: Not applicable if the stock is not transboundary, shared, straddling, highly migratory or high seas in nature. Although there is some movement of adult shrimp in both directions across the U.S.- Mexico boundary, since the early 1980s each country has assessed and managed populations within their respective EEZs independently and the broad scope of this supporting clause is not applicable to the U.S. GOM shrimp fishery.</p>																
Evaluation Parameters																	
Process: <i>The collaborative technical and research programs to improve understanding of the biology, environment, and status of transboundary aquatic stocks have been developed.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Current status/Appropriateness/Effectiveness: <i>There is evidence available to substantiate that such cooperation or interaction has taken place. There are data on collaborative programs to improve understanding of transboundary, shared, straddling, highly migratory or high seas stocks.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organizations directly, or in conjunction with other States, have developed collaborative technical and research programs to improve understanding of the biology, environment, and status, of transboundary, shared, straddling, highly migratory or high seas stocks. Examples may include outputs resulting from meetings or other research.</i>	<input type="checkbox"/>																
EVIDENCE:																	
References:																	
Numerical score:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs NOT met</td> <td style="text-align: center;">x 3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs NOT met	x 3)	=	Overall score	10							
Starting score	-	(Number of EPs NOT met	x 3)	=	Overall score										
10																	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																
Non-conformance Number (if applicable):																	

9.3.2.7 Supporting Clause 5.5.

5.5. Data generated by research shall be analyzed and the results of such analyses published in a way that ensures confidentiality is respected, where appropriate.	
Relevance:	Relevant.
Evaluation Parameters	
Process: <i>There is a process that allows analysis of research data, ensuring, where appropriate, their confidentiality.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Data generated by research is analyzed and the results are published in a way that ensures confidentiality is respected.	
Current status/Appropriateness/Effectiveness: <i>There is evidence data was properly analyzed. Data was published respecting, where appropriate, confidentiality agreements. The rules of confidentiality are effectively respected.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The various supporting clauses in Fundamental Clauses 6 and 7 demonstrate that research data pertaining to GOM shrimp stocks is properly analyzed and supporting clause 4.3 demonstrates that confidentiality is respected in publication of results.	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that data generated by research is analysed and the results of such analyses published in a way that ensures confidentiality is respected, where appropriate. Examples may include various data or reports.</i>	<input checked="" type="checkbox"/>
EVIDENCE: See evidence provide in supporting clause 4.3 and the various supporting clauses of Fundamental Clauses 6 and 7.	
References:	
Numerical score:	$\text{Starting score} - (\text{Number of EPs NOT met} \times 3) = \text{Overall score}$ $10 - (0 \times 3) = 10$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	NA

9.3.3 Fundamental Clause 6. Biological reference points and harvest control rule

The current state of the stock shall be defined in relation to reference points, relevant proxies, or verifiable substitutes that allow effective management objectives and targets to be set. Remedial actions shall be available and taken where reference points or other suitable proxies are approached or exceeded.

9.3.3.1 Supporting Clause 6.1.

6.1.	The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.	
Relevance:	Relevant.	
Evaluation Parameters		Met?
Process:	A target reference point(s) or proxy has been officially established. Managers shall be able to apply technical measures to reduce fishing pressure in the event that reference points are approached or exceeded.	<input checked="" type="checkbox"/>
EVIDENCE:	<p>The Magnuson-Stevens Act fosters long-term biological and economic sustainability of the marine fisheries out to 200 nautical miles from shore. Its key objectives are to: (i) prevent overfishing, (ii) rebuild overfished stocks, (iii) increase long-term economic and social benefits, and (iv) ensure a safe and sustainable supply of seafood. Subsequent amendments to the act strengthened requirements to prevent overfishing and rebuild overfished fisheries and set national standards for fishery management plans to specify objective and measurable criteria for determining stock status. For managed species, fisheries managers were mandated to quantitatively define "overfishing" (certain specified maximum allowed rates of fishing mortality) and "overfished" (depletion below a certain population level) and, for overfished species, plans must be enacted allowing them to recover to quantitatively specified target population levels (usually about one-third of the estimated pre-fishing population) within ten years (with certain exceptions) (see supporting clause 1.2).</p> <p>Penaeid shrimp in the Gulf of Mexico are not required to have annual catch limits (ACLs) or accountability measures (AMs) because their annual lifecycles exempt them from the Magnuson-Stevens Act requirement for these management measures. Even though ACLs are not required for these stocks, Councils are still required to estimate other biological reference points such as SDC, MSY, OY, ABC and an ABC control rule. Status determination criteria (SDC) are in place for US GOM penaeid shrimp.</p>	
Current status/Appropriateness/Effectiveness:	The official target reference point or proxy is consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid severe adverse impacts on dependent predators (e.g. recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible). Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored. Furthermore, there is evidence that the target reference point/management target has been used as an objective by the management process. If there are historical instances of the reference point being approached or exceeded, managers have taken remedial action as appropriate. In the context of reference points, when data are insufficient to estimate reference points directly, other measures of productive capacity can serve as reasonable substitutes or proxies. Suitable proxies may include, for example, standardized Catch per Unit of Effort (CPUE) as a proxy for biomass; or specific levels of fishing mortality and biomass, which have proven useful in other fisheries, can be used with a reasonable degree of confidence in the absence of better-defined levels. It is important to note that the use of a proxy may involve additional uncertainty, and if so, should trigger extra precaution in setting biological reference points. For salmon, escapement goals are the equivalent of a target reference point proxy.	<input checked="" type="checkbox"/>
EVIDENCE:	<p>Penaeid shrimp in the Gulf of Mexico are not required to have annual catch limits (ACLs) or accountability measures (AMs) because their annual lifecycles exempt them from the Magnuson-Stevens Act requirement for these management measures. Due to their unique life history, the process for setting ACLs does not fit well for stocks which have a life cycle of approximately one year. The exception for species with an annual life cycle allows flexibility for Councils to use other management measures for these stocks which are more appropriate for the unique life history for each stock and the specifics of the fishery which captures them. NMFS</p>	

6.1. The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.

believes that which stocks meet these criteria is a decision best made by the regional Councils. Even though ACLs are not required for these stocks, Councils are still required to estimate other biological reference points such as SDC, MSY, OY, ABC and an ABC control rule. However, the MSA limits the exception and clearly states that if overfishing is occurring on the stock, the exception cannot be used, therefore ACLs would be required. MSA only provided for a 1-year life cycle exception, thus NMFS cannot expand the exception to two years. Nevertheless, provision is made for consideration on a case-by-case basis when flexibility is needed in applying guidelines for certain two-year life cycle species³³⁸.

Status determination criteria (SDC) are in place for US GOM penaeid shrimp (Amendment 15 to the FMP effective December 30, 2015)³³⁹. Response to possible overfishing is set to trigger when overfishing (F in excess of Maximum Fishing Mortality Threshold, i.e. F_{MSY}) persists for two consecutive years. The two consecutive year requirement is in response to the biology of the shrimp stocks and the environmental influence on the stocks – penaeid shrimp rarely live longer than 18 months and stock size is driven by annual variability in environmental conditions. Similarly, response to possible overfished status is set to trigger when values of SSB are below MSST (Minimum Spawning Stock Threshold) for two consecutive years. SDCs were derived from stock assessments using stock synthesis-based models to estimate F and SSB as a basis for overfished and overfishing determinations in these shrimp stocks. The last such assessments were in 2017-2018 (Hart 2018a³⁴⁰, b³⁴¹ and c³⁴²) and they concluded that the stocks were not overfished and overfishing was not occurring. Specifics of a management response to one of these shrimp stocks being in overfished/overfishing status have not been defined. Neither has been assessed as such since SDCs were established.

The three shrimp species under consideration are short-lived (18-24 months but most seldom live longer than one year), grow fast, mature early, and are highly fecund (spawning 215,000 to 1 million eggs multiple times during the spawning season) and disperse offspring widely. These biological traits make them highly productive and inherently resilient to fishing pressure. These shrimps are essentially an “annual crop”. Abundance is driven primarily by environmental conditions and as long as these are favourable, populations can rebound from low abundance one year to high abundance the next.

These shrimps are not targeted separately. Rather, they are fished at the same time with relative proportions of each varying widely spatially and temporally. Management of the three stocks to ensure long-term sustainability, as well as the MSY concept generally, must be viewed in the context of ongoing ecosystem shifts that control recruitment. MSY cannot be considered in the conventional, long-term, steady state (equilibrium) sense but rather as a series of short-term equilibria that continue to change as these populations respond to environmental conditions prevailing at any given time. The shrimp resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species.

Although no target reference point as such (per supporting clause wording) has been established for these shrimp stocks, the approach to managing them is consistent with achieving MSY. Given that abundance is driven primarily by environmental conditions, fishing is unlikely to have a significant impact on these shrimp stocks in terms of long-term recruitment dynamics. The primary focus of the harvest strategy is aimed at eliminating small shrimp in the catch to the extent possible. The management measures in place (described in supporting clause 8.1) within all 6 jurisdictions act collectively to avoid catching small shrimp and

³³⁸ <https://www.federalregister.gov/d/E9-636/p-221>

³³⁹ https://gulfcouncil.org/Shrimp-Amendment-15-FINAL_508Compliant.pdf

³⁴⁰ Hart, R.A. 2018a. Stock Assessment Update for Pink Shrimp (*Farfantepenaeus duorarum*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4c-Pink-Assess_Rpt-2018_CPT.pdf

³⁴¹ Hart, R. A. 2018b. Stock Assessment Update for Brown Shrimp (*Farfantepenaeus aztecus*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4b-Brown-Assess_Rpt_2018-CPT.pdf

³⁴² Hart, R. A. 2018c. Stock Assessment Update for White Shrimp (*Litopenaeus setiferus*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4d-White-Assess_Rpt_2018_CPT.pdf

6.1. The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.

to control fishing mortality overall to ensure sufficient escapement of adults to offshore spawning areas. These measures ensure that the US Gulf of Mexico shrimp fishery does not impair recruitment by reducing reproductive potential and, also allow for efficient harvesting of whatever recruitment that becomes available for each species.

In 2019, an assessment model review found several technical concerns among these three penaeid shrimp SS models (e.g., conflicting indices, convergence issues, and residual patterns), prompting the GMFMC to initiate a Southeast Data, Assessment, and Review (SEDAR) research track process for all three stocks.

Empirical dynamic models (EDMs) have been under consideration as a new candidate model for GOM Penaeid shrimp stock assessments. Their background and concept are detailed in Tsai *et al.* (2023). Peer review of these models is underway as part of the SEDAR³⁴³ research track. A workgroup has been convened following a request to the Southeast Fishery Science Center from the Gulf Council following their April 2022 Meeting. Terms of reference for SEDAR 87³⁴⁴ were submitted to GMFMC for consideration in February 2023. A workgroup meeting in March 2023³⁴⁵ reviewed EDM theory/examples in fisheries and laid plans for moving forward. Work has been underway on conceptual model development along with review of data requirements/scoping. A data workshop is planned for September 2023. As of September 2023, there is no indication of when new stock determination criteria will be in place.

Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that target reference points have been established and are consistent with achieving MSY, a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid severe adverse impacts on dependent predators. Examples may include stock assessment reports or fishery management plans.</i>	<input checked="" type="checkbox"/>
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EVIDENCE:

See links provided.

References:

Numerical score:	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score
	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									NA

³⁴³ SEDAR. 2023. SEDAR 87 Gulf of Mexico White, Pink, and Brown Shrimp. Southeast Data, Assessment, and Review <https://sedarweb.org/assessments/sedar-87-gulf-of-mexico-white-pink-and-brown-shrimp/>

³⁴⁴ https://gulfcouncil.org/wp-content/uploads/08a.-S87_ToR_memo.pdf

³⁴⁵ Gulf of Mexico Shrimp Empirical Dynamic Modeling Workgroup Summary. Presentation to GMFMC SSC: https://gulfcouncil.org/wp-content/uploads/06a.-StevensMunch_GulfShrimpEDM_SSCMarch2023.pdf

9.3.3.2 Supporting Clause 6.2.

<p>6.2. The fishery management organization shall establish appropriate limit reference point(s) for exploitation (i.e., consistent with avoiding recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible; Appendix 1, Part 1). When a limit reference point is approached, measures shall be taken to ensure that it will not be exceeded. For instance, if fishing mortality (or its proxy) is above the associated limit reference point, actions should be taken to decrease the fishing mortality (or its proxy) below that limit reference point.</p>	
<p>Relevance:</p>	<p>Relevant.</p>
<p>Evaluation Parameters</p>	
<p>Process: <i>A scientifically based limit reference point or proxy has been officially established, and together with the measure to be taken, ensures the reference point(s) will not be exceeded.</i></p>	
<p>EVIDENCE: The Magnuson-Stevens Act fosters long-term biological and economic sustainability of the marine fisheries out to 200 nautical miles from shore. Its key objectives are to: (i) prevent overfishing, (ii) rebuild overfished stocks, (iii) increase long-term economic and social benefits, and (iv) ensure a safe and sustainable supply of seafood. Subsequent amendments to the act strengthened requirements to prevent overfishing and rebuild overfished fisheries and set national standards for fishery management plans to specify objective and measurable criteria for determining stock status. For managed species, fisheries managers were mandated to quantitatively define "overfishing" (certain specified maximum allowed rates of fishing mortality) and "overfished" (depletion below a certain population level) and, for overfished species, plans must be enacted allowing them to recover to quantitatively specified target population levels (usually about one-third of the estimated pre-fishing population) within ten years (with certain exceptions) (see supporting clause 1.2).</p> <p>Penaeid shrimp in the Gulf of Mexico are not required to have annual catch limits (ACLs) or accountability measures (AMs) because their annual lifecycles exempt them from the Magnuson-Stevens Act requirement for these management measures. Even though ACLs are not required for these stocks, Councils are still required to estimate other biological reference points such as SDC, MSY, OY, ABC and an ABC control rule. Status determination criteria (SDC) are in place for US GOM penaeid shrimp.</p>	
<p>Current status/Appropriateness/Effectiveness: <i>The stock under assessment shall not currently be overfished (see glossary) according to the best scientific evidence available. The stock is currently estimated to be on the sustainable side of this reference point (e.g., spawning stock biomass is above the limit reference point, F is below F_{lim}, etc.). F_{lim} shall not exceed F_{msy}. The limit reference point or proxy is consistent with avoiding recruitment overfishing and other severe negative impacts on the stock. There are mechanisms in place (e.g., harvest control rule or mechanism) to ensure that the level of fishing pressure is reduced if the limit reference point is approached or reached, and these mechanisms are consistent with ensuring to a high degree of certainty that the limit reference point will not be exceeded, and that actions are taken to decrease the fishing mortality (or its proxy) below that limit reference point. The level of B_{lim} should be set on the basis of historical information, applying an appropriate level of precaution according to the reliability of that information. In addition, an upper limit should be set on fishing mortality, F_{lim}, which is the fishing mortality rate that, if sustained, would drive biomass down to the B_{lim} level. It is important to clarify that for salmon, spawning escapement goals are a suitable proxy for the intent of this clause. Escapement goal performance over a 4- to 5-year period shall be considered a suitable minimum reference point for salmon management. Specific to this point, underperforming salmon stocks that do not meet their escapement goals for a sustained period (over 4–5 years) shall be appropriately managed within the stock of concern framework by the State of Alaska to ensure stocks are managed with the objective of returning them to safe biological targets.</i></p>	
<p>EVIDENCE: Status determination criteria (SDC) are in place for US GOM penaeid shrimp (Amendment 15 to the FMP effective December 30, 2015). Response to possible overfishing is set to trigger when overfishing (F in excess of Maximum Fishing Mortality Threshold, i.e., F_{MSY}) persists for two consecutive years. The two consecutive year requirement is in response to the biology of the shrimp stocks and the environmental influence on the stocks – penaeid shrimp rarely live longer than 18 months and stock size is driven by annual variability in environmental conditions. Similarly, response to possible overfished status is set to trigger when values of SSB are below MSST (Minimum Spawning Stock Threshold, i.e., B_{lim}) for two consecutive years. SDCs were derived from stock assessments using stock synthesis-based models to estimate F and SSB as a basis for overfished and overfishing determinations in these shrimp stocks. The last such assessments were in 2017-2018 and they concluded that the stocks were not overfished, and overfishing was not</p>	

6.2. The fishery management organization shall establish appropriate limit reference point(s) for exploitation (i.e., consistent with avoiding recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible; Appendix 1, Part 1). When a limit reference point is approached, measures shall be taken to ensure that it will not be exceeded. For instance, if fishing mortality (or its proxy) is above the associated limit reference point, actions should be taken to decrease the fishing mortality (or its proxy) below that limit reference point.

occurring. Specifics of a management response to one of these shrimp stocks being in overfished/overfishing status have not been defined. Neither has been assessed as such since SDCs were established.

Given that abundance is driven primarily by environmental conditions, fishing is unlikely to have a significant impact on these shrimp stocks in terms of long-term recruitment dynamics. The primary focus of the harvest strategy is aimed at eliminating small shrimp in the catch to the extent possible. The management measures in place (described in supporting clause 8.1) within all 6 jurisdictions act collectively to avoid catching small shrimp and to control fishing mortality overall to ensure sufficient escapement of adults to offshore spawning areas. These measures ensure that the US Gulf of Mexico shrimp fishery does not impair recruitment by reducing reproductive potential and, also allow for efficient harvesting of whatever recruitment that becomes available for each species.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are established safe limit reference point(s) for exploitation (i.e., consistent with avoiding recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible). When a limit reference point is approached, measures are taken to ensure that it will not be exceeded. For instance, if fishing mortality (or its proxy) is above the associated limit reference point, actions are taken to decrease the fishing mortality (or its proxy) below that limit reference point. Examples may include stock assessment reports or fishery management plans.



EVIDENCE:
 See links provided in supporting clause 6.1.

References:	
Numerical score:	$\text{Starting score} - \left(\text{Number of EPs NOT met} \times 3 \right) = \text{Overall score}$ $10 - (0 \times 3) = 10$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	NA

9.3.3.3 Supporting Clause 6.3.

6.3.	Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>Data and assessment procedures (i.e., stock assessment process) are in place to measure the position of the fishery in relation to the target and limit reference points.</i>	<input checked="" type="checkbox"/>
EVIDENCE: There are comprehensive fishery-dependent and fishery-independent data collection programs in place in all 6 of the jurisdictions involved in the management of the US GOM penaeid shrimp stocks and stocks are assessed to determine F in relation to F_{MSY} and SSB in relation to B_{lim} .	
Current status/Appropriateness/Effectiveness: <i>The current stock status in relation to reference points is used to determine the level of fishing permitted. The latter is commensurate with the current state of the fishery resources (i.e., close to or above target reference point and most importantly, not overfished or at or below its limit reference point or proxy), and takes into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing. The stock is positioned at or above the target reference point. As a minimum, the stock is located above the midway point between the target and the limit reference point. It is important to clarify that, for salmon, spawning escapement goals are a suitable proxy for the intent of this clause. Escapement goal performance over a 4- to 5-year period shall be considered as a suitable minimum reference point for salmon management. Underperforming salmon stocks that do not meet their escapement goals for a sustained period (over 4– 5 years) shall be appropriately managed within the stock of concern framework by the State of Alaska to return them to safe biological targets. Assessors shall present evidence and evaluate escapement goals and escapement goal performance (i.e., met, not met) for all the wild salmon stock with a formal escapement goal in force in Alaska (about 300 annually). Overall, statewide summary data for Alaska can be found in the annually released ADF&G document Summary of Pacific salmon escapement goals in Alaska with a review of escapements from [year] to [year]. The document generally presents the latest 9–10 years of salmon escapement performance in review.</i>	<input type="checkbox"/>
EVIDENCE: Penaeid shrimp in the Gulf of Mexico are not required to have annual catch limits (ACLs) or accountability measures (AMs) because their annual lifecycles exempt them from the Magnuson-Stevens Act requirement for these management measures. Due to their unique life history, the process for setting ACLs does not fit well for stocks which have a life cycle of approximately one year. The exception for species with an annual life cycle allows flexibility for Councils to use other management measures for these stocks which are more appropriate for the unique life history for each stock and the specifics of the fishery which captures them. NMFS believes that which stocks meet these criteria is a decision best made by the regional Councils. Even though ACLs are not required for these stocks, Councils are still required to estimate other biological reference points such as SDC, MSY, OY, ABC and an ABC control rule. However, the MSA limits the exception and clearly states that if overfishing is occurring on the stock, the exception cannot be used, therefore ACLs would be required. MSA only provided for a 1-year life cycle exception, thus NMFS cannot expand the exception to two years. Nevertheless, provision is made for consideration on a case-by-case basis when flexibility is needed in applying guidelines for certain two-year life cycle species ³⁴⁶ . Status determination criteria (SDC) are in place for US GOM penaeid shrimp (Amendment 15 to the FMP effective December 30, 2015) ³⁴⁷ . Response to possible overfishing is set to trigger when overfishing (F in excess of Maximum Fishing Mortality Threshold, i.e. F_{MSY}) persists for two consecutive years. The two consecutive year requirement is in response to the biology of the shrimp stocks and the environmental influence on the stocks – penaeid shrimp rarely live longer than 18 months and stock size is driven by annual variability in environmental conditions. Similarly, response to possible overfished status is set to trigger when values of SSB are below	

³⁴⁶ <https://www.federalregister.gov/d/E9-636/p-221>

³⁴⁷ https://gulfcouncil.org/Shrimp-Amendment-15-FINAL_508Compliant.pdf

6.3. Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).

MSST (Minimum Spawning Stock Threshold) for two consecutive years. SDCs were derived from stock assessments using stock synthesis-based models to estimate F and SSB as a basis for overfished and overfishing determinations in these shrimp stocks. The last such assessments were in 2017-2018 (Hart 2018a³⁴⁸, b³⁴⁹ and c³⁵⁰) and they concluded that the stocks were not overfished and overfishing was not occurring. Specifics of a management response to one of these shrimp stocks being in overfished/overfishing status have not been defined. Neither has been assessed as such since SDCs were established.

The three shrimp species under consideration are short-lived (18-24 months but most seldom live longer than one year), grow fast, mature early, and are highly fecund (spawning 215,000 to 1 million eggs multiple times during the spawning season) and disperse offspring widely. These biological traits make them highly productive and inherently resilient to fishing pressure. These shrimps are essentially an “annual crop”. Abundance is driven primarily by environmental conditions and as long as these are favourable, populations can rebound from low abundance one year to high abundance the next.

These shrimps are not targeted separately. Rather, they are fished at the same time with relative proportions of each varying widely spatially and temporally. Management of the three stocks to ensure long-term sustainability, as well as the MSY concept generally, must be viewed in the context of ongoing ecosystem shifts that control recruitment. MSY cannot be considered in the conventional, long-term, steady state (equilibrium) sense but rather as a series of short-term equilibria that continue to change as these populations respond to environmental conditions prevailing at any given time. The shrimp resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species.

Although no target reference point as such (per supporting clause wording) has been established for these shrimp stocks, the approach to managing them is consistent with achieving MSY. Given that abundance is driven primarily by environmental conditions, fishing is unlikely to have a significant impact on these shrimp stocks in terms of long-term recruitment dynamics. The primary focus of the harvest strategy is aimed at eliminating small shrimp in the catch to the extent possible. The management measures in place (described in supporting clause 8.1) within all 6 jurisdictions act collectively to avoid catching small shrimp and to control fishing mortality overall to ensure sufficient escapement of adults to offshore spawning areas. These measures ensure that the US Gulf of Mexico shrimp fishery does not impair recruitment by reducing reproductive potential and, also allow for efficient harvesting of whatever recruitment that becomes available for each species.

In 2019, an assessment model review found several technical concerns among these three penaeid shrimp SS models (e.g., conflicting indices, convergence issues, and residual patterns), prompting the GMFMC to initiate a Southeast Data, Assessment, and Review (SEDAR) research track process for all three stocks.

Empirical dynamic models (EDMs) have been under consideration as a new candidate model for GOM Penaeid shrimp stock assessments. Their background and concept are detailed in Tsai *et al.* (2023). Peer review of these models is underway as part of the SEDAR³⁵¹ research track. A workgroup has been convened following a request to the Southeast Fishery Science Center from the Gulf

³⁴⁸ Hart, R.A. 2018a. Stock Assessment Update for Pink Shrimp (*Farfantepenaeus duorarum*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4c-Pink-Assess_Rpt-2018_CPT.pdf

³⁴⁹ Hart, R. A. 2018b. Stock Assessment Update for Brown Shrimp (*Farfantepenaeus aztecus*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4b-Brown-Assess_Rpt_2018-CPT.pdf

³⁵⁰ Hart, R. A. 2018c. Stock Assessment Update for White Shrimp (*Litopenaeus setiferus*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551.

https://gulfcouncil.org/wp-content/uploads/D-4d-White-Assess_Rpt_2018_CPT.pdf

³⁵¹ SEDAR. 2023. SEDAR 87 Gulf of Mexico White, Pink, and Brown Shrimp. Southeast Data, Assessment, and Review <https://sedarweb.org/assessments/sedar-87-gulf-of-mexico-white-pink-and-brown-shrimp/>

6.3. Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).

Council following their April 2022 Meeting. Terms of reference for SEDAR 87³⁵² were submitted to GMFMC for consideration in February 2023. A workgroup meeting in March 2023³⁵³ reviewed EDM theory/examples in fisheries and laid plans for moving forward. Work has been underway on conceptual model development along with review of data requirements/scoping. A data workshop is planned for September 2023.

As of September 2023, there is no indication of when new stock determination criteria will be in place. Therefore, in this initial assessment of the Gulf of Mexico pink, brown and white shrimp fisheries, **the DDF framework was used to evaluate US GOM shrimp status PSA scores were entered into the DDF Worksheet for each of the three species.**

The Assessment Team calculate vulnerability scores for the stock under consideration and also document other existing information about the state of the stock under consideration (Please see appendix 3) . The vulnerability score for all of the three species was 1.67. This means that Vulnerability scores from 1 to 2.5 are consistent with a low potential risk or vulnerability to overfishing. That being said this provides High Confidence Ratings.

Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that data and assessment procedures are installed measuring the position of the fishery in relation to the reference points. Accordingly, the stock under consideration is not overfished (i.e., it is above limit reference point or proxy) and the level of fishing permitted is commensurate with the current state of the fishery resources—maintaining its future availability and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing. Examples may include stock assessment reports or fishery management plans.</i>	<input checked="" type="checkbox"/>
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EVIDENCE:
 See links provided in supporting clause 6.1.

References:			
Numerical score:	Starting score	-	(
	10		Number of EPs <u>NOT</u> met
			0
		)	x 3
		=	Overall score
			10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Full Conformance
Non-conformance Number (if applicable):			

³⁵² https://gulfcouncil.org/wp-content/uploads/08a.-S87_ToR_memo.pdf

³⁵³ Gulf of Mexico Shrimp Empirical Dynamic Modeling Workgroup Summary. Presentation to GMFMC SSC: https://gulfcouncil.org/wp-content/uploads/06a.-StevensMunch_GulfShrimpEDM_SSCMarch2023.pdf

9.3.3.4 Supporting Clause 6.4.

<p>6.4. Management actions shall be agreed to in the eventuality that data sources and analyses indicate that these reference points have been exceeded. Accordingly, contingency plans shall be agreed in advance to allow an appropriate management response to serious threats to the resource as a result of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource (Appendix 1, Part 2). Such measures may be temporary and shall be based on best scientific evidence available.</p>	
<p>Relevance:</p>	<p>Relevant.</p>
<p>Evaluation Parameters</p>	<p>Met?</p>
<p>Process: <i>There is an agreed process, system, or contingency plan in the eventuality that the data sources and analyses indicate that these reference points have been exceeded—detailing the appropriate management response to serious threats to the resource because of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource. Accordingly, the contingency plan/harvest control rule shall be agreed in advance to allow an appropriate management response to serious threats to the resource because of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource.</i></p>	<p><input checked="" type="checkbox"/></p>
<p>EVIDENCE: Penaeid shrimp in the Gulf of Mexico are not required to have annual catch limits (ACLs) or accountability measures (AMs) because their annual lifecycles exempt them from the Magnuson-Stevens Act requirement for these management measures. Even though ACLs are not required for these stocks, Councils are still required to estimate other biological reference points such as SDC, MSY, OY, ABC and an ABC control rule. Status determination criteria (SDC) are in place for US GOM penaeid shrimp.</p>	
<p>Current status/Appropriateness/Effectiveness: <i>In the eventuality that the current level of the stock has exceeded target or limit reference points, the agreed and corresponding management action (as directed by the harvest control rule or framework) shall be immediately implemented and fishing reduced or halted as necessary. The harvest control rule is effective at keeping or bringing back the stock to acceptable and safe biological levels (i.e., to avoid overfishing/ed status). Underperforming salmon stocks that do not meet their escapement goals shall be appropriately managed within the stock of concern framework by the State of Alaska.</i></p>	<p><input checked="" type="checkbox"/></p>
<p>EVIDENCE: Status determination criteria (SDC) are in place for US GOM penaeid shrimp (Amendment 15 to the FMP effective December 30, 2015). Response to possible overfishing is set to trigger when overfishing (F in excess of Maximum Fishing Mortality Threshold, i.e., F_{MSY}) persists for two consecutive years. The two consecutive year requirement is in response to the biology of the shrimp stocks and the environmental influence on the stocks – penaeid shrimp rarely live longer than 18 months and stock size is driven by annual variability in environmental conditions. Similarly, response to possible overfished status is set to trigger when values of SSB are below MSST (Minimum Spawning Stock Threshold, i.e., B_{lim}) for two consecutive years. SDCs were derived from stock assessments using stock synthesis-based models to estimate F and SSB as a basis for overfished and overfishing determinations in these shrimp stocks. The last such assessments were in 2017-2018 and they concluded that the stocks were not overfished, and overfishing was not occurring. Specifics of a management response to one of these shrimp stocks being in overfished/overfishing status have not been defined. Neither has been assessed as such since SDCs were established.</p> <p>Given that abundance is driven primarily by environmental conditions, fishing is unlikely to have a significant impact on these shrimp stocks in terms of long-term recruitment dynamics. The primary focus of the harvest strategy is aimed at eliminating small shrimp in the catch to the extent possible. The management measures in place (described in supporting clause 8.1) within all 6 jurisdictions act collectively to avoid catching small shrimp and to control fishing mortality overall to ensure sufficient escapement of adults to offshore spawning areas. These measures ensure that the US Gulf of Mexico shrimp fishery does not impair recruitment by reducing reproductive potential and, also allow for efficient harvesting of whatever recruitment that becomes available for each species.</p>	
<p>Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that management actions are agreed should data sources and analyses indicate that these reference points have been exceeded. Accordingly, contingency plans are agreed in advance for the appropriate management response to serious threats to the resource as a result of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource.</i></p>	<p><input checked="" type="checkbox"/></p>

6.4. Management actions shall be agreed to in the eventuality that data sources and analyses indicate that these reference points have been exceeded. Accordingly, contingency plans shall be agreed in advance to allow an appropriate management response to serious threats to the resource as a result of overfishing, adverse environmental changes, or other phenomena that may have adverse e on impacts on the fishery resource (Appendix 1, Part 2). Such measures may be temporary and shall be based on best scientific evidence available.

Such measures may be temporary and are based on best scientific evidence available. Examples may include stock assessment reports or fishery management plans.

EVIDENCE:

See links provided in supporting clause 6.1.

References:

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									NA

9.3.3.5 Supporting Clause 6.5.

6.5	Measures shall be introduced to identify and protect depleted stocks and those stocks threatened with depletion, and to facilitate the sustained recovery/restoration of such stocks. Also, efforts shall be made to ensure that resources and habitats critical to the well-being of such stocks, which have received adverse impacts by fishing or other human activities, are restored.	
Relevance:	Relevant.	
Evaluation Parameters		Met?
Process:		
<i>There is a process that identifies depleted stocks, resources, and habitats. A depleted stock is usually a stock, which has been overfished, the stock status is below limit reference point, and the ability of the stock to recover has been impaired.</i>		<input checked="" type="checkbox"/>
EVIDENCE:		
Penaeid shrimp in the Gulf of Mexico are not required to have annual catch limits (ACLs) or accountability measures (AMs) because their annual lifecycles exempt them from the Magnuson-Stevens Act requirement for these management measures. Even though ACLs are not required for these stocks, Councils are still required to estimate other biological reference points such as SDC, MSY, OY, ABC and an ABC control rule. Status determination criteria (SDC) are in place for US GOM penaeid shrimp.		
Current status/Appropriateness/Effectiveness:		
<i>There is evidence that where depleted or adversely impacted stocks, resources, and habitats have been identified, efforts have been made to ensure they are restored or allowed to recover (i.e., ideally within a two generations timescale). Underperforming salmon stocks that do not meet their escapement goals shall be appropriately managed within the stock of concern framework by the State of Alaska.</i>		<input checked="" type="checkbox"/>
EVIDENCE:		
Status determination criteria (SDC) are in place for US GOM penaeid shrimp (Amendment 15 to the FMP effective December 30, 2015). Response to possible overfishing is set to trigger when overfishing (F in excess of Maximum Fishing Mortality Threshold, i.e. F_{MSY}) persists for two consecutive years. The two consecutive year requirement is in response to the biology of the shrimp stocks and the environmental influence on the stocks – penaeid shrimp rarely live longer than 18 months and stock size is driven by annual variability in environmental conditions. Similarly, response to possible overfished status is set to trigger when values of SSB are below MSST (Minimum Spawning Stock Threshold, i.e., B_{lim}) for two consecutive years. SDCs were derived from stock assessments using stock synthesis-based models to estimate F and SSB as a basis for overfished and overfishing determinations in these shrimp stocks. The last such assessments were in 2017-2018 and they concluded that the stocks were not overfished, and overfishing was not occurring. Specifics of a management response to one of these shrimp stocks being in overfished/overfishing status have not been defined. Neither has been assessed as such since SDCs were established.		
Given that abundance is driven primarily by environmental conditions, fishing is unlikely to have a significant impact on these shrimp stocks in terms of long-term recruitment dynamics. The primary focus of the harvest strategy is aimed at eliminating small shrimp in the catch to the extent possible. The management measures in place (described in supporting clause 8.1) within all 6 jurisdictions act collectively to avoid catching small shrimp and to control fishing mortality overall to ensure sufficient escapement of adults to offshore spawning areas. These measures ensure that the US Gulf of Mexico shrimp fishery does not impair recruitment by reducing reproductive potential and, also allow for efficient harvesting of whatever recruitment that becomes available for each species.		
Conservation activities conducted by NOAA fisheries include protecting EFH, mitigating damage to and enhancing/restoring habitat affected by human activity with a focus on habitat used by federally-managed fish species located offshore, nearshore, in estuaries and in freshwater areas.		
Evidence Basis:		
<i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that measures are introduced to identify and protect depleted stocks and those stocks threatened with depletion, and to facilitate the sustained recovery/restoration of such stocks. Also, efforts are made to ensure that resources and essential habitats critical to the wellbeing of the stocks, which have been adversely impacted by fishing or other human activities, are restored. Examples may include laws and regulations, fishery management plans, and stock assessment reports.</i>		<input checked="" type="checkbox"/>
EVIDENCE:		

6.5 Measures shall be introduced to identify and protect depleted stocks and those stocks threatened with depletion, and to facilitate the sustained recovery/restoration of such stocks. Also, efforts shall be made to ensure that resources and habitats critical to the well-being of such stocks, which have received adverse impacts by fishing or other human activities, are restored.

See links provided in supporting clause 6.1 as well as evidence and links provided in supporting clauses 5.1.1, 5.1.2 and 5.2.

References:	
Numerical score:	$\text{Starting score} - \left(\text{Number of EPs NOT met} \times 3 \right) = \text{Overall score}$ $10 - \left(0 \times 3 \right) = 10$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	NA

9.3.4 Fundamental Clause 7. Precautionary approach

Management actions and measures for the conservation of stock and the ecosystem shall be based on the precautionary approach. Where information is deficient a suitable method using risk management shall be adopted to consider uncertainty.

9.3.4.1 Supporting Clause 7.1.

7.1.	The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species. ³⁵⁴	
Relevance:	Relevant.	
Evaluation Parameters		Met?
Process:		<input checked="" type="checkbox"/>
There are management measures, regulations, and laws that command or direct the use of the precautionary approach (PA) for conservation, management, and exploitation of the aquatic resources under assessment. This could either take the form of an explicit commitment to the application of the PA, or be evidenced by an overarching approach applied throughout the management literature.		
EVIDENCE:		<input checked="" type="checkbox"/>
Application of the precautionary approach principle is a fundamental tenet of US law in regard to the management of fisheries in federally-managed waters. This includes using the best available information such as when providing science-based stock assessment advice and recommending new or amended management measures including for mitigating the impacts of fisheries on habitats and ecosystems. The application of the principle is prevalent in decisions taken by the Council as well as in recommendations advanced by the Commission. GOM states are represented on both entities; the proven record of collaboration and cooperation between member agencies suggests that the principle is well established and used across all jurisdictions and is based on best available information. The Assessment team note that the science-based stock assessments for all shrimp species are led by NOAA scientific staff and applied on a Gulf-wide basis; advisories are implemented across individual UoAs as appropriate.		
Current status/Appropriateness/Effectiveness:		<input checked="" type="checkbox"/>
The FAO Guidelines for the PA for fisheries management (FAO CCRF 1995) advocate a comprehensive management process that includes data collection, monitoring, research, enforcement, and review. More specifically, prior identification of desirable (target) and undesirable (limit) reference points must be carried out, and measures are required that will avoid undesirable outcomes with high probability and correct them promptly should they occur. The guidelines suggest that this be achieved through rules that specify in advance what action should be taken when specified deviations from operational targets are observed (i.e., harvest control rules). Furthermore, the guidelines suggest that a management plan should not be accepted until it has been shown to perform effectively in terms of its ability to avoid undesirable outcomes (for example through simulation trials). Lastly, the absence of adequate scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent predator, or non-target species and their environment (https://www.sciencebase.gov/catalog/item/50538887e4b097cd4fce2446). There is evidence for the practical application of the PA for resource management and conservation. Note that the PA may be integrated into stock assessment practices, specific management measures enacted for everyday fisheries operations, or other measures. Application of the PA considers enhanced fisheries (e.g., at the policy level) where appropriate, and relevant uncertainties are considered using a suitable method of risk management (e.g., evaluation of potential impacts of increased hatchery releases on wild salmon), including that associated with the use of introduced or translocated species.		

³⁵⁴ FAO Technical Guidelines for Responsible Fisheries No. 2 – Precautionary approach to capture fisheries and species introductions. <http://www.fao.org/docrep/003/w3592e/w3592e00.htm>

7.1. The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species.³⁵⁴

EVIDENCE:

US and All Gulf States

The three penaeid shrimp species under consideration are not targeted separately. Rather, they are fished at the same time with relative proportions of each varying widely spatially and temporally. The overall management framework applies to all three species collectively. This also applies to the three different gears used in varying proportions across the 6 jurisdictions involved in management of the overall fishery. Therefore, the following description of the harvest strategy applies equally to the various species/gear combinations making up the UoAs in each jurisdiction.

The three shrimp species under consideration are short-lived (18-24 months but most seldom live longer than one year), grow fast, mature early, and are highly fecund (spawning 215,000 to 1 million eggs multiple times during the spawning season) and disperse offspring widely. These biological traits make them highly productive and inherently resilient to fishing pressure. These shrimps are essentially an “annual crop”. Abundance is driven primarily by environmental conditions and as long as these are favourable, populations can rebound from low abundance one year to high abundance the next. Salinity, water temperature, and dissolved oxygen can influence function, distribution, growth, survival, and movement of shrimp. In fact, the hydrological conditions in shrimp nursery areas, particularly in early spring, play a large role in dictating the next shrimping season’s potential harvest. Optimal conditions for growth and survival can vary between species and life-history stages.

A statistically significant parent stock - recruitment relationship is not apparent for any of these three shrimp species. The statistically poor relationship between parents and recruits comes from the variable effects of the environment on the survival of the young shrimp stages from spawning until entrance into the fishery. This variability in survival of young shrimp stages clouds the stock - recruitment relationship and makes it difficult to quantify the underlying association between parents and recruits. Dynamics of short-lived marine species often exhibit large fluctuations in population size and increased sensitivity to environmental variability compared with longer-lived species. This high variability in abundance is often attributed to environmental processes (especially bottom temperature) underlying recruitment. This has been recognised for GOM shrimp stocks from the earliest stages of their management.

Management of the three stocks to ensure long-term sustainability, as well as the MSY concept generally, must be viewed in the context of ongoing environmental variability that controls recruitment. MSY cannot be considered in the conventional, long-term, steady state (equilibrium) sense but rather as a series of short-term equilibria that continue to change as these populations respond to environmental conditions prevailing at any given time. The shrimp resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species. The shrimp resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas. Superimposed on this is ongoing natural mortality, given that these shrimp species are prey for a wide variety of predators throughout their life cycle.

Management of the fishery targeting penaeid shrimp in the Gulf of Mexico is divided between the Federal and various State governments. In Federal waters, shrimp are managed by the Gulf of Mexico Fishery Management Council (Gulf Council) and the National Marine Fisheries Service (NMFS), a branch of the National Oceanographic and Atmospheric Administration (NOAA). In Federal waters the fishery is managed under the Gulf of Mexico Shrimp Fishery Management Plan (FMP) first implemented in 1981. One of the plan’s main objectives is to enhance yield in volume and value by deferring harvest of small shrimp to provide for growth. Shrimpers fishing in Federal waters are subject to the requirements of the Gulf of Mexico Shrimp Management Plan (GOMSMP). Management of the fishery in individual State waters is separate from, but consistent with, Federal management. Within each fishing season, the primary focus of the overarching harvest strategy is to avoid catching small shrimp. This is meant to minimise waste associated with catching and discarding small shrimp and to allow small shrimp to grow to larger, marketable sizes. Various measures in place aimed at eliminating small shrimp from the catch are described briefly for each of the 6 jurisdictions below.

7.1. The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species.³⁵⁴

Federal Waters (UoAs 1-6)

Penaeid shrimp in the Gulf of Mexico are not required to have annual catch limits (ACLs) or accountability measures (AMs) because their annual lifecycles exempt them from the Magnuson-Stevens Act requirement for these management measures. Nevertheless, status determination criteria (SDC) are in place (Amendment 15 to the FMP). Response to possible overfishing is set to trigger when overfishing (F in excess of Maximum Fishing Mortality Threshold, i.e. F_{MSY}) persists for two consecutive years. The two consecutive year requirement is in response to the biology of the shrimp stocks and the environmental influence on the stocks – penaeid shrimp rarely live longer than 18 months and stock size is driven by annual variability in environmental conditions. Similarly, response to possible overfished status is set to trigger when values of SSB are below MSST (Minimum Spawning Stock Threshold) for two consecutive years.

Management measures outlined in the FMP for Federal waters include: Commercial fishing permits (currently no new permits are being issued – see below); Electronic logbook requirements (for selected shrimpers) and mandatory trip reports after each fishing trip (for all shrimpers); Mandatory observer coverage (if selected); and, Area and time closures: e.g., all Federal waters off Texas are closed from mid-May to mid-July to protect spawning brown shrimp and area closures to protect juvenile red snapper. Under federal management, there is no recognized recreational fishery. Recreational fishermen catch shrimp seasonally and almost always in State waters. State regulations vary from state to state. In addition, otter and skimmer trawls must have a minimum mesh size of 5/8 inch (1.56 cm) square or 1 and 1/4 inch (3.2 cm) when stretched as well as restrictions on net dimensions. There are requirements for approved turtle excluder devices and bycatch reduction devices. There is a size limit in the form of a 100 shrimp per pound minimum as well as daily catch and/or possession limits, that apply to some areas/times. Also, all shrimpers in the Gulf of Mexico must have a weak link in the tickler chain (which hangs in front of the net and drags along the ocean floor stirring up shrimp from the seafloor) that will allow the tickler chain to drop away if it is hung up on bottom structures.

Texas State Waters (UoAs 16-18)

Commercial vessels fishing in Texas State waters are subject to state-specific fishing regulations. For management of the shrimp fishery, State waters are divided into 6 zones: coast to 3 nm, 3 nm to 5 nm and 5 nm to 9 nm, each divided by north and south sections. Current shrimp regulations include: Limited entry license systems for both inshore shrimping (bay and bait licenses) and offshore shrimping (Gulf license); Designated nursery areas including tributary bays, bayous, inlets, lakes and rivers where all shrimping is prohibited; Specific designated zones for Bay shrimping, Bait shrimping and Gulf shrimping with varying regulations specific to each area to address different user needs, reduce conflict and protect smaller shrimp. These include: Variable closed seasons; Trawl number and trawl size regulations; No size limits but bag limits apply for certain license categories; Strict gear requirements: Only legal trawls are otter trawl and beam trawl: Specific size and mesh requirements for each net type allowed (a minimum net mesh size of 8 and 3/4 inches over 5 stretched meshes for most areas/seasons): BRDs and TED are required in all trawls (except bait shrimp nets, which are exempt from BRDs, but are required to carry TEDs).

There is a large closure area off Texas that covers State and Federal waters which allows brown shrimp to reach a larger and more valuable size prior to harvest, and to prevent waste of brown shrimp that might otherwise be discarded due to their small size. The closing and re-opening dates of the closure are based on the results of sampling by the TPWD. This sampling is used to project the closure, which coincides with brown shrimp in Texas bays and estuaries reaching a mean size of 90 mm and beginning strong emigrations out of the bays and estuaries during maximum duration ebb tides. Texas re-opens state waters to shrimp trawling based on sampling projections of when brown shrimp reach a mean size of 112 mm, and when maximum duration ebb tides occur.

Louisiana State Waters (UoAs 7-15)

Commercial vessels fishing in Louisiana State waters are subject to state-specific fishing regulations. Louisiana maintains an open access shrimp fishery with no limitations on the number of participants or the total effort that can be applied to the resource. Entry to the fishery is controlled more by market/economic cost/opportunities than by biological objectives.

To increase flexibility in managing the shrimp resource and to enhance economic benefits, state managers regulate the shrimp fishery

7.1. The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species.³⁵⁴

by area in response to different patterns in shrimp recruitment, growth, and emigration among basins. Shrimp found in nearshore waters are often a different size and age than shrimp found in inside waters at the same time of year. Also, shrimp do not migrate on the same schedule or grow at the same rates uniformly across the coast. This approach allows managers to account for these differences and stagger seasons according to data about shrimp populations. In effect, these seasons serve to limit effort.

In addition to designated nursery areas that are closed to fishing, within State waters a flexible and quite elaborate season opening/closing arrangement on relatively small spatial scales is a key measure aimed at avoiding small shrimp in the catch. Other measures that contribute to minimizing small shrimp in the catch include a possession limit, a maximum count of 100 shrimp per pound and minimum mesh size in the various legal gears.

Mississippi State Waters (UoAs 31-36)

Mississippi has several technical measures in place for the protection of shrimp populations and habitat that are consistent with federal shrimp management. MDMR manages the shrimp fishery through seasonal closures to ensure that enough mature shrimp survive to reproduce and to allow for shrimp to grow to marketable size prior to harvest. The Shrimp Sampling Program determines seasonal openings based on size count, and the season opens when the majority of shrimp have reached legal size (68 count). MDMR has also implemented many nearshore and estuarine area closures to protect nursery habitats that have been declared to be protective and staging areas for young shrimp, and as such permanently closed to commercial and recreational shrimping activities. Also, commercial trawling is prohibited within ½ mile of the shoreline on the mainland and prohibits all shrimping within one mile of the barrier islands. Additionally, licenses are required and there are restrictions on trawl size.

Alabama State Waters (UoAs 25-30)

Alabama has several technical measures in place for the protection of shrimp populations and habitat that are consistent with federal shrimp management. ADCNR MRD manages the shrimp fishery through seasonal closures to ensure that enough mature shrimp survive to reproduce and to allow for shrimp to grow to marketable size prior to harvest. MRD FAMP sampling efforts increase during shrimp seasons for the specific purpose of shrimp sampling in order to determine when shrimp reach legal size for harvest (68 count or fewer per pound). MRD also implements area closures to protect nursery habitats and prohibits commercial trawling within streams, bayous, creeks, and enclosed areas with seagrass beds. Additionally, licenses are required, there are restrictions on trawl size and TEDs are required.

The DCNR manages the shrimp fishery primarily by protecting young shrimp. The most productive nursery grounds are permanently closed to all shrimping activities. In these, shrimp taken by any method cannot be retained. This allows juveniles to grow to harvestable size and reduces damage to the fragile marsh from fishing activities. Various areas of state waters may be closed for short periods when DCNR personnel observe that migratory shrimp are below harvestable size. When sampling in these areas indicates that shrimp have grown large enough, the areas are reopened for shrimping. These measures are taken to ensure that shrimp are of legal size and that enough adults escape to spawn offshore and provide the following year's harvest. There are also exclusive bait areas open only to licensed recreational shrimping and live saltwater bait dealers as well as seasonal bait areas open exclusively to the commercial and recreational taking of live saltwater bait when adjacent waters are closed.

Florida State Waters (UoAs 19-24)

In Florida, all harvesters are required to be licensed. Vessels need permits to fish in State and Federal waters. In Florida State waters a Saltwater Products License (SPL) is required. For certain coastal areas, specific licenses are required which contain restrictions established for determinate zones. In areas where a specific license is required, open access is not available, and the vessel must have a RS (Restricted Species license). Requirements vary for food producers, bait and recreational harvesters. In general, there are limitations on overall size and number of the various legal gears that can be used and these vary between the various management regions. There is a bag limit for recreational harvesters.

For food shrimp producers there are minimum mesh size requirements in the body and cod end of trawls. Minimum cod end mesh

7.1. The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species.³⁵⁴

size is usually 3/4 to 5/8 inches (mid-knot to mid-knot). There is a size limit in the form of an average count per pound of 47 (whole) or 70 (heads off). BRDs and TEDs are required in all trawls.

Two large, protected areas have been established in southern Florida: the Tortugas Shrimp Sanctuary and the Florida Keys National Marine Sanctuary. There are also many localized closed areas and designated fishing seasons.

All UoAs. Given that abundance is driven primarily by environmental conditions, fishing is unlikely to have a significant impact on these shrimp stocks in terms of long-term recruitment dynamics. The primary focus of the harvest strategy is aimed at eliminating small shrimp in the catch to the extent possible. The management measures in place within all 6 jurisdictions act collectively to avoid catching small shrimp and to control fishing mortality overall to ensure sufficient escapement of adults to offshore spawning areas. These measures ensure that the US Gulf of Mexico shrimp fishery does not reduce SSB to the point that recruitment might be impaired and, also allow for efficient harvesting of whatever recruitment that becomes available for each species.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the PA is applied to conservation, management, and exploitation of an ecosystem to protect them and preserve the ecosystem. Examples may include stock assessment reports, fishery management plans and other documents.



EVIDENCE:

Evidence provided for supporting clauses 6.1 and 6.2 demonstrates that a precautionary approach consistent with FAO guidelines is well established in management of the US GOM shrimp fishery.

References:

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									NA

9.3.4.2 Supporting Clause 7.1.1.

7.1.1. In implementing the PA, the fishery management organization shall take into account, <i>inter alia</i>, uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality, the impact of fishing activities (including discards) on non-target and associated or dependent predators, and environmental and socioeconomic conditions.	
Relevance:	Relevant.
Evaluation Parameters	
Process: <i>There is a system in place under which the potential uncertainties listed above can be examined and taken into account during the decision-making process.</i>	<input checked="" type="checkbox"/>
EVIDENCE: As implemented in management of the US GOM shrimp fishery, the precautionary approach takes into account uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality and the impact of fishing activities on non-target and associated or dependent species as well as environmental and socio-economic conditions.	
Current status/Appropriateness/Effectiveness: <i>There is evidence to demonstrate that in the fishery under assessment, uncertainties considered include those associated with the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality and the impact of fishing activities (including discards) on non-target and associated or dependent predators, as well as environmental and socio-economic conditions.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The mission of the NMFS Southeast Fisheries Science Centre (SEFSC) is to plan, develop, and manage scientific research programs which generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence.	
<p>The three shrimp species under consideration are short-lived with biological traits that make them highly productive and inherently resilient to fishing pressure. These shrimps are essentially an “annual crop”. Abundance is driven primarily by environmental conditions and as long as these are favourable, populations can rebound from low abundance one year to high abundance the next. It is clear that environmental drivers play a key role in recruitment dynamics and this has been recognised for these shrimp stocks from the earliest stages of their management. For each the three US GOM penaeid shrimp stocks, stock assessment reports provide a detailed description of the data and methodology used in the assessment of overall, Gulf-wide stock status and the estimated status of the stocks in relation to established reference points (see evidence for supporting clauses 5.1, 6.1, 6.2 and 6.3). Stock assessments and associated reference points take account of uncertainties relating to the size and productivity of each stock.</p> <p>The shrimp resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species. It is the uncertainty associated with this degree of within-season variability with which management measure are meant to contend. Details of annual within-season sampling that inform management decision making, and how data are analysed within each of the 6 jurisdictions involved in management of the fishery are provided in evidence for supporting clauses 4.1, 4.1.1, 4.2. Collectively, ongoing monitoring and observer programs provide the basis for reliable estimation of total removals, including bycatch species, from these shrimp stocks annually and are available to NMFS, GMFMC and State agencies for their scientific, management and enforcement purposes.</p> <p>The SEFSC conducts a program of research and data collection to support an ecosystem approach to management of GOM shrimp stocks, examining climate and environmental changes as well as the impact of fishing on non-target species. It also conducts a socio-economic program which evaluates economic impacts of fisheries programs, compiles and evaluates socio-cultural information on fishing communities and the shrimp industry in general. These provide a basis for scientific evaluation of how fish stocks, ecosystem relationships and user groups might be affected by fishery management actions and climate (see evidence for supporting clauses 4.5, 5.1, 5.1.2, 5.2, 8.1.1, 8.1.2 12.2 and 12.2.1).</p>	

7.1.1. In implementing the PA, the fishery management organization shall take into account, *inter alia*, uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality, the impact of fishing activities (including discards) on non-target and associated or dependent predators, and environmental and socioeconomic conditions.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in implementing the PA, the fishery management organization takes into account, inter alia, uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality and the impact of fishing activities (including discards) on non-target and associated or dependent species, as well as environmental and socio-economic conditions. Examples may include stock assessment reports, fishery management plans and other documents.



EVIDENCE:
 Abundant evidence is provided in supporting clauses cited above to demonstrate the management organization takes account of uncertainties related to stock status determination, levels of fishing mortality, impacts of fishing, environmental and socioeconomic conditions in implementing the precautionary approach.

References:					
Numerical score:	Starting score	- (	Number of EPs NOT met	x 3) =	Overall score
	10		0		10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)					High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					Full Conformance
Non-conformance Number (if applicable):					NA

9.3.4.3 Supporting Clause 7.1.2.

7.1.2. In the absence of adequate scientific information, appropriate research shall be initiated in a timely fashion.																	
Relevance:	Not relevant. Note: This clause is not relevant because the GOM shrimp fishery does not lack adequate scientific information.																
Evaluation Parameters	Met?																
Process: <i>There is a process that identifies weaknesses in the scientific information available to fishery management organizations, and initiates additional research as necessary. The primary focus of this requirement is the status of the stocks under consideration.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Current status/Appropriateness/Effectiveness: <i>There is evidence that such a process has been applied in the case of the fishery under assessment, including examples of initiated research. Depending on the situation, appropriate research or further analysis of the identified risk is initiated in a timely fashion.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the absence of adequate scientific information, appropriate research is initiated in a timely fashion. Examples may include various data or scientific reports.</i>	<input type="checkbox"/>																
EVIDENCE:																	
References:																	
Numerical score:	<table border="0" style="width: 100%;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs <u>NOT</u> met</td> <td style="text-align: center;">x 3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score	10							
Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score										
10																	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																
Non-conformance Number (if applicable):																	

9.3.4.4 Supporting Clause 7.2.

7.2.	<p>In the case of new or exploratory fisheries, the fishery management organization shall adopt, as soon as possible, cautious conservation and management measures, including, <i>inter alia</i>, catch limits and effort limits. Such measures should remain in force until there are sufficient data to allow assessment of the impact of the fisheries on the long-term sustainability of the stocks, whereupon conservation and management measures based on that assessment should be implemented. Management measures should, if appropriate, allow for the gradual development of the fisheries.</p>				
Relevance:	<p>Not relevant. Note. The GOM shrimp fishery under assessment is not new or exploratory.</p>				
Evaluation Parameters			Met?		
Process:					
<p><i>For new or exploratory fisheries, there is a process that allows immediate application of the PA, including catch and effort limits, and the possible adverse impact of such fisheries on the long-term sustainability of the stocks.</i></p>			<input type="checkbox"/>		
EVIDENCE:					
Current status/Appropriateness/Effectiveness:					
<p><i>There is evidence that catch and effort limits have been implemented, and other management measures, including the assessment of possible adverse impacts, have been performed for these fisheries.</i></p>			<input type="checkbox"/>		
EVIDENCE:					
Evidence Basis:					
<p><i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the case of new or exploratory fisheries, the fishery management organization adopts, as soon as possible, cautious conservation and management measures, including, inter alia, catch and effort limits. Such measures remain in force until there are sufficient data to allow assessment of the impact of the fisheries on the long-term sustainability of the stocks, whereupon conservation and management measures based on that assessment are implemented. Management measures should, if appropriate, allow for the gradual development of the fisheries. Examples may include various data or scientific reports.</i></p>			<input type="checkbox"/>		
EVIDENCE:					
References:					
Numerical score:	Starting score	– (Number of EPs <u>NOT</u> met	x 3) =	Overall score
	10				
Corresponding Confidence Rating:					
<p>(10 = High; 4 or 7 = Medium; 1 = Low)</p>					Low/Medium/High
Corresponding Conformance Level:					
<p>(10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)</p>					Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):					

9.4 Section C: Management Measures, Implementation, Monitoring, and Control

9.4.1 Fundamental Clause 8. Management measures

Management shall adopt and implement effective management measures designed to maintain stocks at levels capable of producing maximum sustainable yields, including harvest control rules and technical measures applicable to sustainable utilization of the fishery, and based upon verifiable evidence and advice from available objective scientific and traditional sources.

9.4.1.1 Supporting Clause 8.1.

8.1. Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote optimum utilization, and are based on verifiable and objective scientific and/or traditional, fisher, or community sources.

Relevance: **Relevant.**

Evaluation Parameters	Met?
<p>Process: <i>The process by which management measures are developed for the fishery utilizes the best scientific evidence available, including traditional sources where these are verifiable, and also considers the cost-effectiveness and social impact of potential new measures. The assessment team shall provide evidence for the main type of management measures present in the fishery. Some of the main examples may include (but are not limited to) legal gear specifications, permit requirements, observer requirements, reporting requirements, limited access, vessel license limitations, size limits, sex restrictions, total allowable catch, in season adjustments, fishing seasons, geographical registrations areas, bycatch reduction devices, gear modification, minimizing waste and ghost fishing, closed waters, catch limits for other fisheries, and bycatch management.</i></p>	<input checked="" type="checkbox"/>
<p>EVIDENCE: The US GOM shrimp fishery involves several species whose stocks are shared and co-managed by Federal agencies and agencies of the five Gulf States. Jurisdictional fishery management systems have evolved over many years through collaborative arrangements that include extensive collaboration of industry groups, other stakeholders and the public at large. Being part of the US EEZ, management of the shrimp fisheries in Federal waters off the coasts of the 5 Gulf States is the responsibility of the Gulf of Mexico Fisheries Management Council (GMFMC), which is empowered via the US Magnuson-Stevens Fishery Conservation Act. The Council prepares fishery management plans consistent with National Standards for fishery conservation and management. In addition, the Gulf States Marine Fisheries Commission (GSMFC) provides a scientific advisory arm to the 5 US Gulf States and provides a forum for multi-State discussion on fishery conservation matters. Each state is represented equally as GSMFC Commissioners. GSMFC serves as a discussion centre for marine resource issues, allowing stakeholders to voice concerns and opinions regarding fishery resource management. There are several industry-led organizations representing shrimpers, processors, other segments of the US domestic wild-caught shrimp industry and the general public. These advocate for the shrimping industry by identifying industry issues, obtaining fisheries input, engaging federal and local officials in order to voice industry concerns and work to ensure the continued vitality and existence of the U.S shrimp industry. The scientific basis for the resource conservation/management decision-making process is described in supporting clauses 4.1 and 4.1.1.</p>	
<p>Current status/Appropriateness/Effectiveness: <i>There is evidence that the overall framework of management measures in place is effective at achieving the long-term optimum yield, which is defined by the FAO as “the harvest levels for a species that achieves the greatest overall benefits, including economic, social and biological considerations.” If the stock has been maintained above the limit reference point, this shall be taken as evidence that management measures are effective in avoiding overfishing.</i></p>	<input checked="" type="checkbox"/>
<p>EVIDENCE: The shrimp fishery in Federal waters is managed under the Gulf of Mexico Shrimp Fishery Management Plan (FMP) which was first implemented in 1981 and has been amended several times since. The plan’s objective is to enhance yield in volume and value by deferring harvest of small shrimp to provide for growth. The plan has been amended numerous times since it was implemented. Amendments include adjustments to area closures, definitions of overfishing and action plans to arrest overfishing should it occur, bycatch reduction measures, and vessel permitting requirements.</p>	

8.1. Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote optimum utilization, and are based on verifiable and objective scientific and/or traditional, fisher, or community sources.

Shrimpers fishing in Federal waters are subject to the requirements of the Gulf of Mexico Shrimp Management Plan (GOMSMP). Management of the fishery in individual State waters is separate from, but consistent with, Federal management.

The three shrimp species under consideration are short-lived with biological traits that make them highly productive and inherently resilient to fishing pressure. These shrimps are essentially an “annual crop”. Abundance is driven primarily by environmental conditions and as long as these are favorable, populations can rebound from low abundance one year to high abundance the next. The shrimp resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species.

Penaeid shrimp in the Gulf of Mexico are not required to have annual catch limits (ACLs) or accountability measures (AMs) because their annual lifecycles exempt them from the Magnuson-Stevens Act requirement for these management measures. Due to their unique life history, the process for setting ACLs does not fit well for stocks which have a life cycle of approximately one year. The exception for species with an annual life cycle allows flexibility for Councils to use other management measures for these stocks which are more appropriate for the unique life history for each stock and the specifics of the fishery which captures them. NMFS believes that which stocks meet these criteria is a decision best made by the regional Councils. Even though ACLs are not required for these stocks, Councils are still required to estimate other biological reference points such as SDC, MSY, OY, ABC and an ABC control rule. However, the MSA limits the exception and clearly states that if overfishing is occurring on the stock, the exception cannot be used, therefore ACLs would be required. MSA only provided for a 1-year life cycle exception, thus NMFS cannot expand the exception to two years. Nevertheless, provision is made for consideration on a case-by-case basis when flexibility is needed in applying guidelines for certain two-year life cycle species.

The shrimp resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species. Within each fishing season, the primary focus of the overarching harvest strategy is to avoid catching small shrimp. This is meant to minimize waste associated with catching and discarding small shrimp and to allow small shrimp to grow to larger, marketable sizes. Management measures are in place that act collectively to limit the catch of small shrimp and control overall fishing mortality to ensure that the fishery does not impair recruitment by reducing reproductive potential and, also allow for efficient harvesting of whatever recruitment that becomes available. In addition to designated nursery areas that are closed to fishing, seasonal openings and closings are the primary mechanism for achieving this. These openings/closings are decided each year on the basis of comprehensive sampling regimes that determine when shrimp have grown to sizes that achieve prescribed counts per pound.

Various measures in place aimed at eliminating small shrimp from the catch are described briefly for each of the 6 jurisdictions below.

Federal Waters (UoAs 1-6)

Penaeid shrimp in the Gulf of Mexico are not required to have annual catch limits (ACLs) or accountability measures (AMs) because their annual lifecycles exempt them from the Magnuson-Stevens Act requirement for these management measures. Nevertheless, status determination criteria (SDC) are in place (Amendment 15 to the FMP). Response to possible overfishing is set to trigger when overfishing (F in excess of Maximum Fishing Mortality Threshold, i.e. F_{MSY}) persists for two consecutive years. The two consecutive year requirement is in response to the biology of the shrimp stocks and the environmental influence on the stocks – penaeid shrimp rarely live longer than 18 months and stock size is driven by annual variability in environmental conditions. Similarly, response to possible overfished status is set to trigger when values of SSB are below MSST (Minimum Spawning Stock Threshold) for two consecutive years.

Management measures outlined in the FMP for Federal waters include: Commercial fishing permits (currently no new permits are being issued); Electronic logbook requirements (for selected shrimpers) and mandatory trip reports after each fishing trip (for all shrimpers); Mandatory observer coverage (if selected); and, Area and time closures: e.g., all Federal waters off Texas are closed from mid-May to mid-July to protect spawning brown shrimp and area closures to protect juvenile red snapper. Under federal

8.1. Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote optimum utilization, and are based on verifiable and objective scientific and/or traditional, fisher, or community sources.

management, there is no recognized recreational fishery. Recreational fishermen catch shrimp seasonally and almost always in State waters. State regulations vary from state to state. In addition, otter and skimmer trawls must have a minimum mesh size of 5/8 inch (1.56 cm) square or 1 and 1/4 inch (3.2 cm) when stretched as well as restrictions on net dimensions. There are requirements for approved turtle excluder devices and bycatch reduction devices. There is a size limit in the form of a 100 shrimp per pound minimum as well as daily catch and/or possession limits, that apply to some areas/times. Also, all shrimpers in the Gulf of Mexico must have a weak link in the tickler chain (which hangs in front of the net and drags along the ocean floor stirring up shrimp from the seafloor) that will allow the tickler chain to drop away if it is hung up on bottom structures.

Texas State Waters (UoAs 16-18)

Commercial vessels fishing in Texas State waters are subject to state-specific fishing regulations. For management of the shrimp fishery, State waters are divided into 6 zones: coast to 3 nm, 3 nm to 5 nm and 5 nm to 9 nm, each divided by north and south sections. Current shrimp regulations include: Limited entry license systems for both inshore shrimping (bay and bait licenses) and offshore shrimping (Gulf license); Designated nursery areas including tributary bays, bayous, inlets, lakes and rivers where all shrimping is prohibited; Specific designated zones for Bay shrimping, Bait shrimping and Gulf shrimping with varying regulations specific to each area to address different user needs, reduce conflict and protect smaller shrimp. These include: Variable closed seasons; Trawl number and trawl size regulations; No size limits but bag limits apply for certain licence categories; Strict gear requirements: Only legal trawls are otter trawl and beam trawl: Specific size and mesh requirements for each net type allowed (a minimum net mesh size of 8 and 3/4 inches over 5 stretched meshes for most areas/seasons): BRDs and TED are required in all trawls (except bait shrimp nets, which are exempt from BRDs, but are required to carry TEDs).

There is a large closure area off Texas that covers State and Federal waters which allows brown shrimp to reach a larger and more valuable size prior to harvest, and to prevent waste of brown shrimp that might otherwise be discarded due to their small size. The closing and re-opening dates of the closure are based on the results of sampling by the TPWD. This sampling is used to project the closure, which coincides with brown shrimp in Texas bays and estuaries reaching a mean size of 90 mm and beginning strong emigrations out of the bays and estuaries during maximum duration ebb tides. Texas re-opens state waters to shrimp trawling based on sampling projections of when brown shrimp reach a mean size of 112 mm, and when maximum duration ebb tides occur.

Louisiana State Waters (UoAs 7-15)

Commercial vessels fishing in Louisiana State waters are subject to state-specific fishing regulations. Louisiana maintains an open access shrimp fishery with no limitations on the number of participants or the total effort that can be applied to the resource. Entry to the fishery is controlled more by market/economic cost/opportunities than by biological objectives.

To increase flexibility in managing the shrimp resource and to enhance economic benefits, state managers regulate the shrimp fishery by area in response to different patterns in shrimp recruitment, growth, and emigration among basins. Shrimp found in nearshore waters are often a different size and age than shrimp found in inside waters at the same time of year. Also, shrimp do not migrate on the same schedule or grow at the same rates uniformly across the coast. This approach allows managers to account for these differences and stagger seasons according to data about shrimp populations. In effect, these seasons serve to limit effort.

In addition to designated nursery areas that are closed to fishing, within State waters a flexible and quite elaborate season opening/closing arrangement on relatively small spatial scales is a key measure aimed at avoiding small shrimp in the catch. Other measures that contribute to minimising small shrimp in the catch include a possession limit, a maximum count of 100 shrimp per pound and minimum mesh size in the various legal gears.

Mississippi State Waters (UoAs 31-36)

Mississippi has several technical measures in place for the protection of shrimp populations and habitat that are consistent with federal shrimp management. MDMR manages the shrimp fishery through seasonal closures to ensure that enough mature shrimp survive to reproduce and to allow for shrimp to grow to marketable size prior to harvest. The Shrimp Sampling Program determines seasonal openings based on size count, and the season opens when the majority of shrimp have reached legal size (68 count). MDMR has also implemented many nearshore and estuarine area closures to protect nursery habitats that have been declared to be protective and staging areas for young shrimp, and as such permanently closed to commercial and recreational shrimping activities.

8.1. Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote optimum utilization, and are based on verifiable and objective scientific and/or traditional, fisher, or community sources.

Also, commercial trawling is prohibited within ½ mile of the shoreline on the mainland and prohibits all shrimping within one mile of the barrier islands. Additionally, licenses are required and there are restrictions on trawl size.

Alabama State Waters (UoAs 25-30)

Alabama has several technical measures in place for the protection of shrimp populations and habitat that are consistent with federal shrimp management. ADCNR MRD manages the shrimp fishery through seasonal closures to ensure that enough mature shrimp survive to reproduce and to allow for shrimp to grow to marketable size prior to harvest. MRD FAMP sampling efforts increase during shrimp seasons for the specific purpose of shrimp sampling in order to determine when shrimp reach legal size for harvest (68 count or fewer per pound). MRD also implements area closures to protect nursery habitats and prohibits commercial trawling within streams, bayous, creeks, and enclosed areas with seagrass beds. Additionally, licenses are required, there are restrictions on trawl size and TEDs are required.

The DCNR manages the shrimp fishery primarily by protecting young shrimp. The most productive nursery grounds are permanently closed to all shrimping activities. In these, shrimp taken by any method cannot be retained. This allows juveniles to grow to harvestable size and reduces damage to the fragile marsh from fishing activities. Various areas of state waters may be closed for short periods when DCNR personnel observe that migratory shrimp are below harvestable size. When sampling in these areas indicates that shrimp have grown large enough, the areas are reopened for shrimping. These measures are taken to ensure that shrimp are of legal size and that enough adults escape to spawn offshore and provide the following year's harvest. There are also exclusive bait areas open only to licensed recreational shrimping and live saltwater bait dealers as well as seasonal bait areas open exclusively to the commercial and recreational taking of live saltwater bait when adjacent waters are closed.

Florida State Waters (UoAs 19-24)

In Florida, all harvesters are required to be licensed. Vessels need permits to fish in State and Federal waters. In Florida State waters a Saltwater Products License (SPL) is required. For certain coastal areas, specific licenses are required which contain restrictions established for determinate zones. In areas where a specific license is required, open access is not available, and the vessel must have a RS (Restricted Species license). Requirements vary for food producers, bait and recreational harvesters. In general, there are limitations on overall size and number of the various legal gears that can be used, and these vary between the various management regions. There is a bag limit for recreational harvesters.

For food shrimp producers there are minimum mesh size requirements in the body and cod end of trawls. Minimum cod end mesh size is usually 3/4 to 5/8 inches (mid-knot to mid-knot). There is a size limit in the form of an average count per pound of 47 (whole) or 70 (heads off). BRDs and TEDs are required in all trawls.

Two large, protected areas have been established in southern Florida: the Tortugas Shrimp Sanctuary and the Florida Keys National Marine Sanctuary. There are also many localised closed areas and designated fishing seasons.

All UoAs.

These shrimps are not targeted separately. Rather, they are fished at the same time with relative proportions of each varying widely spatially and temporally. Management of the three stocks to ensure long-term sustainability, as well as the MSY concept generally, must be viewed in the context of ongoing ecosystem shifts that control recruitment. MSY cannot be considered in the conventional, long-term, steady state (equilibrium) sense but rather as a series of short-term equilibria that continue to change as these populations respond to environmental conditions prevailing at any given time. SDCs were derived from stock assessments using stock synthesis-based models to estimate F and SSB as a basis for overfished and overfishing determinations in these shrimp stocks. The last such assessments were in 2017-2018 and they concluded that the stocks were not overfished and overfishing was not occurring.

Given the inherent resilience to fishing which characterises each of these species and that abundance is driven primarily by environmental conditions, fishing is unlikely to have a significant impact on these shrimp stocks in terms of long-term recruitment dynamics. The primary focus of the harvest strategy is aimed at eliminating small shrimp in the catch to the extent possible. The

8.1. Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote optimum utilization, and are based on verifiable and objective scientific and/or traditional, fisher, or community sources.

management measures in place within all 6 jurisdictions act collectively to avoid catching small shrimp and to control fishing mortality overall to ensure sufficient escapement of adults to offshore spawning areas. These measures ensure that the US Gulf of Mexico shrimp fishery does not reduce SSB to the point that recruitment might be impaired and, also allow for efficient harvesting of whatever recruitment that becomes available for each species.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that conservation and management measures are designed to ensure the long-term sustainability of fishery resources at levels which promote optimum utilization, and are based on verifiable and objective scientific and/or traditional, fisher, or community sources. Examples may include reports, fishery management plans, regulations, or other management measures.



EVIDENCE:
 See evidence and links provide in supporting clauses 6.1, 6.2 and 6.3.

References:			
Numerical score:	Starting score	- (	Number of EPs <u>NOT</u> met
	10	- (	0
		x 3) =
			Overall score
			10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Full Conformance
Non-conformance Number (if applicable):			NA

9.4.1.2 Supporting Clause 8.1.1.

8.1.1. When evaluating alternative conservation and management measures, the fishery management organization shall consider their cost-effectiveness and social impact.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>The process by which management measures are developed for the fishery allows for consideration of the cost effectiveness and social impact of potential new or modified management measures.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Various NOAA agencies ³⁵⁵ conduct economic and socio-cultural research to ensure that all of the communities that depend on fishery resources are considered. These agencies conduct a wide range of commercial fisheries economic analyses and related activities which allows assessments of the magnitude of fisheries management decisions, as well as the costs and benefits. This research supports the goal of maximizing benefits to the nation, while ensuring the long-term sustainability of all living marine resources. This research serves as a foundation for scientific analysis of how fish populations, ecological linkages, and user groups may be impacted by fishery management and climate change.	
Current status/Appropriateness/Effectiveness: <i>There is evidence for the consideration of the cost-effectiveness and social impact of potential new or modified management measures.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Various NOAA agencies conduct economic and socio-cultural research to ensure that all of the communities that depend on fishery resources are considered. This can include fishermen, indigenous communities, whale watching operators, and other members of coastal communities that interact with marine resources in different ways. This includes a wide range of commercial fisheries economic analyses and related activities which assess both the magnitude of fisheries management decisions, as well as the costs and benefits. Various federal statutes require agencies to examine the social and economic impacts of policies and regulations at the community level. NOAA initiated a national effort to create and maintain a series of regional fishing community profiles. The community profile series portrays past and current engagement in fisheries. Research is conducted to better understand the impacts of management decisions on fishing communities. Each region creates fishing community profiles, which contain social and economic data and social indicators to help assess community resilience and vulnerability. Social indicators are numerical measures that describe the well-being of individuals or communities. Indicators are comprised of one variable, or several components combined into an index. They are used to describe and evaluate community well-being in terms of social, economic, and psychological welfare. Research is conducted to evaluate the benefits and costs of alternative management actions for commercial fisheries, prioritize management needs, and design policies that sustainably maximize societal benefits from ocean and coastal resources. An annual survey is conducted of all seafood processors which provides data to calculate US seafood consumption and the value of fish and fish products derived from commercial fishing and to assess the impacts of changes in fishery management plans. The foregoing socio-economic research informs management decision making aimed at maximizing societal benefits from ocean and coastal resources while ensuring the long-term sustainability of all living marine resources.	
The Fisheries Economics of the United States report ³⁵⁶ is an annual report that summarizes economic information during a ten-year period related to commercial fishing activities and fishing-related industries in the United States. This includes information on commercial fisheries landings, revenue, and price trends. The value of US commercial fisheries landings remains strong and has a broad positive impact on the US economy. Each report covers 10 years and includes statistics on: Commercial fisheries (commercial fisheries landings, revenue, price trends), Recreational fisheries (recreational fishing effort, participation rates, expenditure information), Fishing-related industries (employer and non-employer establishment, payroll, annual receipt information for fishing-related industries) and Economic impact (employment, sales, value-added impacts).	
Evidence Basis:	<input checked="" type="checkbox"/>

³⁵⁵ www.fisheries.noaa.gov/topic/socioeconomics

³⁵⁶ Fisheries Economics of the United States 2020. NOAA Technical Memorandum NMFS-F/SPO-236A. www.fisheries.noaa.gov/national/sustainable-fisheries/fisheries-economics-united-states

8.1.1.	When evaluating alternative conservation and management measures, the fishery management organization shall consider their cost-effectiveness and social impact.			
	<i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the evaluation of alternative conservation and management measures, their cost-effectiveness and social impact are considered. Examples may include reports, fishery management plans, regulations or other management measures.</i>			
EVIDENCE: Links provided here and evidence provided in supporting clauses 5.1.2, 5.2 and 3.2.1.				
References:				
Numerical score:	Starting score	- (	Number of EPs <u>NOT</u> met x 3) =	Overall score
	10		0	10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)				High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)				Full Conformance
Non-conformance Number (if applicable):				NA

9.4.1.3 Supporting Clause 8.1.2.

8.1.2. Responsible fisheries management organizations shall adopt and implement measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management (1) in accordance with the PA, as reflected in Article 6 of the UN Fish Stocks Agreement, and as set out in Article 6.5 and 7.5 of the Code; (2) in accordance with the responsible use of fish as set out in the Code; and (3) based on the best scientific evidence available, taking into account fishers' knowledge.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>The responsible fisheries management organizations has adopted and implemented effective measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The US GOM shrimp fishery is long established and has been actively managed since the early 1980s. Over the long history of the fishery, fishing gears have been modified to reduce the catch of small shrimp to the extent possible. The primary focus of ongoing gear modifications for many years has been related to bycatch reduction and turtle exclusion devices (BRDs and TEDs). Reduction of discards and bycatch has been a primary focus within each of the 6 jurisdictions involved in the management of the fishery.	
Current status/Appropriateness/Effectiveness: <i>There is evidence of adoption and implementation of effective measures to ensure the management of bycatch and reduction of discards as part of fisheries management (1) in accordance with the PA, as reflected in Article 6 of the UN Fish Stocks Agreement, and as set out in Article 6.5 and 7.5 of the Code; (2) in accordance with the responsible use of fish as set out in the Code; and (3) based on the best scientific evidence available, taking into account fishers' knowledge. Please note that traditional knowledge should be verifiable. The strategy to ensure the management of bycatch and reduction of discards as part of fisheries management is being implemented successfully (e.g., there is a well-known track record of consistently setting conservative bycatch limits based on quality information and advice about bycatch); or bycatch is minimized to the greatest extent possible, especially for vulnerable species such as sharks, seabirds, turtles, and marine mammals, through mitigation measures that have been shown to be highly effective (e.g., observer coverage and procedures, bycatch caps, utilization measures, full catch accounting, on-deck techniques, avoidance mechanisms and gear technology, etc.). Also, the fishery is not a leading cause of a high level of mortality for any species of concern (e.g., not a Category I fishery for marine mammal bycatch as designated by the National Marine Fisheries Service).</i>	<input checked="" type="checkbox"/>
EVIDENCE: The shrimp species under consideration produce annual crops. The resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species. The primary focus of the overarching harvest strategy is to avoid catching small shrimp. Various measures in place aimed at eliminating small shrimp from the catch are described for each of the 6 jurisdictions in supporting clause 8.1. In addition to many permanent and temporary closed areas, the main strategy in terms of avoiding small shrimp is delaying season openings until shrimp have grown to marketable size. Once fishing starts, all shrimp caught are retained. Discussions with representatives of each State as well as with industry representatives during site visit meetings confirmed there is no discarding of shrimp in the fishery. Management of bycatch of non-target species is achieved by widespread use of bycatch reduction and turtle exclusion devices (BRDs and TEDs) (see evidence for supporting clauses 8.5 and 8.5.1). BRDs and TEDs are described in detail in supporting clauses 12.2 and 12.2.1.	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the responsible fisheries management organizations have adopted and implemented effective measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management. Examples may include stock assessment, bycatch or other ecosystem assessment reports.</i>	<input checked="" type="checkbox"/>
EVIDENCE:	

8.1.2. Responsible fisheries management organizations shall adopt and implement measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management (1) in accordance with the PA, as reflected in Article 6 of the UN Fish Stocks Agreement, and as set out in Article 6.5 and 7.5 of the Code; (2) in accordance with the responsible use of fish as set out in the Code; and (3) based on the best scientific evidence available, taking into account fishers' knowledge.

See evidence provided in supporting clauses 8.1, 8.5, 8.5.1, 12.2 and 12.2.1.

References:

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									NA

9.4.1.4 Supporting Clause 8.2.

8.2. The fishery management organization shall prohibit dynamiting, poisoning, and other similar destructive fishing practices.																			
Relevance:	Relevant.																		
Evaluation Parameters	Met?																		
Process: <i>There are management measures, or regulations, or laws that prohibit destructive fishing practices.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: Use of destructive fishing practices is explicitly prohibited in the US GOM.																			
Current status/Appropriateness/Effectiveness: <i>The regulations or laws effectively prohibit dynamiting, poisoning, and other similar destructive fishing practices.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: CFR Title 50, Chapter VI § 6.22.54 and 622.9 ³⁵⁷ expressly prohibit use of explosives and chemicals in the GOM EEZ. Each of the 6 jurisdictions involved in the management of the US GOM shrimp fishery includes in its statutes quite explicit descriptions of fishing gears that are allowed and any method of fishing not listed is illegal (see supporting clause 1.2).																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization prohibits dynamiting, poisoning, and other similar destructive fishing practices. Examples may include laws, fishery management plans, regulations, and enforcement data.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: See link provided. And evidence in supporting clause 1.2.																			
References:																			
Numerical score:	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Starting score</td> <td>-</td> <td>(</td> <td>Number of EPs NOT met</td> <td>x</td> <td>3</td> <td>)</td> <td>=</td> <td>Overall score</td> </tr> <tr> <td>10</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>10</td> </tr> </table>	Starting score	-	(Number of EPs NOT met	x	3)	=	Overall score	10			0					10
Starting score	-	(Number of EPs NOT met	x	3)	=	Overall score											
10			0					10											
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance																		
Non-conformance Number (if applicable):	NA																		

³⁵⁷ www.ecfr.gov/current/title-50/chapter-VI/part-622

9.4.1.5 Supporting Clause 8.3.

8.3.	The fishery management organization shall seek to identify domestic parties having a legitimate interest in the use and management of the fishery. When deciding on use, conservation, and management of the resource, due recognition shall be given, where relevant, in accordance with national laws and regulations, to the traditional practices, needs, and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood. Arrangements shall be made to consult all the interested parties and gain their collaboration in achieving responsible fisheries.		
Relevance:	Relevant.		
Evaluation Parameters			Met?
Process:	<i>There is a process that allows for identifying and consulting with domestic parties (giving due recognition where relevant, in accordance with national laws and regulations, to the traditional practices, needs, and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood) having a legitimate interest in the use and management of the fisheries resource.</i>		<input checked="" type="checkbox"/>
EVIDENCE:	Executive Order 12898 requires that federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. There is a constitutional right to fish for all citizens and all fishery participants fish in the same manner and have to follow current licensing requirements that apply to all citizens.		
Current status/Appropriateness/Effectiveness:	<i>In accordance with national laws and regulations, there is evidence that domestic parties having a legitimate interest in the use and management of the fishery (as described above) have been identified and encouraged to collaborate in the fisheries management process.</i>		<input checked="" type="checkbox"/>
EVIDENCE:	The US GOM shrimp fishery involves several species whose stocks are shared and co-managed by Federal agencies and agencies of the five Gulf States. Jurisdictional fishery management systems have evolved over many years through collaborative arrangements that include extensive collaboration of industry groups, other stakeholders and the public at large. Being part of the US EEZ, management of the shrimp fisheries in Federal waters off the coasts of the 5 Gulf States is the responsibility of the Gulf of Mexico Fisheries Management Council (GMFMC), which is empowered via the US Magnuson-Stevens Fishery Conservation Act. The Council prepares fishery management plans consistent with National Standards for fishery conservation and management. In addition, the Gulf States Marine Fisheries Commission (GSMFC) provides a scientific advisory arm to the 5 US Gulf States and provides a forum for multi-State discussion on fishery conservation matters. Each state is represented equally as GSMFC Commissioners. GSMFC serves as a discussion center for marine resource issues, allowing stakeholders to voice concerns and opinions regarding fishery resource management. There are several industry-led organizations representing shrimpers, processors, other segments of the US domestic wild-caught shrimp industry and the general public. These advocate for the shrimping industry by identifying industry issues, obtaining fisheries input, engaging federal and local officials in order to voice industry concerns and work to ensure the continued vitality and existence of the U.S shrimp industry (see supporting clauses 1.2 and 4.6).		
Evidence Basis:	<i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization seeks to identify domestic parties having a legitimate interest in the use and management of the fishery. When deciding on use, conservation, and management of the resource, due recognition is given, where relevant, in accordance with national laws and regulations, to the traditional practices, needs, and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood. Arrangements are made to consult all the interested parties and gain their collaboration in achieving responsible fisheries. Examples may include laws, fishery management plans, regulations, and meeting records.</i>		<input checked="" type="checkbox"/>
EVIDENCE:	See evidence and links in supporting clauses 1.2 and 4.6.		
References:			
Numerical score:	Starting score	–	Number of EPs <u>NOT</u> met x 3 = Overall score

8.3.	<p>The fishery management organization shall seek to identify domestic parties having a legitimate interest in the use and management of the fishery. When deciding on use, conservation, and management of the resource, due recognition shall be given, where relevant, in accordance with national laws and regulations, to the traditional practices, needs, and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood. Arrangements shall be made to consult all the interested parties and gain their collaboration in achieving responsible fisheries.</p>				
	10	(	0	)	10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)					High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					Full Conformance
Non-conformance Number (if applicable):					NA

9.4.1.6 Supporting Clause 8.4.

8.4.	Where excess capacity exists, mechanisms shall be established to reduce capacity to levels commensurate with sustainable use of the resource. Fleet capacity operating in the fishery shall be measured and monitored. The fishery management organization shall maintain, in accordance with recognized international standards and practices, statistical data, updated at regular intervals, on all fishing operations and a record of all authorizations to fish allowed by them.
Relevance:	Relevant.
Evaluation Parameters	Met?
Process:	<input checked="" type="checkbox"/>
<p><i>There is a system to measure fleet capacity and maintain regularly updated data on all fishing operations. Research has been conducted to determine or estimate the fishing capacity commensurate with the sustainable use of the resource. There are mechanisms in place to measure the total fishing capacity within the unit of certification, and to reduce this capacity if it is determined to exceed the sustainable level.</i></p>	
EVIDENCE:	
<p>Each of the 6 jurisdictions involved in the management of the US GOM shrimp fishery require all participants to be licensed annually. Trip ticket programs within each provides data on fishing effort. Mechanisms are in place to reduce capacity to levels commensurate with sustainable use of the GOM shrimp stocks. Fleet capacity is monitored and data on licenses and fishing effort are updated annually.</p>	
Current status/Appropriateness/Effectiveness:	<input checked="" type="checkbox"/>
<p><i>There is evidence of the size of fleet capacity, and of data describing fishing operation, and that the mechanisms described above are successful at maintaining the effective fishing capacity of the unit of certification at a level commensurate with the sustainable use of the resource. Management mechanisms, which restrict the application of fishing capacity, such as quotas, shall be considered valid mechanisms in relation to this parameter. The core emphasis of this requirement is to ensure that exploitation is sustainable. Assessment teams should ensure that fisheries are within catch limit recommendations to determine whether excess capacity is having an effect on resource overexploitation.</i></p>	
EVIDENCE:	
<p>Penaeid shrimp in the Gulf of Mexico are not required to have annual catch limits (ACLs) or accountability measures (AMs) because their annual lifecycles exempt them from the Magnuson-Stevens Act requirement for these management measures. Nevertheless, there are other catch and effort control measures in place. The shrimp fishery in Federal waters is managed under the Gulf of Mexico Shrimp Fishery Management Plan (FMP). Management measures outlined in the FMP for Federal waters include commercial fishing permits. In 2002, amendment 11 to the FMP required all vessels harvesting shrimp from the exclusive economic zone (EEZ) to obtain a commercial shrimp vessel permit from National Marine Fisheries Service (NMFS) and in 2006, amendment 13 established a moratorium on the issuance of new commercial shrimp vessel permits, which is a form of limited access. There was a subsequent dramatic drop in offshore shrimp fishing effort and a corresponding increase in catch rates (see background section 6.5). In 2016, amendment 17A extended the commercial shrimp permit moratorium for 10 years. The intent of this is to protect federally managed Gulf shrimp stocks while promoting catch efficiency, economic efficiency, and stability in the fishery.</p> <p>While shrimpers fishing in Federal waters are subject to the requirements of the FMP, management of the fishery in individual State waters is consistent with the FMP. Nevertheless, except for Texas, State jurisdictions basically maintain an open access shrimp fishery with no limitations on the number of participants or the total effort that can be applied to the resource. This is based on the premise that entry to the fishery is controlled by market/economic cost/opportunities.</p> <p>The Texas Shrimp FMP was implemented by TPWD in 1989. In 1995, the Texas Inshore Bay and Bait Shrimp License Buyback Program was implemented due to increased effort in the inshore fisheries and concern about biological pressure on the stock and loss of larger shrimp to the Gulf and Federal offshore fleets. A license limitation and buyback program was implemented with the goal of reducing inshore shrimping effort by 50%. The Shrimp License Management Program established limited-entry requirements for the Bay and Bait shrimp fisheries, established a voluntary buyback system, created definitions of flagrant offenses and license suspension and revocation penalties for violations, and limited vessel upgrade option to prevent increased effort under current licenses available. When the program began, there were over 3200 licenses in the Bay and Bait fisheries; as of 2015, there were less than 800 licenses, which exceeded the target reduction goal of the program. In 2005, a limited entry system was also implemented for Texas Gulf shrimp licenses in conjunction with the limited entry system established for federal waters by GMFMC.</p>	

8.4. Where excess capacity exists, mechanisms shall be established to reduce capacity to levels commensurate with sustainable use of the resource. Fleet capacity operating in the fishery shall be measured and monitored. The fishery management organization shall maintain, in accordance with recognized international standards and practices, statistical data, updated at regular intervals, on all fishing operations and a record of all authorizations to fish allowed by them.

In addition to licensing requirements, the management measures in place within all 6 jurisdictions (see evidence in supporting clause 8.1) act collectively to control fishing mortality overall to ensure sufficient escapement of adults to offshore spawning areas. These measures ensure that the US Gulf of Mexico shrimp fishery does not reduce SSB to the point that recruitment might be impaired and, also allow for efficient harvesting of whatever recruitment that becomes available for each species.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fleet capacity operating in the fishery is monitored and measured, and statistical data on all fishing operations allowed is updated and maintained. Where excess capacity exists, mechanisms are established to reduce capacity to levels commensurate with sustainable use of the resource. Examples may include fleet reports or other documents or reports.



EVIDENCE:
 See evidence provided in supporting clause 8.1.

References:			
Numerical score:	Starting score	- (	Number of EPs <u>NOT</u> met
	10	)	0
		x 3)
		=	Overall score
			10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Full Conformance
Non-conformance Number (if applicable):			NA

9.4.1.7 Supporting Clause 8.4.1.

8.4.1. Studies shall be promoted that provide an understanding of the costs, benefits, and effects of alternative management options designed to rationalize fishing, especially options relating to excess fishing capacity and excessive levels of fishing effort.																			
Relevance:	Relevant.																		
Evaluation Parameters	Met?																		
Process: <i>There is a need and a process that allows, as appropriate, for studies to understand the costs, benefits, and effects of alternative management options designed to rationalize fishing.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: NOAA agencies conduct socio-economic research to evaluate the benefits and costs of alternative management actions for commercial fisheries. This would include an evaluation of the costs associated with excessive levels of fishing effort as well as the benefits of effort reduction.																			
Current status/Appropriateness/Effectiveness: <i>There is evidence for studies conducted on alternative management options designed to rationalize fishing.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: Various NOAA agencies conduct socio-economic research to evaluate the benefits and costs of alternative management actions for commercial fisheries and to assess the impacts of changes in fishery management plans. This includes a wide range of commercial fisheries economic analyses and related activities which assess the magnitude of fisheries management decisions, as well as the costs and benefits. This research provides the basis for prioritizing management needs and designing policies that sustainably maximize societal benefits from ocean and coastal resource which informs management decision making including those described in supporting clause 8.4 aimed at reducing effort in the overall GOM shrimp fishery.																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that studies are promoted that provide an understanding of the costs, benefits, and effects of alternative management options designed to rationalize fishing, especially options relating to excess fishing capacity and excessive levels of fishing effort. Examples may include various evaluation or reports on fishing rationalization.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: See evidence and links provided in supporting clauses 4.5, 8.1.1 and 8.4.																			
References:																			
Numerical score:	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Starting score</td> <td>–</td> <td>(</td> <td>Number of EPs NOT met</td> <td>x</td> <td>3</td> <td>)</td> <td>=</td> <td>Overall score</td> </tr> <tr> <td>10</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>10</td> </tr> </table>	Starting score	–	(Number of EPs NOT met	x	3)	=	Overall score	10			0					10
Starting score	–	(Number of EPs NOT met	x	3)	=	Overall score											
10			0					10											
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance																		
Non-conformance Number (if applicable):	NA																		

9.4.1.8 Supporting Clause 8.5.

8.5. Technical measures regarding the stock under consideration shall be taken into account, where appropriate, in relation to fish size, mesh size, gear, closed seasons or areas, areas reserved for particular (e.g., artisanal fisheries), and protection of juveniles or spawners.	
Relevance:	Relevant.
Evaluation Parameters	Met?
Process: <i>The management system has taken into account technical measures, where and as appropriate (i.e., some fisheries do not have the requirement for a minimum fish size), to the fishery and stock under assessment, in relation to fish size, mesh size, gear, closed seasons, closed areas, areas reserved for particular (e.g., artisanal) fisheries, and protection of juveniles or spawners.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The shrimp species under consideration produce annual crops. The resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species. The primary focus of the overarching harvest strategy is to avoid catching small shrimp and there are various measures aimed at eliminating small shrimp from the catch in place in each of the 6 jurisdictions.	
Current status/Appropriateness/Effectiveness: <i>Technical measures are related to sustainability objectives, ensuring sustainable exploitation of the target species, and minimizing the potential negative impacts of fishery activities on non-target species, ETP species, and the physical environment.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The GOM penaeid shrimp resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species. Within each fishing season, the primary focus of the overarching harvest strategy is to avoid catching small shrimp. This is meant to minimise waste associated with catching and discarding small shrimp and to allow small shrimp to grow to larger, marketable sizes. Management measures are in place that act collectively to limit the catch of small shrimp and control overall fishing mortality to ensure that the fishery does not impair recruitment by reducing reproductive potential and, also allow for efficient harvesting of whatever recruitment that becomes available. In addition to designated nursery areas that are closed to fishing, seasonal openings and closings are the primary mechanism for achieving this. These openings/closings are decided each year on the basis of comprehensive sampling regimes that determine when shrimp have grown to sizes that achieve prescribed counts per pound (see supporting clause 8.1 for details of these and other management measures for each jurisdiction). Management of bycatch of non-target species is achieved by widespread use of bycatch reduction and turtle exclusion devices (BRDs and TEDs) (see supporting clause 8.1.2). BRDs and TEDs are described in detail in supporting clauses 12.2 and 12.2.1.	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that technical measures regarding the stock under consideration are taken into account, where appropriate, in relation to fish size, mesh size, gear, closed seasons, closed areas, areas reserved for particular (e.g., artisanal) fisheries, and protection of juveniles or spawners. Examples may include fishery management plans, regulations or various other reports.</i>	<input checked="" type="checkbox"/>
EVIDENCE: See evidence and links provided in supporting clauses 8.1 and 8.1.2.	
References:	
Numerical score:	$\text{Starting score} - \left(\text{Number of EPs NOT met} \times 3 \right) = \text{Overall score}$
	$10 - \left(0 \times 3 \right) = 10$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level:	Full Conformance

8.5. Technical measures regarding the stock under consideration shall be taken into account, where appropriate, in relation to fish size, mesh size, gear, closed seasons or areas, areas reserved for particular (e.g., artisanal fisheries), and protection of juveniles or spawners.

(10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)

Non-conformance Number (if applicable):	NA
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9.4.1.9 Supporting Clause 8.5.1.

8.5.1		Appropriate measures shall be applied to minimize catch, waste, and discards of non-target species (both fish and non-fish species), and impacts on associated, dependent, or endangered species.	
Relevance:	Relevant.		
Evaluation Parameters			Met?
Process:	<p><i>There is a mechanism by which management measures are developed to minimize the catch, waste and discarding of non-target species and the impact of the fishery on associated, dependent, and ETP species. This system shall include the development of specific management objectives.</i></p>		<input checked="" type="checkbox"/>
EVIDENCE:	<p>The US GOM shrimp fishery is long established and has been actively managed since the early 1980s. Over the long history of the fishery, fishing gears have been modified to reduce the catch of small shrimp to the extent possible. The primary focus of ongoing gear modifications for many years has been related to bycatch reduction and turtle exclusion devices (BRDs and TEDs). Reduction of discards and bycatch has been a primary focus within each of the 6 jurisdictions involved in the management of the fishery.</p>		
Current status/Appropriateness/Effectiveness:	<p><i>There are measures in place to minimize catch, waste, and discards of nontarget species (both fish and non-fish species). These measures are considered effective at achieving the specific management objectives described in the process parameter. There are measures in place to minimize impacts on associated, dependent, or endangered species. These measures are considered effective at achieving the specific management objectives described in the process parameter.</i></p>		<input checked="" type="checkbox"/>
EVIDENCE:	<p>Management of bycatch of non-target species in the GOM shrimp fishery is achieved by widespread use of bycatch reduction and turtle exclusion devices (BRDs and TEDs). BRDs and TEDs are described in detail in supporting clauses 12.2 and 12.2.1. These measures are considered effective at achieving management objectives aimed at minimize the catch, waste and discarding of non-target species and the impact of the fishery on associated, dependent, and ETP species.</p>		
Evidence Basis:	<p><i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that appropriate measures are applied to minimize catch, waste and discards of non-target species (both fish and non-fish species), and impacts on associated, dependent, or endangered species. Examples may include various stock and ecosystems assessment reports.</i></p>		<input checked="" type="checkbox"/>
EVIDENCE:	<p>See evidence in supporting clauses 8.1.2, 12.2 and 12.2.1.</p>		
References:			
Numerical score:	Starting score 10	- (Number of EPs NOT met 0 x 3) =	Overall score 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Full Conformance
Non-conformance Number (if applicable):			NA

9.4.1.10 Supporting Clause 8.6.

8.6	Fishing gear shall be marked in accordance with the State’s legislation in order that the owner of the gear can be identified. Gear marking requirements shall take into account uniform and internationally recognizable gear marking systems.				
Relevance:	<p>Not relevant.</p> <p>Note: Most GOM shrimp fishing effort takes place over soft, muddy, flat bottoms where the species targeted occur and harvesters make a conscious effort to avoid rocky outcrops because those habitats can destroy the gear. This clause is not relevant because gear loss is so infrequent that marking is considered unnecessary.</p>				
Evaluation Parameters					
Process:	<i>There is regulation for gear marking.</i>		<input type="checkbox"/>		
EVIDENCE:					
Current status/Appropriateness/Effectiveness:			<input type="checkbox"/>		
<i>Fixed gear is marked according to national legislation, and lost fixed gear can be identified back to owner.</i>					
EVIDENCE:					
Evidence Basis:			<input type="checkbox"/>		
<i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fishing gear is marked in accordance with State’s legislation in order that the owner of the gear can be identified. Gear marking requirements take into account uniform and internationally recognizable gear marking systems. Examples may include various fleet reports and regulations.</i>					
EVIDENCE:					
References:					
Numerical score:	Starting score	- (Number of EPs NOT met	x 3) =	Overall score
	10				
Corresponding Confidence Rating:					Low/Medium/High
(10 = High; 4 or 7 = Medium; 1 = Low)					
Corresponding Conformance Level:					Critical NC/Major NC/Minor NC/Full Conformance
(10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					
Non-conformance Number (if applicable):					

9.4.1.11 Supporting Clause 8.7.

8.7. The fishery management organization and relevant groups from the fishing industry shall measure performance and encourage the development, implementation, and use of selective, environmentally safe, and cost-effective gear, technologies, and techniques that are sufficiently selective as to minimize catch, waste, discards of non-target species (both fish and non-fish species), and impacts on associated or dependent predators. The use of fishing gear and practices that lead to discarding the catch shall be discouraged, and the use of fishing gear and practices that increase survival rates of escaping fish shall be promoted. Inconsistent methods, practices, and gears shall be phased out accordingly.

Relevance: Relevant.

Evaluation Parameters	Met?
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<p>Process: <i>The management system and relevant groups from the fishing industry have encouraged the development of technologies and operational methods to reduce waste and discard of the target species. Relevant groups includes fishers, processors, distributors, and marketers. There are mechanisms in place by which the selectivity, environmental impact, and cost-effectiveness of gears included in the unit of certification are measured.</i></p>	<input checked="" type="checkbox"/>
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EVIDENCE:
 The US GOM shrimp fishery is long established and has been actively managed since the early 1980s. Over the long history of the fishery, fishing gears have been modified to reduce the catch of small shrimp to the extent possible. The management system and relevant groups from the fishing industry have encouraged the development of technologies and operational methods to reduce waste and discard of the target species .

<p>Current status/Appropriateness/Effectiveness: <i>Such technologies and operational methods have been implemented. The methods in use are effective in reducing waste and discards of the non-target species. There is evidence that the gears used in the fishery are appropriate, in terms of selectivity, environmental impact, and cost-effectiveness, as assessed by the responsible scientific authority of the fishery. Methods shall be considered successful if there is evidence that the fishery under assessment is not causing significant risk of overfishing to non-target species.</i></p>	<input checked="" type="checkbox"/>
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EVIDENCE:
 The primary focus of the overarching harvest strategy is to avoid catching small shrimp. Various measures in place aimed at eliminating small shrimp from the catch are described for each of the 6 jurisdictions in supporting clause 8.1. In addition to coastal nursery areas being protected and many other nearshore areas being closed to fishing, the main strategy in terms of avoiding small shrimp is delaying season openings until shrimp have grown to marketable size. Season openings/closings are based on determination of when shrimp have grown to sizes that achieve prescribed counts per pound. There are gear mesh size restrictions that also serve to reduce retention of small shrimp.

Typical mesh size in Federal waters is 1 7/8" stretch mesh. Each State sets its own minimum mesh size (though some states do not have minimum mesh sizes) typically ranging from 1.25-1.5". In Louisiana, skimmer and butterfly nets have the same 1.25" minimum mesh size as otter trawls. At the site visit RBF workshop in July, it was made very clear that, based on economic considerations, over recent years otter trawl fleets in particular have been voluntarily increasing mesh sizes, to as large as 2.5". The economic benefit of larger mesh size is twofold: first, it reduces catch of small shrimp which are much less valuable and time consuming to sort; second, larger mesh size improves water flow through the trawl thereby reducing fuel consumption during the fishing operation.

Once fishing starts, all shrimp caught are retained. Discussions with Federal and State fishery management representatives as well as with representatives of the different industry sectors during site visit meetings confirmed there is no discarding of shrimp in the fishery. Visits to two processing plants during site visits in July showed that all sizes are retained by harvesters and packaged by size category (count per pound) and sold accordingly.

The primary focus of ongoing gear modifications for many years has been related to bycatch reduction and turtle exclusion devices (BRDs and TEDs). Reduction of discards and bycatch has been a primary focus within each of the 6 jurisdictions involved in the management of the fishery and this has resulted in substantial reductions in bycatch in the shrimp fishery (see supporting clauses 12.2 and 12.2.1).

8.7. The fishery management organization and relevant groups from the fishing industry shall measure performance and encourage the development, implementation, and use of selective, environmentally safe, and cost-effective gear, technologies, and techniques that are sufficiently selective as to minimize catch, waste, discards of non-target species (both fish and non-fish species), and impacts on associated or dependent predators. The use of fishing gear and practices that lead to discarding the catch shall be discouraged, and the use of fishing gear and practices that increase survival rates of escaping fish shall be promoted. Inconsistent methods, practices, and gears shall be phased out accordingly.

Various NOAA agencies conduct a wide range of commercial fisheries economic analyses and related activities which allows assessments of the magnitude of fisheries management decisions, as well as the costs and benefits (see supporting clause 8.1.1). The fishing methods in use have been shown to be effective in reducing waste and discards of target and non-target species and not causing significant risk of overfishing to non-target species.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization and relevant groups from the fishing industry measure performance and encourage the development, implementation, and use of selective, environmentally safe, and cost effective gear, technologies and techniques, that are sufficiently selective as to minimize catch, waste, discards of non-target species (both fish and non-fish species), and impacts on associated or dependent species. Examples may include various reports, regulations, or other data.



EVIDENCE:
 See evidence and links provided in supporting clauses 8.1.1, 8.1.2, 8.5.1, 12.2 and 12.2.1.

References:	
Numerical score:	$\text{Starting score} - \left(\text{Number of EPs NOT met} \times 3 \right) = \text{Overall score}$ $10 - (0 \times 3) = 10$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	NA

9.4.1.12 Supporting Clause 8.8.

8.8. Technologies, materials, and operational methods or measures—including, to the extent practicable, the development and use of selective, environmentally safe, and cost effective fishing gear and techniques—shall be applied to minimize the loss of fishing gear, the ghost fishing effects of lost or abandoned fishing gear, pollution, and waste.																	
Relevance:	<p>Not relevant.</p> <p>Note: GOM shrimp fishing effort takes place over soft, muddy, flat bottoms where the species targeted occur. Locations with reefs (natural and artificial) and rocky outcrops have been mapped and are actively avoided by trawlers using GPS and sonar to avoid costs associated with damage to gear. Gear loss is so infrequent it is a non-issue in this fishery and therefore, this supporting clause is not relevant.</p>																
Evaluation Parameters	Met?																
<p>Process: <i>There has been development of technologies, materials, and operational methods that minimize the loss of fishing gear, the ghost fishing effects of lost or abandoned fishing gear, and a system to minimize pollution and waste.</i></p>	<input type="checkbox"/>																
EVIDENCE:																	
<p>Current status/Appropriateness/Effectiveness: <i>Technologies, materials, and operational methods that minimize the loss of fishing gear and ghost fishing by lost or abandoned gear are applied whenever appropriate. Also, these measures are effective in minimizing, to the extent practicable, pollution and waste.</i></p>	<input type="checkbox"/>																
EVIDENCE:																	
<p>Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that technologies, materials, and operational methods or measures—including, to the extent practicable, the development and use of selective, environmentally safe, and cost-effective fishing gear and techniques—are applied to minimize the loss of fishing gear, the ghost fishing effects of lost or abandoned fishing gear, pollution, and waste. Examples may include various regulations, data, and reports.</i></p>	<input type="checkbox"/>																
EVIDENCE:																	
References:																	
Numerical score:	<table border="0"> <tr> <td align="center">Starting score</td> <td align="center">-</td> <td align="center">(</td> <td align="center">Number of EPs <u>NOT</u> met</td> <td align="center">x 3</td> <td align="center">)</td> <td align="center">=</td> <td align="center">Overall score</td> </tr> <tr> <td align="center">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score	10							
Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score										
10																	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																
Non-conformance Number (if applicable):																	

9.4.1.13 Supporting Clause 8.9.

8.9. The intent of fishing selectivity and fishing impacts-related regulations shall not be circumvented by technical devices. Information on new developments and requirements shall be made available to all fishers.															
Relevance:	Relevant.														
Evaluation Parameters															
Process: <i>There is a system that makes available information on new developments and requirements to all fishers to avoid circumvention of fishing regulations.</i>	<input checked="" type="checkbox"/>														
EVIDENCE: The intent of fishing selectivity and fishing impacts related regulations are not circumvented by technical devices in the GOM shrimp fishery and information on new developments and requirements are made available to all fishers.															
Current status/Appropriateness/Effectiveness: <i>The adopted methods are successful and effective and fishing regulations are made known to the participants. Enforcement data are highlighting significant violations.</i>	<input checked="" type="checkbox"/>														
EVIDENCE: The US GOM shrimp fishery is long established and has been actively managed since the early 1980s. Over the long history of the fishery, fishing gears have been modified to reduce the catch of small shrimp to the extent possible. Measures in place aimed at eliminating small shrimp from the catch include gear mesh size restrictions which serve to reduce retention of small shrimp. Typically, mesh size restrictions range from 1.25 to 1.5" stretched mesh. At the site visit RBF workshop in July, it was made very clear that, based on economic considerations, over recent years otter trawl fleets in particular have been voluntarily increasing mesh sizes, to as large as 2.5". The economic benefit of larger mesh size is twofold: first, it reduces catch of small shrimp which are much less valuable and time consuming to sort; second, larger mesh size improves water flow through the trawl thereby reducing fuel consumption during the fishing operation. The primary focus of ongoing gear modifications for many years has been related to bycatch reduction and turtle exclusion devices (BRDs and TEDs). Reduction of discards and bycatch has been a primary focus within each of the 6 jurisdictions involved in the management of the fishery. In discussions with various industry representatives at the site visit meetings in July, it was clear that harvesters very much support measures to eliminate unwanted catch and there is no attempt to circumvent them by use of any technical devices.															
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the intent of fishing selectivity and fishing impacts-related regulations is not circumvented by technical devices. Information on new developments and requirements is made available to all fishers. Examples may include various data and reports.</i>	<input checked="" type="checkbox"/>														
EVIDENCE: See supporting clause 8.7.															
References:															
Numerical score:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs NOT met</td> <td style="text-align: center;">x 3</td> <td style="text-align: center;">) =</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td style="text-align: center;">0</td> <td></td> <td></td> <td style="text-align: center;">10</td> </tr> </table>	Starting score	-	(Number of EPs NOT met	x 3) =	Overall score	10			0			10
Starting score	-	(Number of EPs NOT met	x 3) =	Overall score									
10			0			10									
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High														
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance														
Non-conformance Number (if applicable):	NA														

9.4.1.14 Supporting Clause 8.10.

8.10		Assessment and scientific evaluation shall be carried out on the impacts of habitat disturbance on the fisheries and ecosystems prior to the commercial-scale introduction of new fishing gear, methods, and operations. Accordingly, the impacts of such introductions shall be monitored.	
Relevance:	<p>Not relevant.</p> <p>Note: New gear has not been introduced in the GOM shrimp fishery in the past three years.</p>		
Evaluation Parameters			Met?
Process: <i>New gear has been recently introduced on a commercial scale within the last 3 years, or there is a plan to introduce new gear in the foreseeable future.</i>			<input type="checkbox"/>
EVIDENCE:			
Current status/Appropriateness/Effectiveness: <i>An appropriate assessment of potential impacts has been carried out. There is evidence to suggest that the assessment is adequate to support habitat conservation and fishery management purposes. Additionally, there is a monitoring regime in place.</i>			<input type="checkbox"/>
EVIDENCE:			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that assessment and scientific evaluation is carried out on the implications of habitat disturbance impact on the fisheries and ecosystems prior to the commercial-scale introduction of new fishing gear, methods, and operations. Accordingly, the effects of such introductions are monitored. Examples may include various regulations, data, and reports.</i>			<input type="checkbox"/>
EVIDENCE:			
References:			
Numerical score:	Starting score 10	Number of EPs <u>NOT</u> met () x 3	Overall score =
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):			

9.4.1.15 Supporting Clause 8.11.

8.11. International cooperation shall be encouraged for research programs involving fishing gear selectivity, fishing methods and strategies, dissemination of the results of such research programs, and the transfer of technology.																			
Relevance:	Relevant.																		
Evaluation Parameters																			
Process: <i>There is a system of international information exchange to allow knowledge to be shared.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: There has been extensive international cooperation/collaboration with respect to research focused on all aspects of the management of penaeid shrimp stocks, including fishing gear selectivity, fishing methods and harvest strategies. The widespread distribution of these species as well as numerous fisheries targeting penaeid shrimps world-wide has ensured wide dissemination of results and transfer of technology from such research.																			
Current status/Appropriateness/Effectiveness: <i>There is evidence for international information exchange, such as meeting records or other information.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: Quite early in the long history of managing GOM penaeid shrimp stocks, there was a workshop focused on the scientific basis for their management involving 45 participants from 15 countries ³⁵⁸ . Cooperative efforts in Gulf of Mexico fishery research between the United States and Mexico have operated since the 1970s under a MEXUS-Gulf program. Working groups under this program have focused on shrimp, sea turtles, demersal fisheries, and fishing gear technology ³⁵⁹ . These workshops ensure widespread international information exchange.																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that international cooperation is encouraged for research programs involving fishing gear selectivity, fishing methods and strategies, dissemination of the results of such research programs, and the transfer of technology. Examples may include various data and reports.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: References provided.																			
References:																			
Numerical score:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs <u>NOT</u> met</td> <td style="text-align: center;">x</td> <td style="text-align: center;">3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td style="text-align: center;">0</td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">10</td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score	10			0					10
Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score											
10			0					10											
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance																		
Non-conformance Number (if applicable):	10																		

³⁵⁸ Rothschild, B.J. and Gulland, J.A. Conveners. 1982. Interim report of the workshop on the scientific basis for the management of penaeid shrimp. NOAA Technical Memorandum NMFS-SEFC-98.

³⁵⁹ Kumpf, H.E. and Jones, A.C. [Editors]. 1997. Proceedings of the XX Annual MEXUS-Gulf Symposium. NOAA Technical Memorandum NMFS-SEFSC-403, 29p.

9.4.1.16 Supporting Clause 8.12.

8.12		The fishery management organization and relevant institutions involved in the fishery shall collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies, and on the behavior of target and non-target species regarding such fishing gear—as an aid for management decisions and with a view to minimizing non-utilized catches.	
Relevance:	Relevant.		
Evaluation Parameters		Met?	
Process:	There is collaborative research into fishing gear selectivity, fishing methods, and strategies.		<input checked="" type="checkbox"/>
EVIDENCE: The US GOM shrimp fishery is long established and has been actively managed since the early 1980s. Over the long history of the fishery, fishing gears have been modified to reduce the catch of small shrimp to the extent possible. The management system and relevant groups from the fishing industry have encouraged the development of technologies and operational methods to reduce waste and discard of the target species. For many years, though, the primary focus of ongoing research related to gear selectivity has been related to bycatch reduction and turtle exclusion devices (BRDs and TEDs). Reduction of discards and bycatch has also been a primary focus within each of the 6 jurisdictions involved in the management of the fishery.			
Current status/Appropriateness/Effectiveness:		There is evidence of such research, and the results have been applied accordingly in fisheries management.	
EVIDENCE:		<input checked="" type="checkbox"/>	
The GOM penaeid shrimp resource is highly dynamic given ongoing rapid growth within the standing stock as well as new recruitment as smaller shrimp grow to commercial size during the fishing season and by continuous movement to offshore areas, with the timing of these factors, both annually and seasonally, varying spatially and from species to species. Within each fishing season, the primary focus of the overarching harvest strategy is to avoid catching small shrimp. This is meant to minimise waste associated with catching and discarding small shrimp and to allow small shrimp to grow to larger, marketable sizes. Management measures that act collectively to limit the catch of small shrimp, which include gear mesh size restrictions, have been in place for many years. Therefore, the primary focus of ongoing research related to gear selectivity has been related to bycatch reduction and turtle exclusion devices (BRDs and TEDs).			
Management of bycatch of non-target species in the GOM shrimp fishery is achieved by widespread use of bycatch reduction and turtle exclusion devices (BRDs and TEDs). BRDs and TEDs are described in detail in supporting clauses 12.2 and 12.2.1. These have been shown to be effective in reducing waste and discards of non-target species. At a site visit meeting in July with representatives of the NOAA Gear Monitoring Group, the assessment team was told that current research projects are focused on improving performance of TEDs and BRDs.			
Evidence Basis:		The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization and relevant institutions involved in the fishery collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies, and on the behavior of target and non-target species in relation to such fishing gear—as an aid for management decisions and with a view to minimizing non-utilized catches. Examples may include various data and reports.	
EVIDENCE:		<input checked="" type="checkbox"/>	
See evidence and links provided in supporting clauses 8.1.2, 8.5, 8.5.1, 12.2 and 12.2.1.			
References:			
Numerical score:	Starting score	- (	Number of EPs NOT met
	10	)	0
		x 3	
		=	Overall score
			10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Full Conformance

8.12 The fishery management organization and relevant institutions involved in the fishery shall collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies, and on the behavior of target and non-target species regarding such fishing gear—as an aid for management decisions and with a view to minimizing non-utilized catches.

Non-conformance Number (if applicable):	NA
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9.4.1.17 Supporting Clause 8.13.

8.13		Where appropriate, policies shall be developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures. The fishery management organization shall ensure that, when selecting the materials to be used in the creation of artificial reefs, as well as when selecting the geographical location of such artificial reefs, the provisions of relevant international conventions concerning the environment and the safety of navigation are observed.	
Relevance:	<p>Not relevant.</p> <p>Note: No form of enhancement is practiced by any of the jurisdictions involved in the management of the US GOM shrimp stocks. Therefore, this clause is not relevant.</p>		
Evaluation Parameters			Met?
Process: <i>There is a mechanism in place for identifying potential for increasing stock populations and enhancing fishing opportunities through the use of artificial structures. This mechanism ensures that where artificial structures are deemed appropriate, environmental protection, safety, and navigation are considered in their application.</i>			<input type="checkbox"/>
EVIDENCE:			
Current status/Appropriateness/Effectiveness: <i>This mechanism has been applied to the stocks under consideration, resulting in the conclusion to either use artificial structures, or that artificial structures are inappropriate. Care has been taken in the selection of materials to use in constructing artificial reefs, the selection of sites for their deployment, and to ensure that relevant conventions concerning the environment and the safety of navigation have been observed.</i>			<input type="checkbox"/>
EVIDENCE:			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that where appropriate, policies are developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures. The fishery management organization shall also ensure that, when selecting the materials to be used in the creation of artificial reefs, as well as when selecting the geographical location of such artificial reefs, the provisions of relevant international conventions concerning the environment and the safety of navigation are observed. Examples may include various laws, data and reports.</i>			<input type="checkbox"/>
EVIDENCE:			
References:			
Numerical score:	Starting score 10	- (Number of EPs <u>NOT</u> met x 3) =	Overall score
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):			

9.4.2 Fundamental Clause 9. Appropriate standards of fishers' competence

Fishing operations shall be carried out by fishers with appropriate standards of competence in accordance with international standards, guidelines, and regulations.

9.4.2.1 Supporting Clause 9.1.

9.1.	States shall advance, through education and training programs, the education and skills of fishers and, where appropriate, their professional qualifications. Such programs shall take into account agreed international standards and guidelines.	
Relevance:	Relevant	
Evaluation Parameters		Met?
Process:		
<i>There are implemented education programs for fishers (e.g., health and safety, fisheries management framework, rule and regulation, etc.).</i>	<input checked="" type="checkbox"/>	
EVIDENCE:	There are several programs and resources available through each management resource agency, the Gulf Sea Grant Programs and others that provide training and educational materials for fishermen	
Current status/Appropriateness/Effectiveness:		
<i>These programs are effective in training fishers, in line with international standards and guidelines.</i>	<input checked="" type="checkbox"/>	
EVIDENCE:	<p>In Texas- TPWD does provide clear materials available to fishermen and the general public on all commercial fishing rules and regulations through the TPWD website, TPWD Outdoor annual mobile app, and a published Commercial Fishing regulations guide- <u>2023-24 Texas Commercial Fishing Regulations Summary</u> ³⁶⁰published annually. The Texas Sea Grant program offers informal training to the Gulf shrimp fleet through dockside engagement and vessel inspections annually prior to the Texas Season opening³⁶¹. During dockside engagement activities, Texas Sea Grant Fisheries Specialists and agents work with shrimp crews to evaluate Turtle Excluder Devices (TEDs) and Bycatch Reduction Devices (BRDs) to ensure compliance with regulations, to train crew on how to regularly check these devices to maintain compliance, and work with crews on additional aspects of improving efficiency of gear (<u>modified trawl doors</u>, <u>improved webbing</u>, <u>brine tank use</u>, quality control and handling of shrimp, and additional BRDs or placement changes to further improve bycatch reduction and shrimp retention above and beyond regulatory capacity). Dockside outreach occurs both in collaboration with NOAA's Gear Monitoring Team and by Sea Grant separately to cover as many vessels annually as possible (Texas offshore fleet is over 450 vessels). During dockside visits Sea Grant distributes BRD and TED materials- <u>installation guides</u>, angle meters, etc. to shrimpers Texas Sea Grant also works with partners annually to provide safety trainings available to shrimpers in each port including <u>Drill Conductor courses</u>³⁶² in partnership with AMSEA- this is a required training for vessel captains, however, Sea Grant financial support and assistance with recruitment and training allowed not just captains, but also crew members to take this training (in 2023 during 3 trainings- Galveston, Palacios and Port Arthur, over 120 shrimpers received safety training, in 2022- over 110 shrimpers in Port Arthur were trained). Sea Grant (Texas and Louisiana) also partnered with University of Texas Southwest Agricultural Center to provide Man Overboard trainings to the shrimp fleet- <u>Full article: Improving Crew Overboard Recovery for Commercial Fishing in the Gulf of Mexico (tandfonline.com)</u>³⁶³. Texas Sea Grant also partners with shrimp associations (Texas Shrimp Association, Port Arthur Area Shrimpers Association and Southern Shrimp Alliance) to host meetings annually and provide updates on regulatory changes and other information relevant to the industry. Texas Sea Grant also coordinates and assists with First Aid and CPR training for fishermen annually.</p> <p>In Louisiana- LDWF also provides clear materials available to fishermen and the general public on all commercial fishing rules and regulations through the LDWF website, and a published Commercial Fishing regulations guide-<u>2023-Commercial-Fishing.pdf (louisiana.gov)</u>³⁶⁴. LDWF partners with Louisiana Sea Grant on the LA Fisheries Forward Program to provide education and training to the seafood industry- <u>LA Fisheries Forward - Advancing Our Seafood Industry</u>³⁶⁵ LA Fishing Forward provides extensive education</p>	

³⁶⁰ https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_v3400_0074.pdf

³⁶¹ <https://texasseagrant.org/programs/turtle-excluder-device-training/>

³⁶² <https://drive.google.com/file/d/1nNgbeibxt7Rda4UDwXc6Rm7vBRm1TJ3g/view>

³⁶³ <https://www.tandfonline.com/doi/full/10.1080/1059924X.2023.2226135>

³⁶⁴ <https://www.wlf.louisiana.gov/assets/Resources/Publications/Regulations/2023-Commercial-Fishing.pdf>

³⁶⁵ <https://www.lafisheriesforward.org/shrimp-2/>

9.1. States shall advance, through education and training programs, the education and skills of fishers and, where appropriate, their professional qualifications. Such programs shall take into account agreed international standards and guidelines.

and training materials to shrimpers through the website, regularly scheduled trainings and workshops by LA Sea Grant agents, and a Fisheries Summit held every other year.

NOAA's Gear Monitoring Team provides annual dockside outreach to shrimpers throughout the Gulf (in all 5 states) conducting courtesy dockside inspections of TEDs and BRDs to ensure shrimp crews know proper installation and use of these devices³⁶⁶.

The Gulf of Mexico Fisheries Management Council provides federal regulations in clear outreach materials through the Council's website and the Fish Rules mobile app which has a commercial regulations version³⁶⁷.

USCG vessel safety officers, in addition to conducting vessel safety inspections for commercial vessels, regularly provide education and materials to shrimpers to improve safety at sea.

MS, AL and FL -

Sea Grant programs in these states also provide resources to fishermen, though not as targeted towards shrimpers as TX and LA. Texas and LA Sea Grant, through the Better BRD project, are conducting outreach in all 5 states³⁶⁸.

Resource agencies in each state maintain websites and outreach materials to ensure that shrimpers are aware of regulations and key information needed for commercial fishing operations.

The Marine Resource Education Program (MREP) is also a training program for fishermen, and has a Southern Fisheries division that provide opportunities for training for commercial fishermen³⁶⁹.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States enhance, through education and training programs, the education and skills of fishers and, where appropriate, their professional qualifications. Such programs take into account agreed international standards and guidelines. Examples may include various data, websites.



EVIDENCE:

The availability and quality of the evidence is sufficient to substantiate that training and education provides skills to improve US GOM fishers' professional qualifications. Please see supported evidence in the links

References:

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									NA

³⁶⁶ <https://www.lafisheriesforward.org/noaa-gear-monitoring-team-spring-2023-ted-outreach-courtesy-inspection-schedule/>

³⁶⁷ <https://gulfcouncil.org/>

³⁶⁸ <https://www.laseagrant.org/outreach/projects/better-brds/>

³⁶⁹ <https://mrep.gmri.org/>

9.4.2.2 Supporting Clause 9.2.

9.2. States, with the assistance of relevant international organizations, shall endeavor to ensure, through education and training, that all those engaged in fishing operations be given information on the most important provisions of the FAO CCRF (1995), as well as provisions of relevant international conventions and applicable environmental and other standards that are essential to ensure responsible fishing operations.	
Relevance:	Relevant
Evaluation Parameters	Met?
Process: <i>There are relevant measures of the FAO CCFR and other applicable environmental and other standards being exposed to fishers for their training.</i>	<input checked="" type="checkbox"/>
EVIDENCE: All UoAs Education and training for Gulf shrimp fishermen includes US State and federal commercial fisheries regulations, which are in line with (and largely based on) the FAO Code of Conduct for Responsible Fisheries.	
Current status/Appropriateness/Effectiveness: <i>These programs are effective in training fishers, in line with international standards, guidelines, and key CCRF principles. The presence of general training programs for fishermen (e.g., health and safety, fisheries management framework, rule and regulation, etc.) shall be evidence that the key principles of the CCRF have been filtered down from management to fishermen. Furthermore, the existence of laws and regulation with which fishermen are compliant demonstrate further compliance to this clause.</i>	<input checked="" type="checkbox"/>
EVIDENCE: All UoAs All rules and regulations governing Gulf Shrimp fisheries, including those dealing with responsible fishing methods, are readily available on NMFS ³⁷⁰ and GMFMC websites ³⁷¹ . In addition, federal and state enforcement agencies and the USCG maintain close communication with the fishing industry through written materials, online notices, and in-person contacts. The general characterization of industry-enforcement relations in the Gulf shrimp fishery is collaborative and positive. From the federal enforcement perspective, the Gulf shrimp fishery continues to be a well-managed fishery with a highly regulated and observed fleet considered to be one of the most compliant with regulations. Communication between members of the industry and enforcement is enhanced by active enforcement coordination between federal and non-federal agencies. Joint Enforcement Agreements (JEA) ³⁷² authorizing state marine conservation law enforcement officers, who have an extensive on-the-ground presence, to interact with industry members in the enforcement of federal laws and regulation. In addition to daily personal interactions on the water, docks, and in processing facilities, enforcement contacts harvesters and industry personnel at organized events, including trade shows, and responded to email and telephone inquiries, providing current regulatory information and guidance to promote compliance and responsible fisheries.	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States, with the assistance of relevant international organizations, endeavor to ensure, through education and training, that all those engaged in fishing operations be given information on the most important provisions of the FAO CCRF, as well as provisions of relevant international conventions and applicable environmental and other standards that are essential to ensure responsible fishing operations. Examples may include various data, websites.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The quality and availability of evidence is sufficient to ensure that education and training for fishers on the intent of the FAO CCRF Please see supported evidence in the references	
References:	
Numerical score:	Starting score – Number of EPs <u>NOT</u> met x 3 = Overall score

³⁷⁰ <https://www.fisheries.noaa.gov/about/southeast-regional-office>

³⁷¹ <https://gulfcouncil.org/>

³⁷² https://gulfcouncil.org/council_meetings/CCC/ole_ccc_jea_budget_overview_final061915.pdf

9.2.	States, with the assistance of relevant international organizations, shall endeavor to ensure, through education and training, that all those engaged in fishing operations be given information on the most important provisions of the FAO CCRF (1995), as well as provisions of relevant international conventions and applicable environmental and other standards that are essential to ensure responsible fishing operations.		
	10	(0)	10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Full Conformance
Non-conformance Number (if applicable):			NA

9.4.2.3 Supporting Clause 9.3.

9.3. The fishery management organization shall, as appropriate, maintain records of fishers which shall, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their State's laws.																			
Relevance:	Relevant.																		
Evaluation Parameters																			
Process: <i>There is a system to collect and maintain fisher records.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: Each State and NOAA, federally, maintains databases for current permit holders eligible to fish in the state and/or federal waters in the Gulf. The US Coast Guard requires a USCG Captains License and Drill Conductor Training for Captains in the Gulf Shrimp Fleet																			
Current status/Appropriateness/Effectiveness: <i>These records are considered accurate and effective for management purposes.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: There is a comprehensive system in place to collect and maintain fishermen records. Data on fishers is held in a number of agencies ³⁷³ ³⁷⁴ ³⁷⁵ ³⁷⁶ ³⁷⁷ . Depending on the type of license, application processes require individuals to register information for qualification requirements. Every individual operating or assisting in the operation of any commercial fishing gear or fishing boat must have a commercial fishing license or crewmember license. Every member of the crew on a commercial fishing boat must be licensed. Licenses are required for any boat, vessel, or floating craft used in taking of food fish or shellfish for commercial purposes. Depending on where the vessel fishes, vessel licenses may be either state or federal. The USCG also maintains records and issues credentials on licenses for crewmembers, including engineers, captains, mates, deckhands, etc. The USCG provides information on federal requirements for commercial fishing vessels online. The records are considered accurate. They are a necessary component of routine fishery monitoring and for the effective functioning of the Gulf shrimp management.																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization maintains, as appropriate, records of fishers which, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their national laws. Examples may include various data or reports.</i>	<input checked="" type="checkbox"/>																		
EVIDENCE: The evidence is sufficient to substantiate that the fishery management organizations maintain complete records of fishers and their qualifications. Please see supported evidence in the links																			
References:																			
Numerical score:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs NOT met</td> <td style="text-align: center;">x</td> <td style="text-align: center;">3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td style="text-align: center;">0</td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">10</td> </tr> </table>	Starting score	-	(Number of EPs NOT met	x	3)	=	Overall score	10			0					10
Starting score	-	(Number of EPs NOT met	x	3)	=	Overall score											
10			0					10											
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High																		

³⁷³ <https://tpwd.texas.gov/fishboat/fish/>

³⁷⁴ <https://www.wlf.louisiana.gov/page/commercial-fishing-reptile-and-amphibian-collecting-licenses-and-permits>

³⁷⁵ <https://www.outdooralabama.com/license-information>

³⁷⁶ <https://myfwc.com/license/public-record/>

³⁷⁷ <https://www.mdwfp.com/>

9.3.	The fishery management organization shall, as appropriate, maintain records of fishers which shall, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their State's laws.
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	NA

9.4.3 Fundamental Clause 10. Effective legal and administrative framework

An effective legal and administrative framework shall be established, and compliance ensured, through effective mechanisms for monitoring, surveillance, control, and enforcement for all fishing activities within the jurisdiction.

9.4.3.1 Supporting Clause 10.1.

10.1.	Effective mechanisms shall be established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified.	
Relevance:	Relevant	
Evaluation Parameters		
Process:	There are clear mechanisms established for fisheries monitoring, surveillance, control, and enforcement.	<input checked="" type="checkbox"/>
EVIDENCE:		
<p>An effective and modern Monitoring, Control and Surveillance (MCS) system is a necessity for ensuring that license holders and the public comply with established statutes, regulations, and other directives; and that unauthorized individuals do not profit from a public resource. Sanctions and other penalties must be sufficient to deter recidivism and garner public respect of the judicial system at all levels; public support for, and confidence in, the law enforcement communities' ability to ensure rules are respected is equally important.</p> <p>Texas MCS Profile</p> <p>The Texas Parks and Wildlife Department's Law Enforcement Division (LED) provides a comprehensive statewide law enforcement program to protect Texas' wildlife, other natural resources, and the environment. The Division also provides safe boating and recreational water safety on public waters by ensuring compliance with applicable state laws and regulations. It employs approximately 500 wardens throughout the state and operates 28 field offices that sell licenses, register boats, and provide the public with local information across the state³⁷⁸.</p> <p>Texas Game Wardens are responsible for enforcement of the <i>Parks and Wildlife Code</i>, all TPWD regulations, the <i>Texas Penal Code</i>, regulations enacted by the Parks and Wildlife Commission, and selected statutes and regulations applicable to clean air and water, hazardous materials, and human health. Wardens fulfil these responsibilities through educating the public about various laws and regulations, preventing violations by conducting high visibility patrols, and apprehending and arresting violators. They have the same powers and privileges as any other state peace officers. They have the same authority as a sheriff, for instance, to arrest, serve criminal or civil process, and require aid in serving criminal or civil process, and may arrest without a warrant any person in this state for violating the law.³⁷⁹ In addition, they hold federal commissions issued by the US Department of the Interior and the US Department of Commerce for purposes of enforcing federal fisheries and wildlife laws in Texas.</p> <p>The LED first entered into a Joint Enforcement Agreement (JEA) with NMFS in July 2001. The JEA was created to enhance enforcement of shrimp, reef fish, and highly migratory species regulations in the Gulf of Mexico. The program increased law enforcement presence in the Gulf and provided additional equipment to Texas game wardens, allowing them to maintain a higher level of patrol in offshore waters. JEAs include a formal operations plan that transfers funds to state and US territorial law enforcement agencies to perform law enforcement services in support of federal regulations. Federal agents hold a Texas deputy game warden commission and Texas game wardens hold a federal law enforcement commission. The JEA authorizes specified Texas game wardens to enforce provisions of the <i>Endangered Species Act</i>, specifically related to endangered or threatened sea turtles and the use of Turtle Excluder Devices (TED) on shrimp boats operating within the waters of the Gulf of Mexico extending from the shoreline seaward for nine nautical miles.</p>		

³⁷⁸ <https://tpwd.texas.gov/about/administration-divisions/law-enforcement>

³⁷⁹ <https://tpwd.texas.gov/warden/regs>

10.1. Effective mechanisms shall be established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified.

The LED's mandate and activities are informed by 5 strategic goals, all of which are supported by a number of objectives.³⁸⁰ Only 2 of the 5 goals are considered to be germane to this assessment and are presented here. The other 3 goals include (i) enhancing the safety and outdoor experience of residents and visitors of Texas, (ii) providing for the safety and protection of residents and visitors of Texas, and (iii) promoting and maintaining a diverse, accountable, responsible, and skilled workforce.

Goal: Protect fish and wildlife species through effective enforcement and outreach.

- Ensure the sustainability of Texas' diverse ecosystems through effective law enforcement activities.
- Enhance overt and covert investigative capabilities to better address resource protection needs and trends.
- Ensure proactive and responsive enforcement, regulation, and education, with an emphasis on invasive and exotic species.
- Inform residents and visitors about conservation stewardship and encourage their active involvement in achieving conservation of fish and wildlife.
- Enhance wildlife forensic lab capabilities to address resource protection needs and trends.

Goal: Implement and enforce regulations in a manner to promote compliance while safeguarding the natural resources.

- Promote compliance with coastal fisheries regulations through proactive and responsive law enforcement patrols.
- Promote compliance with freshwater fisheries regulations through proactive and responsive law enforcement patrols.
- Promote compliance with wildlife regulations through proactive and responsive law enforcement patrols.
- Promote compliance with environmental regulations through proactive and responsive law enforcement patrols.

Louisiana MCS Profile

The Louisiana Department of Wildlife and Fisheries – Enforcement Division (ED) is the fish and game regulatory agency of Louisiana. It has jurisdiction anywhere in the state, and in state territorial waters. The agency enforces both state and federal laws dealing with hunting, fishing, and boating safety. Most of the Department's Wildlife Agents also carry Federal law enforcement commissions issued from the US Departments of the Interior and Commerce. These federal commissions allow these state officers to enforce federal migratory waterfowl laws and federal marine fisheries laws in state and federal waters off the coast of Louisiana.

The ED contains four specialized units with selected missions or purposes: the Special Operations Section; the Statewide Strike Force; the Maritime Special Response Team; and the Aviation Section. Agents in specialized units have developed specific skills, expertise and knowledge appropriate for their particular operational fields. Agents in specialized units operate in relatively broad geographic areas and may work alongside regional enforcement agents when appropriate.

Agents use a variety of vehicles during land patrols, primarily four-wheel drive trucks and all-terrain vehicles. The primary patrol vessels used during water patrols are outboard bay boats and 19-to-40-foot marine patrol vessels. LDWF-LED also deploys go-devils, airboats, surface river mudboats, bass boats and flatboats.

Mississippi MCS Profile

The Department's marine enforcement program is centered in the Office of Marine Patrol. The Office provides marine enforcement of federal and state laws and the ordinances of the Commission on Marine Resources for the protection, preservation and conservation of Mississippi's seafood, aquatic life and associated coastal wetlands habitats. Marine Patrol also carries out the enforcement of state and federal laws pertaining to boating safety and provides emergency assistance concerning the state's marine environment.³⁸¹ It operates and maintains 24-hour patrol of an area that encompasses over 1,000 square miles of marine waters, approximately 369 miles of shoreline, approximately 66,933 acres of marsh land and the land mass of Hancock, Harrison, and Jackson counties.

³⁸⁰ https://tpwd.texas.gov/publications/nonpwdpubs/media/tpwd_sunset_self_evaluation_report_2019.pdf

³⁸¹ <https://dmr.ms.gov/marine-patrol/>

10.1. Effective mechanisms shall be established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified.

The Office of Marine Patrol contributes to the major goals identified in the Department’s Strategic Plan 2019-2023³⁸² through various outcomes and tasks. For example: (i) Enforce laws and regulations to ensure compliance with state laws and regulations related to native marine species populations (Strategy C.1.2); and (ii) Enforce the marine conservation laws of the State of Mississippi and CMR regulations (Strategy E.2.1). It is composed of three Divisions – (i) Patrol, (ii) Administrative, and (iii) Investigative. The Patrol Division provides the overt daily presence and uniformed inspections and emergency response on Mississippi marine waters. This division consists of four separate shifts, providing 24 hours of law enforcement on and off the water. The Criminal Investigations Division (CID) is responsible for investigating complex commercial fisheries violations, and boat accident investigations and reconstruction, requiring subject matter experts, and digital and cellular forensics analysis. CID officials serve as agency liaisons with local, state, and federal partners.

The MDMR maintains a cooperative enforcement agreement with the NOAA - OLE. As part of the agreement, Marine Patrol officers are granted federal inspection authority to stop, board, and inspect recreational and commercial fishing vessels outside Mississippi territorial waters.

Alabama MCS Profile

The state’s Enforcement Section is housed within the Marine Resources Division. It is responsible for enforcing state laws and regulations pertaining to Alabama’s marine resources and working cooperatively with other state agencies and federal fisheries enforcement agencies to protect federal fisheries resources in federal waters adjacent to Alabama. The section also works with the US Coast Guard, NOAA - OLE and the Alabama Law Enforcement Agency to accomplish their missions.

MRD officers participate in joint investigations with the NOAA - OLE regarding Gulf reef fish, marine mammals, sea turtle protection, and international unreported/undocumented seafood. Additionally, staff conducted joint patrols with uniformed NOAA Enforcement Officers. The Enforcement Section annually enters into Joint Enforcement Agreement (JEA) with NOAA - OLE. The JEA provides equipment and funding for officers to enforce federal laws and regulations. The most recent contract included funding for patrol vehicles, outboard engines, and vessel repairs. Additionally, it provided funding for underway and dockside patrols for federal priorities such as reef fish and turtle excluder devices, as well as training for patrol officers.

Florida MCS Profile

The Commission’s Law Enforcement Division’s mission is to “protect Florida’s natural resources and people through proactive and responsive law enforcement services.” Its’ vision is to be “recognized as the leading conservation law enforcement agency in the nation, set apart by strategic vision, clear missions, strong leadership, and a professional officer corps.”³⁸³

Statewide, enforcement personnel are responsible for uniformed patrol and investigative law enforcement services on more than 8,400 miles of coastline and 13,200 square miles of offshore waters.

The Division’s Offshore Patrol Vessel (OPV) fleet consists of 14 specialized boats that are strategically dispersed across the state’s coastline. Of the agency’s two Heavy Endurance vessels, the Gulf Sentry operates out of St. Petersburg while the CT Randall is at Marco Island. Heavy Endurance vessels conduct one to four-day patrols offshore in the Gulf of Mexico covering hundreds of miles. The crews perform resource and boating safety inspections on commercial fishing vessels as well as recreational vessels.

The OPV crews’ primary enforcement efforts consist of JEA patrols of EEZ waters and conducting commercial shrimp boat inspections to ensure compliance with TED regulations.

Florida’s Division of Law Enforcement has cooperative agreements with the NMFS and the USFWS. Officers are also cross-deputized to enforce federal marine fisheries and wildlife laws, thus ensuring state and federal consistency in resource protection efforts.

³⁸² <https://dmr.ms.gov/wp-content/uploads/2019/07/MDMR-Strategic-Plan-2019-2023.pdf>

³⁸³ <https://myfwc.com/law-enforcement/>

10.1. Effective mechanisms shall be established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified.

NOAA - OLE Profile

NOAA's Office of Law Enforcement protects marine wildlife and habitat by enforcing domestic laws and supporting international treaty requirements designed to ensure global resources are available for future generations. OLE special agents, enforcement officers, as well as investigative and mission support staff provide stakeholders with compliance assistance and education about the nation's marine resource laws.

OLE conducts enforcement activities through patrols both on and off the water as well as monitoring vessels electronically; criminal and civil investigations; partnerships with state, tribal, federal, and nongovernmental organizations; outreach and compliance assistance; and the use of innovative technological tools.

NOAA's Cooperative Enforcement Program (CEP) aims to increase living marine resource conservation, endangered species protection, and critical habitat enforcement while strengthening state and territorial enforcement resources. The program uses two main tools to accomplish its goals:

- CEAs, which authorize state and US territorial marine conservation law enforcement officers to enforce federal laws and regulations.
- JEAs, which include a formal operations plan that transfers funds to state and US territorial law enforcement agencies to perform law enforcement services in support of federal regulations.

The program partners with state and territorial marine and natural resource enforcement agencies to enhance its active presence, visibility, and interactions with the regulated industry. Partnerships with these enforcement agencies help promote compliance with federal laws and regulations under NOAA's purview, and the agency's law enforcement agents and officers leverage JEA partnerships to conduct joint operations.

Observer Programs

The authority to place observers on commercial fishing and processing vessels operating in particular fisheries is provided either by the MSA or the MMPA. These two acts require the government to collect data on activities that affect marine resources. Many of the program's core activities also satisfy requirements of the ESA.

In the Southeast Region, there are 5 NOAA observer programs under the Southeast Fisheries Science Center.³⁸⁴ NOAA Fishery observers collect catch and bycatch data from US commercial fishing and processing vessels, as well as from shore-side processing plants and receiving vessels. The data they collect are used to monitor federal fisheries, assess fish populations, set fishing quotas, inform management of those fisheries, and support compliance with fishing and safety regulations. The Southeast Fisheries Observer Program accumulated 3,461 sea days of 6 fisheries in 2018 with a total of 82 observers.³⁸⁵ Of this total, 1,814 sea days of observations were expended on the commercial shrimp fishery.

The Gulf of Mexico Reef Fish and Shrimp Fisheries Observer Program is one of the 5 observer programs.³⁸⁶ The program has existed since 1987 and was originally developed to provide an economic evaluation of TEDs in shrimp trawls. Onboard observers monitor shrimp trawl, and reef fish trap and longline vessels. The deployment of observers and related coverage to vessels participating in the commercial shrimp fishery in federal waters is determined by the fishery's level of interactions that result in incidental mortality or serious injury of marine mammals pursuant to the *Marine Mammal Protection Act*. The fishery was originally classified as a Category III in 1996 based on over 17,000 observer hours in the Gulf of Mexico. No injuries or mortalities of any marine mammal species were observed. The fishery was elevated to Category II in 2011 based on interactions reported through observer reports, stranding data, and fisheries research data, with multiple strategic marine mammal stocks (e.g., bottlenose and spotted dolphins).³⁸⁷

³⁸⁴ <https://www.fisheries.noaa.gov/southeast/fisheries-observers/fishery-observer-programs-southeast>

³⁸⁵ <https://spo.nmfs.noaa.gov/sites/default/files/TMSPO206.pdf>

³⁸⁶ <https://www.fisheries.noaa.gov/southeast/fisheries-observers/gulf-mexico-reef-fish-and-shrimp-observer-program>

³⁸⁷ <https://www.fisheries.noaa.gov/national/marine-mammal-protection/southeastern-us-atlantic-gulf-mexico-shrimp-trawl-fishery-mmpa#historical-information>

10.1. Effective mechanisms shall be established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified.

The primary objectives of the program are to provide quantitative biological, vessel, and gear-selectivity information for the southeastern shrimp fishery, including to (i) provide general fishery bycatch characterization and catch rates for finfish species by area and target species, and (ii) provide catch rates that can be used to estimate protected species bycatch levels.

The primary provider of at-sea fishery observers for the Southeast Region is A.I.S. Inc., a private sector firm that works closely with NOAA Fisheries to train, manage and deploy observers and at-sea monitors. Its Area and Field Coordinators supervise, support, and monitor the activities of the observers and monitors. NOAA Fisheries decide how many observer sea days are required by month, port, gear, and fisheries. Observer coverage of the entire southeastern federal shrimp otter trawl fishery is about 2.5 %.³⁸⁸

USCG - District 8 Profile

The 8th Coast Guard District, headquartered in New Orleans, covers all or part of 26 states throughout the Gulf Coast and Heartland of America. It stretches from the Appalachian Mountains and Chattahoochee River in the east, to the Rocky Mountains in the west, and from the Canadian border in North Dakota to the border between the US and Mexico, and the Gulf of Mexico.

The organization’s MCS program is highly structured with multi-tasked aerial assets that include the MH-65 Dolphin rotary wing and HC-144 fixed wing airframes, and various surface patrol vessels including the 29’ and 45’ ft. small and medium response boats, the 87’ ft. patrol boat, and the fast response cutter.

Fishery boardings emphasize quality over quantity, target vessels actively fishing as well as high precedence fisheries like shrimp, snappers, groupers and those in the Highly Migratory Species (HMS) category.

Current status/Appropriateness/Effectiveness:

These mechanisms are effective, and include effective observer programs, inspection schemes, and vessel monitoring systems where appropriate for the type of fishery under assessment. Monitoring, surveillance, control, and enforcement mechanisms can be considered effective if they are sufficiently broad to cover the entirety of the unit of certification, there is evidence that rules and regulations are consistently enforced, and there is no evidence of frequent or widespread violation of fishery regulations. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified. With respect to fisheries on the high seas, the legal obligations of UNCLOS and UNFSA have particular relevance. Evidence of the performance of the legal framework can be derived from assessing conformance with requirements covering compliance and enforcement. Specifically, the assessment team shall document the general level/type of fisheries controls (e.g., number of boarding’s, reprimands) and the respective level of fisheries violations (e.g., %) on a yearly basis.



EVIDENCE:

All federal and state agencies with operational mandates for enforcing the rules and regulations of the Gulf commercial shrimp fishery have effective MCS assets and procedures in place to ensure an acceptable level of compliance across the fleet sectors. The scope and level of fishery violations is detailed in clause 11.1 for each agency. The broad nature of the violation categories is indicative of the many regulations that agents enforce.

All Gulf state enforcement entities have had annual JEAs in place with NOAA-OLE for many years. The agreements augment the states operational budgets by funding incremental MCS activities in federal waters that otherwise would not be undertaken. Moreover, all Gulf agencies have dedicated outreach programs and external communications services that are effective in building and sustaining effective relations and interactions with the commercial shrimp sectors and other stakeholders.

³⁸⁸<https://www.fisheries.noaa.gov/southeast/fisheries-observers/gulf-mexico-reef-fish-and-shrimp-observer-program>

10.1. Effective mechanisms shall be established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified.

A federal at-sea observer program has been in place for several years. Observers are trained in the scientific and technical aspects of their assigned tasks. While they do not have an enforcement responsibility per se, they are generally cognizant of the fishery's rules and regulations; therefore, should an apparent violation be observed, the matter would be brought to the attention of an enforcement agent upon the vessel's return to port.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that effective mechanisms are established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher or community approaches, provided their performance could be objectively verified. Examples may include rules and regulations, enforcement reports.



EVIDENCE:
 The availability, quality, and adequacy of the evidence is sufficient to substantiate that effective mechanisms are established for fisheries monitoring, surveillance, control, and enforcement measures to ensure compliance with the conservation and management measures for the Gulf of Mexico commercial shrimp fishery. Please see supported evidence in the references

- References:**
1. <https://tpwd.texas.gov/about/administration-divisions/law-enforcement>
 2. <https://tpwd.texas.gov/warden/regs>
 3. https://tpwd.texas.gov/publications/nonpwdpubs/media/tpwd_sunset_self_evaluation_report_2019.pdf
 4. <https://dmr.ms.gov/marine-patrol/>
 5. <https://dmr.ms.gov/wp-content/uploads/2019/07/MDMR-Strategic-Plan-2019-2023.pdf>
 6. <https://myfwc.com/law-enforcement/>
 7. <https://www.fisheries.noaa.gov/southeast/fisheries-observers/fishery-observer-programs-southeast>
 8. <https://spo.nmfs.noaa.gov/sites/default/files/TMSPO206.pdf>
 9. <https://www.fisheries.noaa.gov/southeast/fisheries-observers/gulf-mexico-reef-fish-and-shrimp-observer-program>
 10. <https://www.fisheries.noaa.gov/national/marine-mammal-protection/southeastern-us-atlantic-gulf-mexico-shrimp-trawl-fishery-mmpa#historical-information>
 11. <https://www.fisheries.noaa.gov/southeast/fisheries-observers/gulf-mexico-reef-fish-and-shrimp-observer-program>

Numerical score:	Starting score	-	Number of EPs <u>NOT</u> met	x	3	=	Overall score	
	All agencies - 10		All agencies - 0				All agencies - 10	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							All agencies - High	
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							All agencies - Full	
Non-conformance Number (if applicable):							NA	

9.4.3.2 Supporting Clause 10.2.

10.2. Fishing vessels shall not be allowed to operate on the stock under consideration in question without specific authorization.	
Relevance:	Relevant
Evaluation Parameters	
Process: <i>There is a mechanism or system established to maintain a record of fishing authorizations.</i>	<input checked="" type="checkbox"/>
EVIDENCE:	
<p>All Gulf jurisdictions have legislation and policies that require commercial shrimp harvesters to be licensed in order to participate in the fishery. For example:</p> <p>NOAA – NMFS</p> <p>NOAA Fisheries’ Southeast Region administers the commercial licensing program for vessels that participate in the GOM shrimp fishery in federally-managed waters. A web-based application – the Southeast Fisheries Permit System – is available for this purpose, as is a paper application. The system includes two portals: (i) a limited access for the GOM’s brown, white and pink shrimp species, and (ii) an open access for the GOM’s red royal shrimp species. Both permit types have logbook and reporting requirements.</p> <p>For both access types, the permit’s expiration date if the vessel owner is an individual is the last day of the permit holder’s birth month; for multiple owners, the expiration date is the birth date of the managing owner; if the vessel owner is a business, the expiration date is the last day of the month the company was formed; and, if the vessel is leased, the expiration date is the last day of the last full month of the lease term.</p> <p>The open access permit type also requires that licensees hold a valid GOM Shrimp Moratorium (SPGM) permit on the vessel. Permit renewals may be processed by either the online or paper applications; however, requests for a new permit can only be requested by the paper application process, and permits are non-transferable. A similar process exists for the limited access permit type with the exception that permit transfers are available but only through the paper application process.</p> <p>Further commercial licensing requirements are outlined in a document titled: <i>Commercial Fishing Regulations for Gulf of Mexico Federal Waters</i> under the authority of the Gulf of Mexico Fishery Management Council.³⁸⁹ These include:</p> <ul style="list-style-type: none"> ● Permit required for all vessels that intend to fish for shrimp in EEZ waters of the Gulf of Mexico. ● Permit moratorium in effect. ● Endorsement required for royal red shrimp. ● Shrimp trawlers must have a bycatch reduction device (BRD) and an approved turtle excluder device (TED) installed in each net that is rigged for fishing. ● State licensed shrimpers may transit from state waters through federal waters to return to state waters and port without a federal permit when gear is appropriately stowed. <p>Texas</p> <p>A moratorium on the sale of commercial licences has been in effect for the Texas bay and bait shrimp fishery since 1996, and the Gulf shrimp fishery since 2005. To retain eligibility in these fisheries, purchase of the previous year’s license is required. A license buyback provision is in place for the bay and bait shrimp boat commercial licenses, but not for Gulf shrimp boat licenses. The following license provisions apply for individuals and businesses who are engaged in the commercial shrimp fishery in state waters.</p> <ul style="list-style-type: none"> ● A General Commercial Fisherman’s Licence is not required for a person who holds a commercial shrimp boat captain’s license or the crew of a licensed commercial shrimp boat. ● A Commercial Shrimp Boat Captain’s License is required of any person who operates a commercial shrimp boat catching or attempting to catch shrimp and other aquatic products from the public waters of this state or unloading or attempting to unload in this state shrimp and other aquatic products taken from waters outside this state. 	

³⁸⁹ <http://gulfcouncil.org/wp-content/uploads/commercial-regulations.pdf>

10.2. Fishing vessels shall not be allowed to operate on the stock under consideration in question without specific authorization.

- A Bait-Shrimp Boat License is required for each boat that must be registered under federal or state laws and is used in the “inside” waters of the state for taking bait shrimp for pay, barter, sale, or exchange.
- A Bay-Shrimp Boat License is required for each boat that must be registered under federal or state laws and is used in the “inside” major bay waters of the state for taking shrimp for pay, barter, sale, or exchange.
- A Gulf - Shrimp Boat License is required for each boat that must be registered under federal or state laws and is used in the Gulf of Mexico or “outside” waters of the state for taking shrimp for pay, barter, sale or exchange or for boats unloading within the state such other products taken outside the state’s waters.
- A Commercial Gulf Shrimp Boat Offloading License is required for a vessel to unload shrimp or other aquatic products, taken incidental to lawful shrimping activities, caught, or taken from saltwater outside of the state without having been previously unloaded in another state or foreign country.
- A person who holds a commercial shrimp boat captain’s license or the crew of a licensed commercial shrimp boat is not required to obtain a commercial finfish fisherman’s license when catching finfish incidental to legal shrimp trawling operations.
- A Bait Dealer who catches, transports or sells his own catch of shrimp for bait is not required to hold an individual bait dealer’s license; however, all bait dealers who purchase aquatic products from anyone except other dealers, and all bait dealers who harvest aquatic products themselves are required to report these landings under the Trip Ticket Program.
- A Bait-Shrimp Dealer - Place of Business or Building License is required for any person who operates an established place of business engaged in selling shrimp for fish bait in non-coastal counties.
- A Wholesale Fish Dealer License is required for any person who operates a place of business for the purpose of selling, offering for sale, canning, preserving, processing, or handling for shipments or sale aquatic products to retail or wholesale fish dealers, hotels, restaurants, cafes, or consumers.
- A Retail Fish Dealer License is required for any person who operates a place of business and sells aquatic products to consumers.

Louisiana

The state requires that harvesters and vessels be registered annually when participating in the commercial shrimp fishery in state waters. Fees are also associated with gear types (trawl, butterfly net, skimmer net, cast net). Seafood wholesale and retail dealers are also required to be permitted annually. A Gulf Seafood Traversing and Offloading License is required when harvesting commercially in federal waters for travel through state waters with harvested catch and/or commercial gear.

Mississippi

The DMR oversees and administers the state’s licensing program for all fishing and onshore activities and categories. All commercial licenses expire on April 30th including Seafood Dealer and Seafood Processor Licences. All commercial boats, whether resident or non-resident, fishing for shrimp (with approved nets) within the territorial waters of the state of Mississippi are required to be licensed. A commercial fisherman must be in possession of a Fresh Product Permit in order to sell seafood to anyone other than a Dealer/Processor. The no-cost permit is associated with the fisherman’s harvest license.

Alabama

The state’s commercial licensing program is overseen and administered by the DMR³⁹⁰. Public information is limited. What the Assessment team has learned is that:

- The license is issued to the boat and cannot be transferred.
- Commercial shrimp boat decal should be displayed on the port side of the vessel.
- Non-residents pay a license fee equal to that paid by Alabama residents or boats to shrimp in their state but no less than double the amount paid by Alabama residents.
- Persons trawling for crabs for commercial purposes or selling crabs taken incidentally while shrimping must have a Commercial Crab License.
- Shrimp and bycatch can be sold only to an Alabama seafood dealer unless the shrimper possesses an Alabama Seafood Dealers License (must meet requirements for license).

³⁹⁰ <https://www.outdooralabama.com/sites/default/files/PDF%20documents/Shrimp%20Commercial%202023.pdf>

10.2. Fishing vessels shall not be allowed to operate on the stock under consideration in question without specific authorization.

Florida

The State’s commercial licensing regulations are detailed in Rule Chapter 68B-31 of the *Florida Administrative Code*. The FFWC oversees the administration of the state’s commercial licensing requirements for saltwater products. These are defined as any marine fish, shellfish, clam, invertebrate, sponge, jellyfish, coral, crustacean, lobster, crab, shrimp, snail, marine plant, echinoderm, sea star, brittle star or urchin, etc.; except non-living shells and salted, cured, canned or smoked seafood.

Harvesters are required to hold a Saltwater Products Licence (SPL) to commercially harvest and sell saltwater products and can only sell only to a licensed Florida wholesale dealer. An SPL may be issued in the name of an individual or a valid commercial vessel registration number issued in the name of the license applicant. Any vessel used to harvest commercial quantities of saltwater products must have a commercial vessel registration. This license is not transferable or refundable if the vessel is sold. Licenses are valid for a license year (July 1- June 30) and are not prorated.

There are specific residency requirements that must be met in order to qualify for a SPL commercial licence. For example, a Florida resident is a person who has continuously resided in the state of Florida for at least one year and can provide documentation of permanent residency status from the state’s Immigration and Naturalization Service.

Current status/Appropriateness/Effectiveness:
This mechanism is effective for maintaining updated records of fishing authorizations and ensuring fishing vessels operate with appropriate authorization.

EVIDENCE:
 Updated records of fishing authorizations in regard to harvesters and shore-based dealers/processors are maintained by all Gulf of Mexico federal and state fishery management agencies. Records are required to be maintained and managed in accordance with prevailing statutes. Ensuring that fishing vessels operate with appropriate authorization is verified by enforcement agents from all management agencies at sea and at dockside.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fishing vessels are not allowed to operate on the stock under consideration in question without specific authorization. Examples may include various data.

EVIDENCE:
 The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fishing vessels are not allowed to operate on the stock under consideration in question without specific authorization. Please see supported evidence in the references

- References:**
1. GMFMC Commercial Fishing Regulations (2019): <http://gulfcouncil.org/wp-content/uploads/commercial-regulations.pdf>
 2. Alabama Department of Conservation and Natural Resources - Commercial Shrimping Regulations 2023: <https://www.outdooralabama.com/sites/default/files/PDF%20documents/Shrimp%20Commercial%202023.pdf>
 3. Florida Administrative Code, 68B-31: <https://www.flrules.org/gateway/ChapterHome.asp?Chapter=68B-31>

Numerical score:	Starting score	-	(	Number of EPs NOT met	x 3	)	=	Overall score
	All agencies - 10			All agencies - 0				All agencies - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								All agencies - Full
Non-conformance Number (if applicable):								NA

9.4.3.3 Supporting Clause 10.3.

10.3. States involved in the fishery shall, in accordance with international law, and within the framework of fisheries management organizations or arrangements, cooperate to establish systems for monitoring, control, surveillance, and enforcement of applicable measures with respect to fishing operations and related activities in waters outside the States jurisdiction.																	
Relevance:	Not relevant Note. This clause is not relevant since the fishery does not operate outside the U.S. EEZ in the Gulf of Mexico.																
Evaluation Parameters																	
Process: <i>There is a mechanism or system established to conduct enforcement operations outside the State's jurisdiction.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Current status/Appropriateness/Effectiveness: <i>transboundary, shared, straddling, highly migratory or high seas, then the Standard need only be concerned with the effectiveness and suitability of the monitoring, surveillance, control, and enforcement activities at the States level for the fishery of which the unit of certification is a part. If the unit of certification is part of a States fleet fishing on a transboundary, shared, straddling, highly migratory or high seas stock, then it is still likely to be the effectiveness and suitability of the monitoring, surveillance, control, and enforcement activities at the States level that shall be assessed. If the unit of certification covers all the fishing on the stock under consideration, then the monitoring, surveillance, control, and enforcement of all of the States fleets is of concern and shall be assessed (to ensure full consideration of total fishing mortality on the stock under consideration).</i>	<input type="checkbox"/>																
EVIDENCE:																	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States involved in the fishery do, in accordance with international law, and within the framework of fisheries management organizations or arrangements, cooperate to establish systems for monitoring, control, surveillance, and enforcement of applicable measures with respect to fishing operations and related activities in waters outside their States jurisdiction. Examples may include enforcement reports.</i>	<input type="checkbox"/>																
EVIDENCE:																	
References:																	
Numerical score:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs <u>NOT</u> met</td> <td style="text-align: center;">x 3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score	10							
Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score										
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Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																
Non-conformance Number (if applicable):																	

9.4.3.4 Supporting Clause 10.3.1.

10.3.1. Fishery management organizations which are members of or participants in fisheries management organizations or arrangements, shall implement internationally agreed measures adopted in the framework of such organizations or arrangements and consistent with international law to deter the activities of vessels flying the flag of non-members or non-participants engaging in activities that undermine the effectiveness of conservation and management measures established by such organizations or arrangements. In that respect, port States shall also proceed, as necessary, to assist other States in achieving the objectives of the FAO CCRF (1995), and should make known to other States details of regulations and measures they have established for this purpose without discrimination for any vessel of any other State.																	
Relevance:	Not relevant Note: This clause is not relevant since the fishery does not occur outside the U.S. EEZ in the Gulf of Mexico.																
Evaluation Parameters	Met?																
Process: <i>There are regulations established against vessels flying the flag of non-member or non-participant States, which may engage in activities that undermine the effectiveness of conservation and management measures established by fisheries management organizations .</i>	<input type="checkbox"/>																
EVIDENCE:																	
Current status/Appropriateness/Effectiveness: <i>These measures are effective in deterring such practices.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organizations which are members of or participants in fisheries management organizations or arrangements implement internationally agreed measures adopted in the framework of such organizations or arrangements and consistent with international law to deter the activities of vessels flying the flag of non-members or non-participants engaging in activities which undermine the effectiveness of conservation and management measures established by such organizations or arrangements. In that respect, port States also proceed, as necessary, to achieve and to assist other States in achieving the objectives of the FAO CCRF, and make known to other States details of regulations and measures they have established for this purpose without discrimination for any vessel of any other State. Examples may include enforcement or other reports.</i>	<input type="checkbox"/>																
EVIDENCE:																	
References:																	
Numerical score:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs <u>NOT</u> met</td> <td style="text-align: center;">x 3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score	10							
Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score										
10																	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																
Non-conformance Number (if applicable):																	

9.4.3.5 Supporting Clause 10.4.

10.4. Flag States shall ensure that no fishing vessels are entitled to fly their flag, fish on the high seas or in waters under the jurisdiction of other States, unless such vessels have been issued with a Certificate of Registry and have been authorized to fish by the competent authorities. Such vessels shall carry on board the Certificate of Registry and their authorization to fish.							
Relevance:	<p>Not relevant</p> <p>Note: This clause is not relevant since no foreign vessels are licensed to operate in the U.S. EEZ of the Gulf of Mexico.</p>						
Evaluation Parameters	Met?						
Process: <i>There are foreign vessels fishing in State's EEZ. State's EEZ vessels do not fish in high seas or in another State's EEZ.</i>	<input type="checkbox"/>						
EVIDENCE:							
Current status/Appropriateness/Effectiveness: <i>These vessels have been issued with a Certificate of Registry and they are required to carry it on board.</i>	<input type="checkbox"/>						
EVIDENCE:							
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the flag State ensures that no fishing vessels are entitled to fly their flag, fish on the high seas or in waters under the jurisdiction of other States, unless such vessels have been issued with a Certificate of Registry and have been authorized to fish by the competent authorities. Such vessels shall carry on board the Certificate of Registry and their authorization to fish. Examples may include various laws, regulations, and other data or reports.</i>	<input type="checkbox"/>						
EVIDENCE:							
References:							
Numerical score:	<table border="1"> <thead> <tr> <th>Starting score</th> <th>Number of EPs <u>NOT</u> met</th> <th>Overall score</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>$(\quad \times 3)$</td> <td></td> </tr> </tbody> </table>	Starting score	Number of EPs <u>NOT</u> met	Overall score	10	$(\quad \times 3)$	
Starting score	Number of EPs <u>NOT</u> met	Overall score					
10	$(\quad \times 3)$						
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High						
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance						
Non-conformance Number (if applicable):							

9.4.3.6 Supporting Clause 10.4.1.

10.4.1. Fishing vessels authorized to fish on the high seas or in waters under the jurisdiction of a State other than the flag State shall be marked in accordance with uniform and internationally recognizable vessel marking systems such as the FAO Standard Specifications and Guidelines for Marking and Identification of Fishing Vessels.													
Relevance:	Not relevant Note: This clause is not relevant since no foreign vessels are licensed to operate in the U.S. EEZ of the Gulf of Mexico.												
Evaluation Parameters	Met?												
Process: <i>There are foreign vessels fishing in State's EEZ. State's EEZ vessels do not fish in high seas or in another State's EEZ.</i>	<input type="checkbox"/>												
EVIDENCE:													
Current status/Appropriateness/Effectiveness: <i>Foreign vessels authorized to fish in the State's EEZ or its vessels fishing in another State's EEZ have been marked accordingly to international guidelines.</i>	<input type="checkbox"/>												
EVIDENCE:													
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fishing vessels authorized to fish on the high seas or in waters under the jurisdiction of a State other than the flag State, are marked in accordance with uniform and internationally recognizable vessel marking systems such as the FAO Standard Specifications and Guidelines for Marking and Identification of Fishing Vessels. Examples may include various laws, regulations, and other data or reports.</i>	<input type="checkbox"/>												
EVIDENCE:													
References:													
Numerical score:	<table border="1"> <tr> <td>Starting score</td> <td>Number of EPs <u>NOT</u> met</td> <td>x</td> <td>3</td> <td>=</td> <td>Overall score</td> </tr> <tr> <td>10</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	Number of EPs <u>NOT</u> met	x	3	=	Overall score	10					
Starting score	Number of EPs <u>NOT</u> met	x	3	=	Overall score								
10													
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High												
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance												
Non-conformance Number (if applicable):													

9.4.4 Fundamental Clause 11. Framework for sanctions

There shall be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations.

9.4.4.1 Supporting Clause 11.1.

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.	
Relevance:	Relevant
Evaluation Parameters	
Process: <i>The system of States laws is of adequate severity to provide for effective sanctions.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The commercial fisheries of the Gulf of Mexico are among the most regulated in the US and they generate important revenues and employment for the economies of the five Gulf States. This clause includes information on the sanctions available to all five Gulf states for state-managed waters, and to the NOAA-OLE for federally-managed waters. As a practical matter, sanctions are not designed, sought nor applied to be of inadequate severity.	
NOAA-OLE Federal agents enforce more than 40 federal statutes within and beyond the US EEZ. The more common statutes of relevance to the Gulf of Mexico include: (i) the Magnusen-Stevens Act, (ii) the Endangered Species Act, (iii) the Marine Mammal Protection Act, (iv) the Coastal Zone Management Act, (v) the National Environmental Policy Act, (vi) the Lacey Act, (vii) the National Marine Sanctuaries Act, and (viii) the Shark Conservation Act.	
NOAA's Office of General Counsel, Enforcement Section revised its Penalty Policy in June 2019. The policy provides guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. ³⁹¹ The purpose of the Policy is to continue to ensure that: (i) civil administrative penalties and permit sanctions are assessed in accordance with the laws that NOAA enforces in a fair and consistent manner; (ii) penalties and permit sanctions are appropriate for the gravity of the violation; (iii) penalties and permit sanctions are sufficient to deter both individual violators and the regulated community as a whole from committing violations; (iv) economic incentives for noncompliance are eliminated; and (v) compliance is expeditiously achieved and maintained to protect natural resources.	
While the policy provides guidance to NOAA attorneys regarding the assessment of proposed penalties and permit sanctions, NOAA retains discretion to assess the full range of penalties authorized by statute in any particular case. Moreover, the Policy is not binding on administrative law judges who hear NOAA enforcement cases.	
Where Cooperative Enforcement Agreements are in place, federal, state, and territorial enforcement personnel may pursue one of several available options, depending on the nature and seriousness of the violation. These include:	
<ol style="list-style-type: none"> 1. Where a violation is minor or is merely technical, having little to no impact on marine resources, the officer or agent may provide compliance assistance, issue a "Fix-It Ticket," which provides the alleged violator with an opportunity to correct the violation within a certain amount of time and waives all penalties if the alleged violator takes appropriate curative action, or issue a Written Warning. 2. For certain violations, an OLE officer or agent may issue a Summary Settlement offer whereby an alleged violator receives a document explaining the alleged violation and the alleged violator may resolve the matter expeditiously by paying a reduced penalty. 3. Where an officer or agent determines that an alleged violation is significant, or where an alleged violator has one or more prior violations, or does not pay a proposed summary settlement amount, the officer or agent is required to refer the case to the NOAA General Counsel's Enforcement Section for further action. 	

³⁹¹ <https://www.gc.noaa.gov/documents/Penalty-Policy-CLEAN-June242019.pdf>

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.

For more significant violations, the NOAA attorney may recommend charges under NOAA’s civil administrative process (15 C.F.R. Part 904), through issuance of a Notice of Violation and Assessment of a penalty (NOVA), Notice of Permit Sanction (NOPS), Notice of Intent to Deny Permit (NIDP), or some combination thereof. Alternatively, the NOAA attorney may determine that there is a violation of a criminal provision that is sufficiently significant to warrant referral to a US Attorney’s Office for criminal prosecution.

Under this Policy, penalties and permit sanctions are based on two criteria: (1) a “base penalty” calculated by adding (a) an initial base penalty amount and permit sanction reflective of the gravity of the violation and the culpability of the violator and (b) adjustments to the initial base penalty and permit sanction upward or downward to reflect the particular circumstances of a specific violation; and (2) an additional amount added to the base penalty to recoup the proceeds of any unlawful activity and any additional economic benefit of noncompliance.

As of the date of this Penalty Policy, the current maximum statutory civil penalties under the *Magnuson-Stevens Act* (16 U.S.C § 1801 et seq.); the *National Marine Sanctuaries Act* (16 U.S.C § 1431 et seq.); the *Endangered Species Act* (16 U.S.C § 1531 et seq.); the *Marine Mammal Protection Act* (16 U.S.C § 1361 et seq.), the *Lacey Act* (16 U.S.C § 3371 et seq.) are as follows:

- Magnuson-Stevens Act - \$189,427 per violation.
- National Marine Sanctuaries Act - \$178,338 per violation.
- Endangered Species Act - \$52,596 per violation.
- Marine Mammal Protection Act - \$29,239 per violation.
- Lacey Act - \$27,075 per violation.

The US Department of Commerce adjusts the maximum civil monetary penalties authorized by statute for inflation, pursuant to the *Federal Civil Penalties Inflation Adjustment Act* of 1990 (Pub. L. 101-410), as amended by the *Debt Collection Improvement Act* of 1996 (Pub. L. 104-134), and the *Federal Civil Penalties Inflation Adjustment Act Improvements Act* of 2015 (Pub. L. 114-74).

USCG - District 8

In FY 21, the USCG reported a total of 60 violations across the district of which 85% were from the shrimp fishery, 10% from the reef fish fishery, and 5% from the HMS fisheries. Of the shrimp violations, 75% were associated with turtle mitigation gear, turtle excluder devices and bycatch reduction devices. In a subsequent report to the GMFMC, the Coast Guard added additional data that included 48 **commercial shrimp fishery** violations from 441 boardings (from 495 total commercial shrimp boardings). In an October 2021 report to the GMFMC, the Coast Guard also reported 274 total vessel safety violations including 179 commercial shrimp vessel violations.³⁹² The USCG typically refers its fishery violations to NOAA-OLE for review and prosecution as warranted.

Texas - Parks and Wildlife Department

The Department’s Law Enforcement Division (LED) provides a comprehensive statewide law enforcement program to protect Texas’ wildlife, other natural resources, and the environment. The Division also provides safe boating and recreational water safety on public waters by ensuring compliance with applicable state laws and regulations. It employs approximately 500 wardens throughout the state and operates 28 field offices that sell licenses, register boats, and provide the public with local information across the state.³⁹³

Texas Game Wardens are responsible for enforcement of the *Parks and Wildlife Code*, all TPWD regulations, the *Texas Penal Code*³⁹⁴, regulations enacted by the Parks and Wildlife Commission, and selected statutes and regulations applicable to clean air and water, hazardous materials, and human health. Wardens fulfil these responsibilities through educating the public about various laws and regulations, preventing violations by conducting high visibility patrols, and apprehending and arresting violators. They have the same powers and privileges as any other state peace officers. They have the same authority as a sheriff, for instance, to arrest, serve criminal or civil process, and require aid in serving criminal or civil process, and may arrest without a warrant any person in this state for violating the law.³⁹⁵ In addition, they hold federal commissions issued by the US Department of the Interior and the US Department of Commerce for purposes of enforcing federal fisheries and wildlife laws in Texas.

³⁹² <https://gulfcouncil.org/wp-content/uploads/R-5-GMFMC-CG-Presentation-Oct-2021.pdf>

³⁹³ <https://tpwd.texas.gov/about/administration-divisions/law-enforcement>

³⁹⁴ <https://txpenalcode.com/sec-1-02/>

³⁹⁵ <https://tpwd.texas.gov/warden/regs>

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.

The general purposes of the Penal Code are to establish a system of prohibitions, penalties, and correctional measures to deal with conduct that unjustifiably and inexcusably causes or threatens harm to those individual or public interests for which state protection is appropriate. To this end, the provisions of this code are intended, and shall be construed, to achieve the following objectives:

- to insure the public safety through (i) the deterrent influence of the penalties hereinafter provided; (ii) the rehabilitation of those convicted of violations of this code; and (iii) such punishment as may be necessary to prevent likely recurrence of criminal behavior.
- by definition and grading of offenses to give fair warning of what is prohibited and of the consequences of violation.
- to prescribe penalties that are proportionate to the seriousness of offenses and that permit recognition of differences in rehabilitation possibilities among individual offenders.
- to safeguard conduct that is without guilt from condemnation as criminal.
- to guide and limit the exercise of official discretion in law enforcement to prevent arbitrary or oppressive treatment of persons suspected, accused, or convicted of offenses.
- to define the scope of state interest in law enforcement against specific offenses and to systematize the exercise of state criminal jurisdiction.

Title 3, Chapter 12 of the *Code* includes a description of offences and associated punishment available to the Courts. The categorization includes:

- Subchapter A. General Provisions
 - Sec. 12.01. Punishment in accordance with Code
 - Sec. 12.02. Classification of Offences
 - Sec. 12.03. Classification of Misdemeanors
 - Sec. 12.04. Classification of Felonies
- Subchapter B. Ordinary Misdemeanor Punishments
 - Sec. 12.21. Class A Misdemeanor
 - Sec. 12.22. Class B Misdemeanor
 - Sec. 12.23. Class C Misdemeanor

Individuals who violate fish and wildlife laws, in addition to civil restitution may:

- be fined per Class C: \$25 - \$500; Class B: \$200 - \$2,000; Class A: \$500 - \$4,000; State Jail Felony: \$1,500 - \$10,000.
- be jailed (Class B and higher offenses).
- face automatic suspension or revocation of licenses for up to five years.
- forfeit hunting gear, including firearms, used to commit a violation.

When a Texas Game Warden encounters a violation of hunting and fishing regulations, a criminal complaint is filed in either a justice court or a county court. Fines for such violations are assessed by the presiding judge hearing the case, and commercial aquatic products harvested in violation of the law may be confiscated and sold.

In addition to assessed fines that may be associated with a criminal complaint, violators are also liable to civil restitution for the loss of or damage to wildlife resources that have resulted from the violation. Civil restitution is assessed following each violation and each violator will receive an invoice for this restitution from the department. Failure to pay the civil recovery value will result in the department's refusal to issue any license, tag or permit in the violator's name until restitution is made. An individual who hunts or fishes after such a refusal commits a Class A misdemeanor which is punishable by a fine not less than \$500 or more than \$4,000; punishment in jail not to exceed one year; or both fine and confinement.

A person who seeks reinstatement of license privileges following license revocation or denial must apply for license privilege reinstatement and pay a \$100 application fee.

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.**Louisiana - Department of Wildlife and Fisheries**

The state's *Revised Statutes* (Title 56) includes a matrix of penalty provisions for various violation types.³⁹⁶ For example:

- §31. Class one violation: (a) for the first offense, a fine of fifty dollars. The fine shall include all costs of court; (b) for the second offense, a fine of not less than seventy-five dollars nor more than two hundred fifty dollars; (c) for the third offense and all subsequent offenses, a fine of not less than two hundred dollars nor more than five hundred fifty dollars.
- §32. Class two (2-A) violation: (a) for the first offense, the fine shall be not less than one hundred dollars nor more than three hundred fifty dollars; (b) for the second offense, the fine shall be not less than three hundred dollars, nor more than five hundred fifty dollars; (c) for the third offense and all subsequent offenses, the fine shall be not less than five hundred dollars nor more than seven hundred fifty dollars, and forfeiture to the commission of anything seized in connection with the violation.
- §32. Class two (2-B) violation: (a) for the first offense, the fine shall be not less than two hundred fifty dollars nor more than five hundred dollars; (b) for the second offense, the fine shall be not less than five hundred dollars, nor more than eight hundred dollars, and forfeiture to the commission of anything seized in connection with the violation; (c) for the third offense and all subsequent offenses, the fine shall be not less than seven hundred fifty dollars, nor more than one thousand dollars, and forfeiture to the commission of anything seized in connection with the violation; (d) In addition to any other penalty, for a second or subsequent violation of the same provision of law, the penalty imposed may include revocation of the permit or license under which the violation occurred for the period for which it was issued and barring of the issuance of another permit or license for that same period.
- §33. Class three violation: (a) for the first offense, the fine shall be not less than two hundred fifty dollars nor more than five hundred dollars, or imprisonment for not more than ninety days, or both; (b) for the second offense, the fine shall be not less than five hundred dollars, nor more than eight hundred dollars, and imprisonment for not less than sixty days nor more than ninety days, and forfeiture to the commission of anything seized in connection with the violation; (c) for the third offense and all subsequent offenses, the fine shall be not less than seven hundred fifty dollars, nor more than one thousand dollars, and imprisonment for not less than ninety days nor more than one hundred twenty days, and forfeiture to the commission of anything seized in connection with the violation.

In addition to any other penalty, for a second or subsequent violation of the same provision of law the penalty imposed may include revocation of the permit or license under which the violation occurred for the period for which it was issued and barring the issuance of another permit or license for that same period.

- §34. Class four violation: (a) for the first offense, the fine shall be not less than four hundred dollars nor more than nine hundred fifty dollars or imprisonment for not more than one hundred twenty days, or both; (b) for the second offense, the fine shall be not less than seven hundred fifty dollars nor more than nine hundred ninety-nine dollars and imprisonment for not less than ninety days nor more than one hundred eighty days; (c) for the third offense and all subsequent offenses, the fine shall be not less than one thousand dollars, nor more than five thousand dollars, and imprisonment for not less than one hundred eighty days nor more than two years.

The above penalties in all cases shall include forfeiture to the commission of anything seized in connection with the violation.

- §35. Class five (5-A) violation: (a) for the first offense not less than five hundred dollars nor more than seven hundred fifty dollars and shall be sentenced to serve not less than fifteen nor more than thirty days in jail; (b) for the second offense not less than seven hundred fifty dollars nor more than one thousand dollars and not less than sixty nor more than ninety days in jail; (c) for the third and all subsequent offenses, the fine shall be not less than seven hundred fifty dollars nor more than one thousand dollars and shall serve not less than ninety nor more than one hundred twenty days in jail.
- §35. Class five (5-B) violation: (a) for the first offense shall be a fine of not less than three hundred and fifty dollars and not more than five hundred dollars and shall be imprisonment in jail for thirty days; (b) for the second offense the violator shall be fined not less than five hundred dollars and not more than one thousand dollars and shall be imprisoned in jail for sixty days; (c) for the third and all subsequent offenses, the violator shall be fined not less than one thousand dollars and not more than two thousand dollars and shall be imprisoned in jail for ninety days.

³⁹⁶ <https://law.justia.com/codes/louisiana/2014/code-revisedstatutes/title-56>

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.

In addition to the above fines and jail sentences and for both 5-A and 5-B of class five violations, the license under which the violation occurred shall be revoked and shall not be reinstated at any time during the period for which it was issued and for one year thereafter. The above penalties in all cases shall include forfeiture to the department of anything seized in connection with the violation.

- §36. Class six violation: for each offense, the fine shall be not less than nine hundred dollars nor more than nine hundred fifty dollars, or imprisonment for not more than one hundred twenty days, or both, and shall include the forfeiture to the commission of anything seized in connection with the violation.
- §37. Class seven (7-A) violation: (a) for each offense, the fine shall be not less than five thousand dollars nor more than seven thousand five hundred dollars or imprisonment for one year, or both.
- §37. Class seven (7-B) violation: (a) for each offense, the fine shall be not less than five thousand dollars nor more than seven thousand five hundred dollars and imprisonment for one year.

The penalties provided for in this Section shall include the forfeiture to the commission of anything seized in connection with the violation.

- §37.1. Class eight violation: (a) for each offense, the fine shall not be less than five thousand dollars nor more than seven thousand dollars and the violator may be imprisoned in jail for not less than sixty days nor more than six months.

Mississippi - Department of Marine Resources

The state’s penalty provisions are stipulated in Title 22, Chapter 21 of the *Mississippi Code*.³⁹⁷ For example,

- Any violation of the rules and regulations of the CMR or violations of Mississippi Code Sections 49-15-1 through 49-15-321, 49-27-1 through 49-27-71, 59-21-111, or other statutes within the jurisdiction of the CMR may result in the imposition of administrative penalties not to exceed Ten Thousand Dollars (\$10,000.00) for each violation (Section 100).
- Violations of rules and regulations of the CMR may also constitute a misdemeanor punishable by fine and or imprisonment in the county jail as provided for in Mississippi Code Section 49-15-63 (1) (a) (Section 101).
- Forfeiture of nets, equipment and paraphernalia used in committing a violation may be commenced in addition to seeking administrative penalties (Section 103).
- The Commission may suspend or revoke regulatory program requirements established by the Commission, such as but not limited to endorsements, tags, permits. or similar provisions for violations related to that particular program (Section 105) in accordance with the following schedule:
 - for 1st offenses, a suspension for up to 3 months
 - for 2nd offenses. a suspension for up to 6 months
 - for 3rd offenses. a suspension of up to 1 year
 - for 4th and subsequent offenses, a suspension for up to 2 years or revocation.

Suspension shall be scheduled for a time period coinciding with the particular fishing season in which the offense is related. If the violation is deemed to be so egregious to warrant a suspension outside of the penalty matrix, the Commission, by unanimous vote, may impose a suspension outside of the above matrix by skipping to the next level (Section 105).

Alabama - Department of Conservation and Natural Resources

The *Alabama Code*’s penalty provisions are described in Title 13 A (Criminal Code), Chapter 5 (Punishments and Sentences), Article 1 (General Provisions).³⁹⁸ They include:

- § 13A-5-3: (a) Offenses are designated as felonies, misdemeanors or violations; (b) Felonies are classified according to the relative seriousness of the offense into four categories (i.e., Class A, Class B, Class C, and Class D); (c) Misdemeanors are classified according to the relative seriousness of the offense into three categories (i.e., Class A, Class B, and Class C; (d) Violations are not classified
- § 13A-5-6: Sentences of Imprisonment for Felonies.
- § 13A-5-7: Sentences of Imprisonment for Misdemeanors and Violations.
- §13A-5-11: Fines for Felonies. (a) for a Class A felony, not more than \$60,000; (b) for a Class B felony, not more than \$30,000; (c) for a Class C felony, not more than \$15,000; (d) for a Class D felony, not more than \$7,500. or (e) any amount not exceeding double the pecuniary gain to the defendant or loss to the victim caused by the commission of the offense.

³⁹⁷ <https://www.law.cornell.edu/regulations/mississippi/title-22/part-20/chapter-21>

³⁹⁸ <http://alisondb.legislature.state.al.us/alison/codeofalabama/1975/coatoc.htm>

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.

- §13A-5-12: Fines for Misdemeanors and Violations. (a) for a Class A misdemeanor, not more than \$6,000; (b) for a Class B misdemeanor, not more than \$3,000; (c) for a Class C misdemeanor, not more than \$500. or (d) any amount not exceeding double the pecuniary gain to the defendant or loss to the victim caused by the commission of the offense.

Florida - Fish and Wildlife Commission

The Commission's Law Enforcement Division's mission is to "protect Florida's natural resources and people through proactive and responsive law enforcement services." Its' vision is to be "recognized as the leading conservation law enforcement agency in the nation, set apart by strategic vision, clear missions, strong leadership, and a professional officer corps."³⁹⁹

Title XXVIII, Chapter 379, Part VIII (ss. 379.401 to 379.504) of the *Florida Statutes*⁴⁰⁰ lists the civil penalties to be applied by the courts for non-criminal violations, criminal penalties, and suspension and forfeiture of licenses and permits. The information presented here is but a very small reflection of the content of the statute.

Violators of the provisions of the Chapter including rules adopted by the FFWC Commission are punishable:

- (a) Upon a first conviction, by imprisonment for a period of not more than 60 days or by a fine of not less than \$100 nor more than \$500, or by both such fine and imprisonment.
- (b) On a second or subsequent conviction within 12 months, by imprisonment for not more than 6 months or by a fine of not less than \$250 nor more than \$1,000, or by both such fine and imprisonment.

Major violations are also referenced in Part VIII. For example, a commercial shrimp harvester who is convicted of taking or harvesting shrimp from a nursery or other prohibited area, or any two violations within a 12-month period involving shrimping gear, minimum size (count), or season, an additional penalty of \$10 for each pound of illegal shrimp or part thereof is imposed.

The FFWC Commission has the legal authority to suspend and revoke a commercial harvester's licence it issues for a major violation under the following:

- Upon a first conviction, for up to 30 calendar days.
- Upon a second conviction which occurs within 12 months after a prior violation, for up to 90 calendar days.
- Upon a third conviction which occurs within 24 months after a prior conviction, for up to 180 calendar days.
- Upon a fourth conviction which occurs within 36 months after a prior conviction, for a period of 6 months to 3 years.

For a violation involving the taking or harvesting of any marine life species, as defined by rule of the commission, the harvest of which is prohibited, or the taking or harvesting of such a species out of season, or with an illegal gear or chemical, or any violation involving the possession of 25 or more individual specimens of marine life species, or any combination of violations in any 3-year period involving more than 70 such specimens in the aggregate, the suspension or revocation of the license holder's marine life endorsement is as provided in the previous paragraph.

The commission may institute a civil action in a court of competent jurisdiction to impose and to recover a civil penalty for each violation in an amount of not more than \$10,000 per offense. However, the court may receive evidence in mitigation. Each day during any portion of which such violation occurs constitutes a separate offense.

The commission may institute an administrative proceeding to establish liability and to recover damages for any injury to the waters or property of the state, including animal, plant, or aquatic life, caused by certain violations. The commission may order that the violator pay a specified sum as damages to the state. Judgment for the amount of damages determined by the commission may be entered in any court having jurisdiction thereof and may be enforced as any other judgment.

It is the intent of the Legislature that the civil penalties and criminal fines imposed by a court be of such an amount as to ensure immediate and continued compliance with this section.

³⁹⁹ <https://myfwc.com/law-enforcement/>

⁴⁰⁰ <https://law.justia.com/codes/florida/2022/title-xxviii/chapter-379/part-viii/>

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.
Current status/Appropriateness/Effectiveness:

There is evidence to substantiate that States laws are of adequate severity to provide for effective sanctions. The evidence here includes largely (a) whether laws set out effective penalty provisions and the courts respond in a manner that deters further or repeat offenses, (b) the views of the industry, other stakeholders, and the general public, and (c) the outcomes and associated trends of the enforcement efforts when measured against appropriate performance indicators.


EVIDENCE:
NOAA-OLE

The regulations governing NOAA's administrative proceedings for the assessment of civil penalties; suspension, revocation, modification, or denial of permits; issuance and use of written warnings; and release or forfeiture of seized property can be found at 15 CFR Part 904. The regulations were most recently amended in 2006 and 2010.⁴⁰¹

Detailed information in respect of the current *Summary Settlement and Fit-it Schedule* for NOAA's Southeast Region is available at: <https://www.gc.noaa.gov/gces/2019/SE-SSS-Final-6-27-19.pdf>. The document specifies the level of monetary penalties to be levied within each of NOAA's regions for various types of offences and whether the violator is a first time or a multiple time offender. NOAA's Office of General Council also publishes a US list of *Enforcement Orders and Decisions* for the period beginning from 2010 to the present of the legal decisions issued by Administrative Law Judges and the Courts. The list is available at: <https://www.gc.noaa.gov/enforce-office6.html#ao>.

The Assessment team reviewed a significant number of quarterly enforcement reports from the NOAA - OLE's Southeast Division between January 2020 and December 2022 that were tabled at various meetings of the GMFMC. Examples for three particular quarters are included here:

Quarterly Report: January 1 - March 31, 2020

There were 37 documented patrols, 33 documented instances of outreach (not an exhaustive list; includes phone calls with industry, dock visits, trade shows, presentations, etc.), and 8 meetings. During the quarter, NOAA-OLE opened 204 incidents in the SED, which included 216 violation counts of which 104 were in the Gulf of Mexico Geographical Area.

Law/Regulation/Program	AL	FL KEYS	FL WEST	LA	MS	TX	Total
Magnuson Stevens Act		8	26	2		23	59
Endangered Species Act		3	2	3		7	15
Highly Migratory Species		1	6	5			12
Lacey Act				1		2	3
Marine Mammal Protection Act		1	7				8
Marine Sanctuaries Act		6				1	7
Other Federal Law							0
TOTAL	0	19	41	11	0	33	104

Selective Enforcement Highlights

1. EO's from Galveston and Houston, TX, and an EO from Savannah, GA, completed Port State Measures boarding on two **Mexican shrimp vessels** during an operation in South Texas. The EO's determined both vessels were in violation for failing to stow their fishing gear on deck when in US waters. Both violations were documented.
2. A SA from the St Petersburg, FL office, along with CBP and FFWC conducted an examination of a container of seafood product at Port of Tampa, Florida; approximately 30 boxes of frozen **shrimp** were examined. No violations found.
3. An EO from Galveston, TX conducted an offshore patrol of the Flower Gardens National Marine Sanctuary aboard a USCG cutter. While in route, the EO completed TED boardings of **commercial shrimp vessels** and found violations on all three vessels boarded. The violations on the first vessel consisted of possession of out of season red snapper, possession of a not intact shark, a double-cover TED over-flap sewn closed, and a TED with bar spacing of 4.75-inches which is .75 over the maximum spacing. The second vessel violations consisted with the possession of an out of season red snapper, a TED with bar spacing of 4.5-inches, two (2) TEDs

⁴⁰¹ <https://www.gc.noaa.gov/enforce-office4.html>

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.

with leading edges less than 60-inches, three TED's with the flap exceeding 24-inches, and all four (4) TEDs were sewn down the sides over 6-inches. The third vessel violation consisted of two (2) TEDs with the sides sewn down over 6-inches.

- An EO from Houma, LA conducted a two-day patrol onboard the USCG Cutter Skipjack south of Grand Isle, LA. During the patrol, the EO and the USCG boarding team boarded three **commercial shrimp vessels** in federal waters. The first shrimp vessel was found with Port 1, Port 2, and Starboard 2 TED bar spacing exceeding 4 inches and was found in possession of four shark fins hidden in the vessels inside freezer. The second shrimp vessel was found with port TED angle exceeding 55 degrees, leading edge was less than 71", length of the flap exceeded 24", and the net was sewn down 6" past the TED. The third shrimp vessel was found to have documented exceeding the double cover overlap for the port 2 and Starboard 2 TEDs.

Quarterly Report: July 1 - September 30, 2021

During the quarter, there were 162 documented patrols, 62 documented instances of outreach, and 10 meetings. NOAA-OLE opened 352 incident violation counts in the GMFM.

Law/Regulation/Program	AL	FL KEYS	FL WEST	LA	MS	TX	Total
Magnuson Stevens Act	4	67	42	2		22	137
Endangered Species Act	2	2	3	3		7	17
Highly Migratory Species	1	2	1	3		2	9
Lacey Act		1					1
Marine Mammal Protection Act	1		2	3		2	8
Marine Sanctuaries Act		174	1				175
Other State Law/Regulation			1				1
Other Federal Law/Regulation		3	1				4
TOTAL	8	249	51	11	0	33	352

Selective Enforcement Highlights

- A Corpus Christi, TX EO conducted a joint patrol with Texas Parks & Wildlife. TEDs were inspected aboard a **shrimp trawler**; no violations were documented.

NOAA Selective Charging Information

- F/V Patricia Lee: Owner Patricia Lee LLC and Operator Michael Wayne Williams were charged jointly and severally under the *Endangered Species Act* with fishing for **shrimp** in the Gulf of Mexico with non-compliant TEDs, and under the *Magnuson-Stevens Act* for non-compliant Bycatch Reduction Devices. An \$8,375 NOVA was issued.
- F/V Capt Scott II: Owner J&N Marine LLC and Operator Kevin Nguyen were charged jointly and severally under the *Endangered Species Act* for failing to comply with the TED requirements. A \$7,500 NOVA was issued.
- F/V Patricia Lee: Owner Patricia Lee LLC and Operator Michael Shawn Robbins were charged jointly and severally under the *Endangered Species Act* with fishing for **shrimp** in the Gulf of Mexico with non-compliant TEDs. A \$17,500 NOVA was issued.
- F/V Ambush: Owner/Operator John P. Fish was charged under the *Magnuson-Stevens Act* with fishing without an observer when the vessel was required to carry an observer. A \$7,000 NOVA was issued.
- F/V Fish Hound: Owner Fish Hound Seafood, LLC was charged under the Magnuson-Stevens Act with fishing without an observer when the vessel was required to carry an observer. A \$12,500 NOVA was issued, and the case settled for \$10,000.
- Owner Sea Goddess LLC and operator Chau Ngoc Trinh were charged jointly and severally under the *Endangered Species Act* for fishing for **shrimp** with non-compliant TEDs. A \$14,000 NOVA was issued. The case against the Owner settled for \$5,000. The NOVA became a final administrative decision against the Operator due to default.

Quarterly Report: October 1 - December 31, 2022

During the quarter, there were 186 documented patrols, 66 documented instances of outreach, and 17 meetings. NOAA-OLE opened 192 incident violation counts in the GMFMC.

Law/Regulation/Program	AL	FL KEYS	FL WEST	LA	MS	TX	Total
Magnuson Stevens Act	2	34	73	7	5	26	147
Endangered Species Act		6	2	1	8	7	24
Highly Migratory Species							0
Lacey Act			1				1
Marine Mammal Protection Act							0
Marine Sanctuaries Act		17				1	18
Other State Law/Regulation		2	1			1	15
International Trade Program			2			13	
TOTAL	2	59	79	8	13	48	209

Selective Enforcement Highlights

1. A Houston, TX EO reviewed a USCG case package where a **commercial shrimp trawler** was found with all four By-catch Reduction Devices sewn shut. The EO issued the owner/operator a \$3,000.00 summary settlement offer.
2. A Houston, TX EO reviewed a USCG case package where a **commercial shrimp trawler** was found with level I and level II Turtle Exclusion Device violations. The EO issued the captain a \$700.00 summary settlement offer.
3. A Houma, LA EO reviewed a USCG case package where a captain of a **skimmer trawl vessel** over 40 ft in length was actively fishing without Turtle Excluder Devices (TEDs) installed. The EO interviewed the captain who admitted he did not have TEDs installed when boarded by the USCG. The EO prepared a case package and referred it to GCS for civil prosecution.
4. A Key West, FL EO and Key Largo, FL EO, conducted a patrol with JEA partners aboard the FWC Offshore Patrol Vessel Trident. The EO's conducted 5 TED inspections aboard **commercial shrimp vessels**. The EO's issued one FIX-IT Notice and documented one violation for discharging oily bilge water into the Florida National Marine Sanctuary.

NOAA Selective Charging Information

1. F/V Double E: Owner E&E LLC and Operator Chazz Michael Alario were charged jointly and severally under the *Magnuson-Stevens Act* with fishing for **shrimp** inside the Tortugas Shrimp Sanctuary. The proceeds (\$876) of the violation were forfeited by abandonment. A \$5,750 NOVA was issued, and the case settled for \$2,500. The proceeds (\$876) of the violation were forfeited by abandonment.

Texas - Parks and Wildlife Department

The Assessment team received TPWD LED violations data for the years 2018 - 2022. The Department's enforcement division issued a total of 246 tickets (**shrimp fishery citations**) and 100 warnings. Shrimping at night (closed time) and illegal turtle excluder devices comprised 46 and 26 of all tickets issued respectively (29%).

Violation Type	Tickets Issued	Warnings Issued	Total
No Captain's Licence	14	6	20
No Dealer's Licence	2	2	4
No Boat Licence	3	0	3
No Bait Trawl Licence	2	1	3
Illegal Trawl (Bay)	3	0	3
Illegal Trawl (Bait)	6	0	6
Illegal Trawl (Gulf)	2	4	6
Shrimping at night (Bay)	21	1	22
Shrimping at night (Bait)	23	3	26
Exceeding shrimp limit (Bay)	2	0	2
Exceeding shrimp limit (Bait)	4	3	7
Sell/unload bait shrimp to unauthorized person	1	0	1
More than ½ cargo of dead shrimp bait	3	6	9
Shrimping in closed waters (nursery area)	3	1	4

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.

Shrimping in closed waters (Gulf)	3	0	3
Shrimping in closed waters (others)	2	0	2
Failure to display boat plates	4	14	17
Exceeding shrimp net size	2	0	2
Illegal Turtle excluder devices	26	46	72
Illegal Bycatch reduction devices	5	3	8
Others (unspecified)	115	9	124
Totals	246	100	346

Louisiana - Department of Wildlife and Fisheries

The LDWF's Law Enforcement Division (LED) presented an operations report of its JEA Program for FY 2020-2021 at the January 2022 meeting of the GMFMC.⁴⁰² Operations tallied a total of 9,173 patrol hrs. of which 7,760 hrs. were dedicated to the commercial fisheries. The latter operations included 1,215 hrs. of dockside checks, 3,922 hrs. of at sea patrols, and 2,623 vessel hrs. There was a total of 2,512 public contacts during the same period of which 1,326 were associated with the commercial fisheries.

The Division reported that 50 inspections were carried out on the state's **52 commercial vessel shrimp** (96.15% inspection level). The level of compliance regarding turtle excluder devices was estimated to be 95.12%.

During the January 2023 meeting of the Council, the LED's JEA Program for FY 2021-2022 accumulated a total of 5,352 patrol hrs. of which 4,352 hrs. were dedicated to the commercial fisheries. These included 1,215 hrs. of dockside checks, 1,909 hrs. of at sea patrols, and 1,228 vessel hrs. The Program also tallied 1,174 public contacts including 852 commercial fisheries contacts. A total of 3 inspections on 5 **shrimp vessels** were undertaken (60% inspection level). A total of 98 inspections of turtle excluder devices were carried out with 9 violations for an overall compliance level of 90.82%.⁴⁰³

The client contributed data of the LDWF's LED enforcement activities directed at the state's **commercial shrimp fleet** for the period 2018 to 2022. Enforcement personnel tallied 150 violations during the period including 122 criminal referrals and 28 warnings. The violation category was dominated by illegal gear and unauthorized turtle excluder devices (83 of the 122 criminal referral violations or 68%, and 100% of the warnings issued).

Calendar Year	Violation Category	Enforcement Outcomes		Totals
		Criminal Referrals	Warnings	
2018	Illegal possession	0	0	0
	Illegal gear/TED	22	8	30
	Closed area/time	2	0	2
	Total	24	8	32
2019	Illegal possession	6	0	6
	Illegal gear/TED	16	10	26
	Closed area/time	2	0	2
	Total	24	10	34
2020	Illegal possession	4	0	4
	Illegal gear/TED	22	3	25
	Closed area/time	5	0	5
	Total	31	3	34
2021	Illegal possession	4	0	4
	Illegal gear/TED	19	2	21
	Closed area/time	7	0	7
	Other	3	0	3

⁴⁰² <https://gulfcouncil.org/wp-content/uploads/R-2-ESkena-January2022-mtg.pdf>

⁴⁰³ <https://gulfcouncil.org/wp-content/uploads/R-2-LDWF-supporting-agency-update-Feb-2023.pdf>

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.

	Total	33	2	35
2022	Illegal possession	1	0	1
	Illegal gear/TED	4	5	9
	Closed area/time	2	0	2
	Other	3	0	3
	Total	10	5	15

The Department issued a press release on February 20, 2023 citing a Texas man for alleged commercial fishing violations in Cameron and East Baton Rouge parishes at the end of 2022.⁴⁰⁴ The individual was cited for criminal conspiracy, take/sell commercial fish without a commercial fishing license, take/possess commercial fish without a vessel license, take commercial fish without a commercial gear license, failing to complete trip tickets, obtain license by fraud, injuring public records, and identity theft. During the investigation, agents learned that the person was prohibited from purchasing any LDWF licenses and that he obtained his commercial licenses through fraud by claiming to be someone else.

On July 19, 2023, SeafoodNews.com reported that enforcement agents of the LDWF cited two men for alleged commercial fishing violations in Plaquemines Parish on July 16. The individuals, both of Venice, were cited for taking commercial fish without a commercial fishing license. One of the individuals was also cited for fishing while under license revocation. Agents were on patrol in Breton Sound when they stopped a **shrimping vessel** for a compliance check.

On August 4, 2023, SeafoodNews.com also reported that LDWF enforcement agents charged two men for alleged commercial fishing violations on August 2 in Plaquemines Parish. Agents cited the individuals, both of St. Bernard, for **skimming for shrimp** during a closed season. Agents subsequently arrested one of the individuals for operating or driving a vessel while impaired (DWI), obstruction of justice and operating a vessel without navigation lights and booked him into the Plaquemines Parish Jail.

On August 21, 2023, SeafoodNews.com further reported that LDWF enforcement agents cited a Raceland man for alleged fishing violations on August 17 in Terrebonne Parish. The individual was in possession of undersized sharks, over the limit of sharks, fish under revocation, operating an unregistered vessel and failing to possess basic fishing, saltwater fishing, commercial fishing and vessel licenses. Agents observed a **shrimping vessel** actively skimming for shrimp. Agents seized 300 lb of shrimp and sold them to the highest bidder, donated the sharks to a local charity, and placed the vessel on a seizure order.

Mississippi - Department of Marine Resources

The enforcement outcomes by the Office of Marine Patrol as reported in the Department's Annual Report for FY 2021 (July 1, 2020 - June 30, 2021) and FY 2022 (July 1, 2021 - June 30, 2022) included the following unspecified violations (non-fishing categories were excluded):

- Fisheries violations - 206 in FY 2021 and 135 in FY 2022
- Courtesy citations - 220 in FY 2021 and 135 in FY 2022
- Commercial fisheries violations - not specified in FY 2021 and 76 in FY 2022.

The Fishery Client Representative provided additional enforcement data from the Marine Patrol Office to the Assessment team in March 2022 for the period from January 1, 2017 to December 31, 2022. The redacted document included **commercial shrimp citations** by year and type, as follows:

- 6 citations for shrimping in closed waters between June 7, 2019 and October 3, 2022.
- 11 citations for shrimping during closed times between October 13, 2018 and June 10, 2021.
- 3 citations for shrimping without a licence between June 20, 2019 and July 4, 2021.
- 5 citations for keeping certain fish caught in shrimp nets for personal consumption between June 20, 2019 and September 8, 2021.
- 1 citation for unspecified commercial shrimping on June 4, 2022.
- 1 citation for possession of 25 lbs. or more of shrimp on March 11, 2022.

⁴⁰⁴ <https://www.wlf.louisiana.gov/news/agents-cite-texas-man-for-commercial-fishing-violations>

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.

At the April 2021 meeting of the GMFMC⁴⁰⁵, the Department reported on the enforcement activities conducted pursuant to its FY 2020 JEA. A total of 4,204-man hrs. and 1,399 vessel hrs. were logged in undertaking patrols in federal and state waters. There were 15 enforcement actions initiated for turtle excluder device violations (93% observed compliance); 9 enforcement actions for reef fish violations (99% observed compliance); 2 enforcement actions for IUU/Lacey Act violations (96% observed compliance); and 19 enforcement actions for HMS/general enforcement (95% observed compliance).

The Department reported on the results of its 2022 JEA Program at the October 2022 meeting of the GMFMC.⁴⁰⁶ They included: (i) turtle excluded devices - 936 hrs. at sea and 72 hrs. dockside; (ii) reef fish - 408 hrs. at sea and 120 hrs. dockside; (iii) individual fishing quota - 192 hrs. dockside; (iv) Lacey Act and IUU - 240 hrs. dockside; and (v) general enforcement - 432 hrs. at sea and 240 hrs. dockside.

Non-JEA patrol hours targeting the state's **commercial shrimp fishery** included: (i) 450 hrs. in 2017, (ii) 549 hrs. in 2018, (iii) 670 hrs. in 2019, (iv) 510 hrs. in 2020, (v) 1,008 hrs. in 2021, and (vi) 468 hrs. in 2022.

Alabama - Department of Conservation and Natural Resources

A summary of enforcement outcomes is described in the Department's Annual Report for FY 2020-2021.⁴⁰⁷ The Enforcement Section's Conservation Enforcement Officers conducted 3,305 commercial fishermen inspections; 11,884 recreational fishermen inspections; 11,353 patrol hours; and 4,321 vessel boardings.

MRD officers also continued to participate in joint investigations with NOAA Office of Law Enforcement (OLE) regarding Gulf reef fish, marine mammals, sea turtle protection, and international unreported/undocumented seafood. Additionally, staff conducted joint patrols with uniformed NOAA enforcement officers. MRD Enforcement entered into its 20th Joint Enforcement Agreement (JEA) with NOAA - OLE. The JEA provided equipment and funding for officers to enforce federal laws and regulations. The most recent contract included funding for patrol vehicles, outboard engines, and repairs to vessels. Additionally, it provided funding for underway and dockside patrols for federal priorities such as reef fish and turtle excluder devices.

By contrast, MRD enforcement officers in FY 2019-2020 conducted 3,103 commercial fishermen inspections; 13,414 recreational fishermen inspections; 13,310 patrol hrs.; and 4,659 vessel boardings. The Fishery Client Representative provided additional commercial (including recreational, live bait boat, and dealers information) shrimp fishery violations data in March 2023 for the years 2018 to 2022. The information for the **commercial shrimp fishery** included:

- For 2018, 7 warnings and 1 notice of violation (citations) were issued; non-compliance issues included fishing in a closed area and fishing without a licence.
- For 2019, 2 warnings and 1 notice of violation (citation) were issued; non-compliance issues included fishing without a licence and fishing in a closed area.
- For 2020, 3 warnings and 1 notice of violation (citation) were issued; non-compliance issues included fishing without a licence and fishing in a closed area.
- For 2021, 5 warnings and 3 notices of violation (citations) were issued; non-compliance issues included fishing without a licence and fishing in a closed area.
- For 2022, 2 warnings and 1 notice of violation (citation) were issued; non-compliance issues included fishing in a closed area and fishing without a licence.

Florida - Fish and Wildlife Commission

The Division's federal enforcement information for the March 1, 2020 - March 1, 2021 period included:⁴⁰⁸

- Total Patrol Hours - 5,035
- Reef Fish Enforcement - 1,466 Patrols
- TED/BRD Enforcement - 69 Patrols
- Closed Area/MPA Patrols Hours - 97

⁴⁰⁵ <https://gulfcouncil.org/wp-content/uploads/R-3-Gulf-of-Mexico-Fishery-Management-Council-Presentation-4-21.pdf>

⁴⁰⁶ <https://gulfcouncil.org/wp-content/uploads/R-2-GULF-COUNCIL-OCTOBER-2022-MS-PRESENTATION.pdf>

⁴⁰⁷ <https://www.outdooralabama.com/sites/default/files/ANNUAL%20REPORTS/ADCNR%202020-2021%20Annual%20Report.pdf>

⁴⁰⁸ <https://gulfcouncil.org/wp-content/uploads/10a.-Florida-DLE-State-Report-LETC-Meeting-March-2021.pdf>

11.1. States laws of adequate severity shall be in place that provide for effective sanctions.

- Education/Outreach Hours - 70
- Dockside Enforcement Hours - 958
- Warnings and Citations - 1,345

In its June 2022 report to the GMFMC⁴⁰⁹, the enforcement activities and partial outcomes from the Commission’s JEA Program in the GOM for FY 2022 (July 1, 2021 - June 30, 2022) included a total of 1,480 hrs of federal enforcement. The breakdown consisted of:

- 553 hrs. of reef fish enforcement
- 187 hrs. of turtle excluder devices enforcement (38 boardings)
- 229 hrs. of other federal enforcement
- 78 hrs. of marine mammal enforcement
- 382 hrs. of electronic reporting enforcement

The program’s enforcement activities resulted in 108 combined warnings and 147 combined citations. One of the **shrimp citations** included the boarding of a shrimp vessel on March 3, 2022, that resulted in violations for a non-compliant turtle excluder device, the failure to possess a restricted species endorsement for shrimp, the illegal possession of cobia fillets, and the seizure of 11,843 lbs. of shrimp valued at approximately \$30,000.

A report was tabled at the June 2021 meeting of the GMFMC that included 3,040 hrs of federal enforcement. The breakdown consisted of:

- 1,634 hrs. of reef fish enforcement
- 607 hrs. of turtle excluder devices enforcement (108 boardings)
- 798 hrs. of other federal enforcement

The program’s enforcement activities resulted in 349 combined warnings and 399 combined citations. **Two shrimp citations** were highlighted - one for various undersized fish species, the other for undersized Lane Snapper, possession of shark filets, no federal reef permit, and no federal HMS permit.

During the same reporting period, the Offshore Program’s regional statewide JEA efforts included:

- 1,379 hrs. of dockside patrols
- 5,452 hrs. of vessel patrols
- 308 hrs. of marine mammal patrols
- 837 hrs. of outreach and administration
- 1,036 hrs. of IFQ dockside checks
- 288 hrs. of IUU patrols
- 2,691 hrs. of Florida Keys National Marine Sanctuary

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States laws of adequate severity are in place that provide for effective sanctions. Examples may include various laws, regulations, and other data or reports.



EVIDENCE:

The availability, quality, and adequacy of the evidence is sufficient to substantiate that Federal and States laws of adequate severity are in place that provide for effective sanctions. The Assessment team located or were provided with ample information and data from all Gulf enforcement agencies to be able to conclude the following with confidence: (i) monitoring and surveillance activities of the Gulf commercial shrimp fishery is a high priority, (ii) dedicated enforcement hours are significant and result in numerous fishery citations, (iii) state and especially federal prosecutorial outcomes result in significant penalties; and (iv) numerous interactions by the Assessment team with state enforcement and shrimp industry officials during the July 2023 site visits opined that the level of recidivism in the fishery across the Gulf was quite low and compliance quite high.

References:

1. <https://www.gc.noaa.gov/documents/Penalty-Policy-CLEAN-June242019.pdf>
2. <https://tpwd.texas.gov/about/administration-divisions/law-enforcement>
3. <https://txpenalcode.com/sec-1-02/>

⁴⁰⁹ <https://gulfcouncil.org/wp-content/uploads/GMFMC-Full-Council-June-2022.pdf>

11.1.	States laws of adequate severity shall be in place that provide for effective sanctions.		
	4. https://tpwd.texas.gov/warden/regs 5. https://myfwc.com/law-enforcement/ 6. https://law.justia.com/codes/florida/2022/title-xxviii/chapter-379/part-viii/ 7. http://alisondb.legislature.state.al.us/alison/codeofalabama/1975/coatoc.htm 8. https://law.justia.com/codes/louisiana/2014/code-revisedstatutes/title-56 9. https://www.law.cornell.edu/regulations/mississippi/title-22/part-20/chapter-21 10. https://www.gc.noaa.gov/enforce-office4.html 11. https://gulfcouncil.org/wp-content/uploads/10a.-Florida-DLE-State-Report-LETC-Meeting-March-2021.pdf 12. https://gulfcouncil.org/wp-content/uploads/GMFMC-Full-Council-June-2022.pdf 13. https://www.outdooralabama.com/sites/default/files/ANNUAL%20REPORTS/ADCNR%202020-2021%20Annual%20Report.pdf 14. https://gulfcouncil.org/wp-content/uploads/R-2-ESkena-January2022-mtg.pdf 15. https://gulfcouncil.org/wp-content/uploads/R-2-LDWF-supporting-agency-update-Feb-2023.pdf 16. https://www.wlf.louisiana.gov/news/agents-cite-texas-man-for-commercial-fishing-violations 17. https://gulfcouncil.org/wp-content/uploads/R-3-Gulf-of-Mexico-Fishery-Management-Council-Presentation-4-21.pdf 18. https://gulfcouncil.org/wp-content/uploads/R-2-GULF-COUNCIL-OCTOBER-2022-MS-PRESENTATION.pdf		
Numerical score:	Starting score All agencies - 10	$- \left(\frac{\text{Number of EPs NOT met}}{\text{All agencies - 0}} \times 3 \right) =$	Overall score All agencies - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			All agencies - Full
Non-conformance Number (if applicable):			NA

9.4.4.2 Supporting Clause 11.2.

11.2. Sanctions applicable to violations and illegal activities shall be adequate in severity to be effective in securing compliance and discouraging violations wherever they occur. Sanctions shall also be in force to affect authorization to fish and/or to serve as masters or officers of a fishing vessel in the event of noncompliance with conservation and management measures.	
Relevance:	Relevant
Evaluation Parameters	Met?
Process: <i>The system of sanctions in place is sufficiently severe to deter violations and illegal activities. The system shall be considered adequate in severity if the potential sanctions include fines, suspension or withdrawal of permission to fish, and confiscation of catch or equipment.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The information provided in clause 11.1 for the federal and Gulf states indicates that the punitive measures available to all agencies includes fines, seizures/forfeitures, license suspensions, and incarceration. Operational procedures serve to guide prosecutors on the best mix of punitive measures to seek, commensurate with the seriousness of the offence and the accused's history.	
Current status/Appropriateness/Effectiveness: <i>There is evidence to substantiate that sanctions for violations of regulations (e.g., suspension, withdrawal, or refusals of fishing permit or of the right to fish) are adequate in severity to secure compliance and discourage violations.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The Assessment team raised a number of enforcement and compliance questions with senior enforcement officials from all jurisdictions during the July 9 - 19, 2023 site visits. Their direct knowledge of the commercial shrimp fishery issues their staff encounter represented a first-person's account of the effectiveness of available sanctions that are administered in both civil and criminal cases. The level of recidivism in the fishery is thought to be low. The team also met with stakeholders and industry representatives who expressed satisfaction with the efforts directed at the fishery by federal and state agencies. There is no evidence of systemic non-compliance across the entire Gulf fishery.	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that sanctions applicable in respect of violations and illegal activities are adequate in severity to be effective in securing compliance and discouraging violations wherever they occur. Sanctions are in force that affects authorization to fish and/or to serve as masters or officers of a fishing vessel, in the event of non-compliance with conservation and management measures. Examples may include various laws, regulations, and other data or reports.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The availability and quality of the evidence is sufficient to substantiate that sanctions applicable in respect of violations and illegal activities are adequate in severity to be effective in securing compliance and discouraging violations wherever they occur. Please see supported evidence in the references	
References:	<ol style="list-style-type: none"> 1. https://www.gc.noaa.gov/documents/Penalty-Policy-CLEAN-June242019.pdf 2. https://tpwd.texas.gov/about/administration-divisions/law-enforcement 3. https://txpenalcode.com/sec-1-02/ 4. https://tpwd.texas.gov/warden/regs 5. https://myfwc.com/law-enforcement/ 6. https://law.justia.com/codes/florida/2022/title-xxviii/chapter-379/part-viii/ 7. http://alisondb.legislature.state.al.us/alison/codeofalabama/1975/coatoc.htm 8. https://law.justia.com/codes/louisiana/2014/code-revisedstatutes/title-56 9. https://www.law.cornell.edu/regulations/mississippi/title-22/part-20/chapter-21 10. https://www.gc.noaa.gov/enforce-office4.html 11. https://gulfcouncil.org/wp-content/uploads/10a.-Florida-DLE-State-Report-LETC-Meeting-March-2021.pdf 12. https://gulfcouncil.org/wp-content/uploads/GMFMC-Full-Council-June-2022.pdf 13. https://www.outdooralabama.com/sites/default/files/ANNUAL%20REPORTS/ADCNR%202020-2021%20Annual%20Report.pdf

11.2. Sanctions applicable to violations and illegal activities shall be adequate in severity to be effective in securing compliance and discouraging violations wherever they occur. Sanctions shall also be in force to affect authorization to fish and/or to serve as masters or officers of a fishing vessel in the event of noncompliance with conservation and management measures.

- 14. <https://gulfcouncil.org/wp-content/uploads/R-2-ESkena-January2022-mtg.pdf>
- 15. <https://gulfcouncil.org/wp-content/uploads/R-2-LDWF-supporting-agency-update-Feb-2023.pdf>
- 16. <https://www.wlf.louisiana.gov/news/agents-cite-texas-man-for-commercial-fishing-violations>
- 17. <https://gulfcouncil.org/wp-content/uploads/R-3-Gulf-of-Mexico-Fishery-Management-Council-Presentation-4-21.pdf>
- 18. <https://gulfcouncil.org/wp-content/uploads/R-2-GULF-COUNCIL-OCTOBER-2022-MS-PRESENTATION.pdf>

Numerical score:	Starting score	-	Number of EPs <u>NOT</u> met	x 3	=	Overall score
	All agencies - 10		All agencies - 0			All agencies - 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)						All agencies - High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)						All agencies - Full
Non-conformance Number (if applicable):						NA

9.4.4.3 Supporting Clause 11.3.

11.3. Fisheries management organizations shall ensure that sanctions for IUU fishing by vessels and, to the greatest extent possible, nationals under its jurisdiction are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. This may include the adoption of a civil sanction regime based on an administrative penalty scheme. Fisheries management organizations shall ensure the consistent and transparent application of sanctions.																			
Relevance:	<p>Not relevant</p> <p>There is no evidence of IUU fishing occurring in the Gulf of Mexico's commercial shrimp fishery.</p>																		
Evaluation Parameters	Met?																		
Process: <i>The system of sanctions in place are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. This may include the adoption of a civil sanction regime based on an administrative penalty scheme. The fisheries management organization also ensures the consistent and transparent application of sanctions.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Current status/Appropriateness/Effectiveness: <i>There is evidence to substantiate that sanctions for violations of regulations are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. Sanctions are applied transparently and consistently across the board.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fisheries management organization ensures that sanctions for IUU fishing by vessels and, to the greatest extent possible, nationals under its jurisdiction are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. This may include the adoption of a civil sanction regime based on an administrative penalty scheme. The fisheries management organization also ensures the consistent and transparent application of sanctions. Examples may include various laws, regulations, and other data or reports.</i>	<input type="checkbox"/>																		
EVIDENCE:																			
References:																			
Numerical score:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs <u>NOT</u> met</td> <td style="text-align: center;">x</td> <td style="text-align: center;">3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score	10								
Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score											
10																			
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																		
Non-conformance Number (if applicable):																			

9.4.4.4 Supporting Clause 11.4.

11.4. Flag States shall take enforcement measures towards fishing vessels entitled to fly their flag, which have been found by the State to have contravened applicable conservation and management measures. The State shall, where appropriate, make the contravention of such measures an offense under national legislation.																	
	<p>Not relevant</p> <p>Note: Not applicable if no foreign vessels fish in the State's EEZ or if its vessels do not fish in high seas or in another State's EEZ.</p> <p>There are no foreign vessels fishing in the US EEZ of the Gulf of Mexico. There are no US registered fishing vessels operating in the EEZ's of Mexico or Cuba within the Gulf of Mexico.</p>																
Evaluation Parameters	Met?																
Process: <i>If applicable, the system of enforcement measures is effective for foreign vessels fishing in the State's EEZ or for its vessels fishing in high seas or in another State's EEZ.</i>	<input type="checkbox"/>																
EVIDENCE:																	
Current status/Appropriateness/Effectiveness: <i>There is evidence to substantiate enforcement action in these cases (i.e., boarding, violations).</i>	<input type="checkbox"/>																
EVIDENCE:																	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that flag States take enforcement measures with fishing vessels entitled to fly their flag if the vessels have been found by the State to have contravened applicable conservation and management measures. These enforcement measures will include, where appropriate, making the contravention of such measures an offense under national legislation. Examples may include various laws, regulations, and other data or enforcements reports.</i>	<input type="checkbox"/>																
EVIDENCE:																	
References:																	
Numerical score:	<table border="0"> <tr> <td align="center">Starting score</td> <td align="center">-</td> <td align="center">(</td> <td align="center">Number of EPs <u>NOT</u> met</td> <td align="center">x 3</td> <td align="center">)</td> <td align="center">=</td> <td align="center">Overall score</td> </tr> <tr> <td align="center">10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score	10							
Starting score	-	(Number of EPs <u>NOT</u> met	x 3)	=	Overall score										
10																	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																
Non-conformance Number (if applicable):																	

9.5 Section D: Serious Impacts of the Fishery on the Ecosystem

9.5.1 Fundamental Clause 12. Impacts of the fishery on the ecosystem

Considerations of fishery interactions and effects on the ecosystem shall be based on the best scientific evidence available, local knowledge where it can be objectively verified, and a risk assessment-based management approach for determining most probable adverse impacts. Adverse impacts of the fishery on the ecosystem shall be appropriately assessed and effectively addressed.

9.5.1.1 Supporting Clause 12.1.

12.1.	The fishery management organization shall assess the impacts of environmental factors on target stocks and associated or dependent species in the same ecosystem, and the relationship among the populations in the ecosystem.	
Relevance:	Relevant	
Evaluation Parameters		Met?
Process: <i>There is a process that allows assessment and monitoring of environmental factors (e.g., climatic, oceanographic) on target and associated species in the same ecosystem, and that assess the relationships between species in the ecosystem.</i>		<input checked="" type="checkbox"/>
EVIDENCE: All UoAs: NOAA has an established system to monitor climatic and oceanic conditions. This is achieved mostly through the NOAA Atlantic Oceanographic and Meteorological Laboratory's (AOML) ⁴¹⁰ Physical Oceanography Division (PhOD). As part of NOAA's mission to study the role of the ocean in weather and ecosystems, AOML scientists have for many years devised methods and tools to allow for the real-time monitoring of ocean conditions.		
Current status/Appropriateness/Effectiveness: <i>There is evidence that assessments have been conducted to determine the impacts of environmental factors on the target and associated or dependent species (to the stock) in the same ecosystems, and on the relationships among these species. The results of these studies are in sufficient detail to allow informed management of the fishery. This requirement is intended to provide information about the current understanding of the overall marine ecosystem structure and relationships among the various species, coupled with environmental monitoring. More information about the effects of the fishery on specific ecosystem components (e.g., associated bycatch and ETPs species interactions, gear-habitat disturbance, ecosystem and food-webs impacts, etc.) are assessed in the following clauses of this section.</i>		<input checked="" type="checkbox"/>
EVIDENCE: All UoAs: The NOAA PhOD website (https://www.aoml.noaa.gov/phod/dhos/index.php) shows products and analysis focused on the monitoring of the ocean conditions in the Gulf of Mexico, in response to selected extreme events, such as: <ul style="list-style-type: none"> • Mississippi River water discharge during May, June, and July of 2011 • Deepwater Horizon oil spill during the summer of 2010 As part of NOAA's mission to study the role of the ocean in weather and ecosystems, AOML scientists have for many years devised methods and tools to allow for the real-time monitoring of ocean conditions. This website is designed to provide some of these tools and products showing the condition of several parameters in the Gulf of Mexico, including information about ocean currents, sea surface temperature, sea level, and chlorophyll-a concentrations. The products presented here have been obtained using both direct ocean measurements and remote observations collected via satellite, as well as using outputs from numerical models. Also included is a list of links to other web sites and resources dedicated to monitoring the Gulf of Mexico region. Maps and graphics shown here help scientists, managers, and decision makers understand more where the water is going, its properties and how they change over time. For example, these fields provide information about flow at different depths using observations and simulations.		

⁴¹⁰ <https://www.aoml.noaa.gov/>

12.1. The fishery management organization shall assess the impacts of environmental factors on target stocks and associated or dependent species in the same ecosystem, and the relationship among the populations in the ecosystem.

Data provided by AMOL PhOD publicly available for use in associated research. The 2017 issue of the PhOD project report contains one study by Lee and Liu, "Predicting the impact of anthropogenic climate change on physical and biogeochemical processes in the northern Gulf of Mexico".⁴¹¹ The main objective of this project was to provide a range of realistic scenarios of future environmental changes in the region for the research community and fishery managers (including fish and shrimp). Another publication from Karnauskas et al. (2015) used AMOL data to assess the impact of climate factors on the ecosystem level (including shrimp species) in the GoM.⁴¹²

Environmental data collected and organized by AMOL and PhOD are used to determine the impacts of environmental factors on the target stock in the GoM.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization assesses the impacts of environmental factors on target and other species belonging to the same ecosystem or associated with or dependent upon the target species, and the relationship among the populations in the ecosystem. Examples may include various stock and ecosystems assessment reports.



EVIDENCE:
 Maps and other tools are produced and are publicly available on the PhOD website.⁴¹³

References: See Footnotes inserted into text

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
	10		(	0			)		10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									N/A

⁴¹¹ PhOD. 2017. PhOD Project Report 2017: Predicting the impact of anthropogenic climate change on physical and biogeochemical processes in the northern Gulf of Mexico. Page 53. https://www.aoml.noaa.gov/phod/docs/PhOD_programs.pdf

⁴¹² Karnauskas M, Schirripa MJ, Craig JK, Cook GS, Kelble CR, Agar JJ, Black BA, Enfield DB, Lindo-Atichati D, Muhling BA, Purcell KM. Evidence of climate-driven ecosystem reorganization in the Gulf of Mexico. Global change biology. 2015 Jul;21(7):2554-68. <https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.12894>

⁴¹³ <https://www.aoml.noaa.gov/phod/dhos/index.php>

9.5.1.2 Supporting Clause 12.2.

12.2. The most probable adverse impacts from human activities, including fishery effects on the ecosystem/environment, shall be assessed and, where appropriate, addressed and or/corrected, taking into account available scientific information and local knowledge. This may take the form of an immediate management response or a further analysis of the identified risk. In this context, full consideration should be given to the special circumstances and requirements in developing fisheries, including financial and technical assistance, technology transfer, training, and scientific cooperation. In the absence of specific information on the ecosystem impacts of fishing on the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk, the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures.

Note. Clause 12.2 is a non-scoring clause with no associated Evaluation Parameters.

Main and Minor associated species

The RFM standard v2.1 defines main and minor associated species that make up that highest 95% of the catch. Main species make up the top 80% and minor are the species found between 80% and 95%. The exception to this is when the fishery exceeds 300,000 tonnes of target catch, for which none of the UoAs exceed this threshold. These percentage thresholds, per RFM v2.1 Appendix 1, part 4, are to be calculated from 3–5-year averages. For the GOM shrimp fishery, there have not been annual standardized monitoring of bycatch that identifies catch to species level, thus a multiplicity of data sets were used to calculate the necessary percentage thresholds. Main and minor species have been classified based on observer data, the source of which has been explained in more detail below. Data is available for otter trawl, skimmer trawl and butterfly net (only used in Louisiana).

The Assessment Team used all the available datasets together (with the exclusion of data from the 90s which was considered too old and not representative of current fishing practices and performance) to create one multi-year dataset that was more reliable for the characterisation of bycatch for each of the gear types analysed here, noting that for butterfly net gear only one year worth of data was available. The result of this is shown in the next 3 tables below.

Observer data was available from 4 sources for otter trawl gear:

1. Scott-Denton *et al.* 2012⁴¹⁴ using observer data from 2007 to 2010 (sampled from all state and federal waters).
2. Scott-Denton *et al.* 2020⁴¹⁵ using observer data from 2011 to 2016 (sampled from all state and federal waters).
3. Elizabeth Scott-Denton provided the assessment team with the unpublished federal observer data that is the continuation of the sequence referenced in items 1 and 2 above. These data span the years 2017 to 2022 and were collected under the same protocols as above.
4. Louisiana Shrimp Bycatch Study 2020⁴¹⁶ using LA state waters data collected from June 2019 to July 2020 (note, the data was then provided disaggregated to the Assessment Team for use in specific gear types). Note, this data offered the full breakdown of species, unlike other previous multiyear studies where some fish species were grouped under the *Pisces* superclass.
5. Draft LGL shrimp bycatch study 2022 using 2021 data⁴¹⁷ (sampled for all state and federal waters). Note, this data offered the full breakdown of species, unlike other previous multiyear studies where some fish species were grouped under the *Pisces* superclass.

⁴¹⁴ Scott-Denton E., Cryer P.F., Duffy M.R., Gocke J.P., Harrelson M.R., Kinsella D.L., Nance J.M., Pulver J.R., Smith R.C., Williams J.A. 2012. Characterization of the US Gulf of Mexico and South Atlantic penaeid and rock shrimp fisheries based on observer data. *Mar. Fish. Rev.*, 82 (2020), pp. 17-47.

<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/MFR/mfr744/mfr7441.pdf>

⁴¹⁵ Scott-Denton E., Cryer P.F., Duffin B.V., Duffy M.R., Gocke J.P., Harrelson M.R., Whatley A.J., Williams J.A. 2020. Characterization of the US Gulf of Mexico and South Atlantic Penaeidae and rock shrimp (Sicyoniidae) fisheries through mandatory observer coverage, from 2011 to 2016. *Mar. Fish. Rev.*, 82, pp. 17-47.

<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/mfr821-22.pdf>

⁴¹⁶ Cagle P. and West J. 2020. Evaluation of Commercial Shrimp Fishery Bycatch in Louisiana Waters, November 2020. Office of Fisheries Louisiana Department of Wildlife and Fisheries. https://www.wlf.louisiana.gov/assets/Resources/Publications/Commercial_Fishing_Seafood/Evaluation-of-Bycatch-in-the-Louisiana-Shrimp-Fishery_final.pdf

⁴¹⁷ Beyea T., Putman N., Gallaway B., Picariello L., Scott-Denton E. 2022. DRAFT Resolving Barriers to Sustainable Fishery Certification for the Gulf of Mexico Federal Otter Trawl Shrimp Fishery, Fishery Improvement Project Report. LGL Ecological Research Associates, Inc. 39 pg.

Table 35. Bycatch in the otter trawl fisheries in the Gulf of Mexico. It applies to all otter trawl states and federal fisheries unless specified. Shrimp species are marked in green (target catch). Main associated species are highlighted in blue. Minor associated species are highlighted in yellow. Note, weighted average excludes the N/As from the calculated average of the percentages from the five datasets.

Scientific name	Scott-Denton 2012 (kg)	Scott-Denton 2012 (%)	Scott-Denton 2020 (kg)	Scott-Denton 2020 (%)	Observer data (2017-2022) (kg)	Observer data (2017-2022) (%)	LA Bycatch Study 2020 (kg)	LA Bycatch Study 2020 (%)	LGL 2022 (kg/hr)	LGL 2022 (%)	Average (weighted %)	Cumulative Catch Percentage
<i>Penaeus</i> spp.	632,056	29.2	1,137,224	28.1	1290075	31.7	331	54.0	10.6	40.2	36.26	36.3
<i>Pisces</i>	589,439	27.3	1,281,387	31.8	1177871	28.9	N/A	N/A	1.5	0.1	17.44	53.7
Atlantic croaker <i>Micropogonias undulatus</i>	342,602	15.9	630,639	15.7	772920	19.0	35	5.7	3.7	14.1	13.93	67.6
Sand and Silver seatrout <i>Cynoscion</i> spp.	125,566	5.8	218,008	5.4	227022	5.6	34	5.5	3.6	13.5	7.08	74.7
Other Crustacea	149,868	7	496,261	12	247989	6	N/A	N/A	0.8	0.0	5.03	79.7
Other Invertebrate	115,359	5.3	210,182	5.2	153386	3.8	N/A	N/A	0.8	0.0	2.83	82.6
Gulf menhaden <i>Brevoortia patronus</i>	443	0.0	2,952	0.1	656	0.0	58	9.5	0.2	0.8	2.07	84.7
Longspine porgy <i>Stenotomus caprinus</i>	86,453	4.0	124,006	3.1	61908	1.5	N/A	N/A	0.5	1.8	2.07	86.7
Blue crab <i>Callinectes sapidus</i>	N/A	N/A	1	0.0	4	0.0	49	8.1	0.3	1.0	1.79	88.5
Debris	32,258	1.5	61,360	1.5	63609	1.6	12	2.0	0.0	0.0	1.31	89.8
Beltfish <i>Trichiurus lepturus</i>	1,226	0.1	2,080	0.1	89	0.0	9	1.4	0.9	3.4	0.99	90.8
Spot <i>Leiostomus xanthurus</i>	972	0.0	3,942	0.1	3725	0.1	7	1.2	0.7	2.6	0.79	91.6
Gafftopsail catfish <i>Bagre marinus</i>	1,991	0.1	144	0.0	25	0.0	14	2.2	0.2	0.7	0.60	92.2
Box jelly <i>Carybdeidae</i>	125	0.0	N/A	N/A	1760	0.0	11	1.8	0.2	0.6	0.47	92.7
Hardhead catfish <i>Arius felis</i>	630	0.0	22	0.0	N/A	N/A	11	1.8	0.1	0.5	0.45	93.1
Bigeye searobin <i>Prionotus longispinosus</i>	107	0.0	N/A	N/A	N/A	N/A	0	0.0	0.6	2.2	0.44	93.6
Swimming crab <i>Portunus spinimanus/gibbesii</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.5	2.0	0.39	93.9
Cownose ray <i>Rhinoptera bonasus</i>	501	0.0	861	0.0	1400	0.0	7	1.2	0.2	0.6	0.37	94.3
Gulf butterfish	2,551	0.1	1,436	0.0	64	0.0	0	0.0	0.3	1.2	0.27	94.6

Scientific name	Scott-Denton 2012 (kg)	Scott-Denton 2012 (%)	Scott-Denton 2020 (kg)	Scott-Denton 2020 (%)	Observer data (2017-2022) (kg)	Observer data (2017-2022) (%)	LA Bycatch Study 2020 (kg)	LA Bycatch Study 2020 (%)	LGL 2022 (kg/hr)	LGL 2022 (%)	Average (weighted %)	Cumulative Catch Percentage
<i>Peprilus burti</i>												
Pinfish <i>Lagodon rhomboides</i>	10,329	0.5	2,726	0.1	150	0.0	0	0.0	0.2	0.7	0.27	94.9
<i>Rhizoprionodon terraenovae</i>	3,276	0.2	15,355	0.4	11050	0.3	N/A	N/A	0.1	0.4	0.25	95.1
<i>Synodus foetens</i>	576	0.0	3,721	0.1	N/A	N/A	0	0.0	0.3	1.1	0.24	95.4
<i>Amusium papyracea</i>	127	0.0	N/A	N/A	N/A	N/A	N/A	N/A	0.3	1.0	0.20	95.6
<i>Demospongiae</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.3	0.9	0.19	95.7
<i>Lutjanus campechanus</i>	5,675	0.3	13,991	0.3	11533	0.3	N/A	N/A	0.0	0.0	0.18	95.9
<i>Sciaenops ocellatus</i>	3,826	0.2	9,651	0.2	7476	0.2	N/A	N/A	0.1	0.2	0.16	96.1
<i>Opisthonema oglinum</i>	N/A	N/A	82	0.0	N/A	N/A	4	0.7	0.0	0.1	0.15	96.2
<i>Scomberomorus maculatus</i>	3,851	0.2	9,594	0.2	5757	0.1	1	0.2	0.0	0.1	0.15	96.4
<i>Centropristis philadelphica</i>	55	0.0	546	0.0	N/A	N/A	N/A	N/A	0.2	0.7	0.14	96.5
<i>Paralichthys lethostigma</i>	3,032	0.1	5,487	0.1	4739	0.1	2	0.3	0.0	0.1	0.14	96.7
<i>Lutjanus synagris</i>	4,539	0.2	6,493	0.2	5868	0.1	N/A	N/A	0.0	0.1	0.13	96.8
<i>Menticirrhus americanus</i>	1,849	0.1	1,077	0.0	131	0.0	3	0.5	0.0	0.1	0.13	96.9
<i>Cynoscion nebulosus</i>	235	0.0	369	0.0	78	0.0	4	0.6	0.0	0.0	0.12	97.0
<i>Xiphopenaeus kroyeri</i>	32	0.0	239	0.0	1004	0.0	4	0.6	N/A	N/A	0.12	97.2
<i>Syacium gunteri</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2	0.6	0.12	97.3
<i>Pogonias cromis</i>	1,403	0.1	3,737	0.1	2482	0.1	N/A	N/A	0.1	0.3	0.11	97.4
<i>Cyclopsetta sp.</i>	26.9	0.0	N/A	N/A	37	0.0	N/A	N/A	0.1	0.6	0.11	97.5
<i>Archosargus probatocephalus</i>	210	0.0	79	0.0	887	0.0	2	0.3	0.0	0.1	0.10	97.6
<i>Sicyonia spp.</i>	2,524	0.1	11,827	0.3	1898	0.0	N/A	N/A	0.0	0.0	0.10	97.7
<i>Squilla sp</i>	N/A	N/A	N/A	N/A	N/A	N/A	0	0.0	0.1	0.5	0.09	97.8
<i>Hypanus sabinus</i>	46	0.0	510	0.0	23	0.0	2	0.3	0.0	0.1	0.09	97.9
<i>Callinectes similis</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1	0.4	0.09	98.0
<i>Upeneus parvus</i>	67	0.0	N/A	N/A	N/A	N/A	N/A	N/A	0.1	0.4	0.08	98.0
<i>Portunus spinicarpus</i>	5	0.0	N/A	N/A	N/A	N/A	N/A	N/A	0.1	0.4	0.08	98.1
<i>Loligo sp.</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1	0.4	0.08	98.2
<i>Selene setapinnis</i>	N/A	N/A	57	0.0	N/A	N/A	0	0.0	0.1	0.4	0.08	98.3

Scientific name	Scott-Denton 2012 (kg)	Scott-Denton 2012 (%)	Scott-Denton 2020 (kg)	Scott-Denton 2020 (%)	Observer data (2017-2022) (kg)	Observer data (2017-2022) (%)	LA Bycatch Study 2020 (kg)	LA Bycatch Study 2020 (%)	LGL 2022 (kg/hr)	LGL 2022 (%)	Average (weighted %)	Cumulative Catch Percentage
<i>Larimus fasciatus</i>	99	0.0	8	0.0	0	0.0	1	0.1	0.1	0.3	0.07	98.4
<i>Carcharhinus limbatus</i>	667	0.0	2,399	0.1	1512	0.0	N/A	N/A	0.1	0.2	0.06	98.4
<i>Anchoa hepsetus</i>	541	0.0	N/A	N/A	N/A	N/A	0	0.1	0.1	0.2	0.06	98.5
<i>Trachurus lathami</i>	N/A	N/A	170	0.0	10	0.0	N/A	N/A	0.1	0.3	0.06	98.5
<i>Sphyrna tiburo</i>	1,252	0.1	2,951	0.1	3617	0.1	N/A	N/A	0.0	0.0	0.06	98.6
<i>Trinectes maculatus</i>	6	0.0	N/A	N/A	N/A	N/A	2	0.2	0.0	0.0	0.05	98.6
<i>Pristipomoides aquilonaris</i>	271	0.0	19	0.0	44	0.0	N/A	N/A	0.1	0.2	0.04	98.7
<i>Lepophidium brevibarbe</i>	7	0.0	N/A	N/A	N/A	N/A	N/A	N/A	0.1	0.2	0.04	98.7
<i>Eucinostomus sp</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1	0.2	0.04	98.8
<i>Eucinostomus gula</i>	4,438	0.2	72	0.0	N/A	N/A	N/A	N/A	0.0	0.0	0.04	98.8
<i>Lolliguncula brevis</i>	N/A	N/A	N/A	N/A	N/A	N/A	1	0.1	0.0	0.1	0.04	98.9
<i>Diplectrum formosum</i>	953	0.0	498	0.0	106	0.0	N/A	N/A	0.1	0.2	0.04	98.9
<i>Syacium papillosum</i>	3,205	0.1	2,360	0.1	N/A	N/A	N/A	N/A	0.0	0.0	0.04	98.9
<i>Mugil cephalus</i>	N/A	N/A	N/A	N/A	N/A	N/A	1	0.2	0.0	0.0	0.04	99.0
General sharks	3,252	0.2	553	0.0	236	0.0	N/A	N/A	N/A	N/A	0.04	99.0
<i>Stellifer lanceolatus</i>	169	0.0	66	0.0	95	0.0	1	0.1	0.0	0.1	0.04	99.1
Sciaenidae	4,168	0.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.04	99.1
<i>Anchoa mitchilli</i>	N/A	N/A	N/A	N/A	N/A	N/A	1	0.2	0.0	0.0	0.04	99.1
<i>Mustelus canis</i>	592	0.0	2,109	0.1	2372	0.1	N/A	N/A	0.0	0.0	0.04	99.2
<i>Chloroscombrus chrysurus</i>	1,063	0.0	2,489	0.1	N/A	N/A	0	0.0	0.0	0.1	0.04	99.2
<i>Calappa sulcata</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.2	0.04	99.3
<i>Serranus atrobranchus</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.2	0.03	99.3
<i>Citharichthys spilopterus</i>	0	0.0	N/A	N/A	N/A	N/A	1	0.1	0.0	0.1	0.03	99.3
<i>Lagocephalus laevigatus</i>	N/A	N/A	N/A	N/A	2	0.0	N/A	N/A	0.0	0.2	0.03	99.4
<i>Harengula jaguana</i>	N/A	N/A	N/A	N/A	N/A	N/A	0	0.0	0.0	0.1	0.03	99.4
<i>Bairdiella chrysoura</i>	N/A	N/A	49	0.0	N/A	N/A	1	0.1	0.0	0.0	0.03	99.4
<i>Trichopsetta ventralis</i>	105	0.0	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.1	0.02	99.4
<i>Dorosoma petenense</i>	0	0.0	N/A	N/A	N/A	N/A	1	0.1	0.0	0.0	0.02	99.5
<i>Sphaeroides parvus</i>	N/A	N/A	N/A	N/A	N/A	N/A	1	0.1	0.0	0.0	0.02	99.5
<i>Raja texana</i>	412	0.0	49	0.0	8	0.0	N/A	N/A	0.0	0.1	0.02	99.5
Bothidae	1,699	0.1	273	0.0	N/A	N/A	N/A	N/A	N/A	N/A	0.02	99.5

Scientific name	Scott-Denton 2012 (kg)	Scott-Denton 2012 (%)	Scott-Denton 2020 (kg)	Scott-Denton 2020 (%)	Observer data (2017-2022) (kg)	Observer data (2017-2022) (%)	LA Bycatch Study 2020 (kg)	LA Bycatch Study 2020 (%)	LGL 2022 (kg/hr)	LGL 2022 (%)	Average (weighted %)	Cumulative Catch Percentage
<i>Eucinostomus</i> spp.	2,415	0.1	121	0.0	N/A	N/A	N/A	N/A	N/A	N/A	0.02	99.5
<i>Caranx hippos</i>	82	0.0	620	0.0	592	0.0	0	0.1	0.0	0.0	0.02	99.6
<i>Ogocophalus declivirostris</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.1	0.02	99.6
<i>Ictalurus furcatus</i>	N/A	N/A	21	0.0	N/A	N/A	0	0.1	0.0	0.0	0.01	99.6
<i>Menippe adina</i>	N/A	N/A	N/A	N/A	N/A	N/A	0	0.1	0.0	0.0	0.01	99.6
<i>Selar crumenophthalmus</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.1	0.01	99.6
<i>Peprilus alevinatus</i>	58	0.0	N/A	N/A	N/A	N/A	0	0.0	0.0	0.1	0.01	99.6
<i>Dorosoma cepedianum</i>	N/A	N/A	N/A	N/A	N/A	N/A	0	0.1	0.0	0.0	0.01	99.6
<i>Urophycis floridana</i>	3	0.0	37	0.0	N/A	N/A	N/A	N/A	0.0	0.1	0.01	99.7
<i>Prionotus alatus</i>	N/A	N/A	N/A	N/A	N/A	N/A	0	0.1	0.0	0.0	0.01	99.7
<i>Scorpaena</i> sp	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.1	0.01	99.7
<i>Sphyrna lewini</i>	127	0.0	413	0.0	979	0.0	N/A	N/A	0.0	0.0	0.01	99.7
<i>Aluterus schoepfii</i>	228	0.0	7	0.0	N/A	N/A	N/A	N/A	0.0	0.1	0.01	99.7
<i>Prionotus tribulus</i>	29	0.0	N/A	N/A	N/A	N/A	0	0.0	0.0	0.0	0.01	99.7
<i>Gobioides brossoneti</i>	N/A	N/A	N/A	N/A	N/A	N/A	0	0.1	0.0	0.0	0.01	99.7
<i>Agriopoma taylorianum</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.01	99.7
<i>Chaetodipterus faber</i>	N/A	N/A	N/A	N/A	N/A	N/A	0	0.0	0.0	0.0	0.01	99.7
<i>Carcharhinus isodon</i>	9	0.0	N/A	N/A	383	0.0	N/A	N/A	0.0	0.0	0.01	99.7
<i>Ophidion holbrookii</i>	66	0.0	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.01	99.8
<i>Porichthys plectrodon</i>	9	0.0	1	0.0	N/A	N/A	N/A	N/A	0.0	0.0	0.01	99.8
<i>Etopus crossotus</i>	87	0.0	N/A	N/A	N/A	N/A	0	0.0	0.0	0.0	0.01	99.8
<i>Rhomboplites aurorubens</i>	893	0.0	399	0.0	656	0.0	N/A	N/A	0.0	0.0	0.01	99.8
<i>Prionotus stearnsi</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.01	99.8
<i>Anasimus latus</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.01	99.8
<i>Halieutichthys aculeatus</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.01	99.8
<i>Tamoya haplonema</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.01	99.8
<i>Hypanus say</i>	10	0.0	N/A	N/A	17	0.0	N/A	N/A	0.0	0.0	0.01	99.8
<i>Scomberomorus cavalla</i>	721.6	0.0	1246.20	0.0	868	0.0	N/A	N/A	0.0	0.0	0.01	99.8
<i>Bellator militaris</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.01	99.8
<i>Rhynchoconger flavus</i>	10	0.0	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.01	99.8

Data for the skimmer trawl fisheries was collected from 6 sources:

1. Pulver *et al.* 2012⁴¹⁸ using NOAA observer data for 2012 sampled from LA, MS, AL here considered to be representatives for state and Gulf waters.
2. Pulver *et al.* 2014⁴¹⁹ using NOAA observer data for 2013 sampled from LA, MS, AL here considered to be representatives for state and Gulf waters.
3. Scott-Denton *et al.* 2014⁴²⁰ using NOAA observer data for 2013 sampled from LA, MS, AL here considered to be representatives for state and Gulf waters.
4. Scott-Denton *et al.* 2020⁴²¹ using observer data from 2011 to 2016 (sampled from all state and federal waters)
5. Elizabeth Scott-Denton provided the assessment team with the unpublished federal observer data that is the continuation of the sequence referenced in items 1 and 2 above. These data span the years 2017 to 2022 and were collected under the same protocols as above.
6. Louisiana Shrimp Bycatch Study 2020⁴²² using LA state waters data collected from June 2019 to July 2020 (note, the data was then provided disaggregated to the Assessment Team for use in specific gear types). Note, this data offered the full breakdown of species, unlike other studies (above) where some fish species were grouped under the *Pisces* superclass.

⁴¹⁸ Pulver, J.R., E. Scott-Denton and J.A. Williams. 2012. Characterization of the U.S. Gulf of Mexico skimmer trawl fishery based on observer coverage. NOAA Technical Memorandum NMFS-SEFSC-636, 27 p. <https://repository.library.noaa.gov/view/noaa/4782>

⁴¹⁹ Pulver, J.R., E. Scott-Denton and J.A. Williams. 2014. Observer coverage of the 2013 Gulf of Mexico skimmer trawl fishery. NOAA Technical Memorandum NMFS-SEFSC-654, 25 p. <http://doi.org/10.7289/V5BG2KXX>

⁴²⁰ Scott-Denton, E., J.A. Williams and Pulver, J. R. 2014. Observer Coverage of the 2014 Gulf of Mexico Skimmer Trawl Fishery. NOAA Technical Memorandum NMFS-SEFSC-666. <http://dx.doi.org/10.7289/V5416V1R>

⁴²¹ Scott-Denton E., Cryer P.F., Duffin B.V., Duffy M.R., Gocke J.P., Harrelson M.R., Whatley A.J., Williams J.A. 2020. Characterization of the US Gulf of Mexico and South Atlantic Penaeidae and rock shrimp (Sicyoniidae) fisheries through mandatory observer coverage, from 2011 to 2016. *Mar. Fish. Rev.*, 82, pp. 17-47. <https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/mfr821-22.pdf>

⁴²² Cagle P. and West J. 2020. Evaluation of Commercial Shrimp Fishery Bycatch in Louisiana Waters, November 2020. Office of Fisheries Louisiana Department of Wildlife and Fisheries. https://www.wlf.louisiana.gov/assets/Resources/Publications/Commercial_Fishing_Seafood/Evaluation-of-Bycatch-in-the-Louisiana-Shrimp-Fishery_final.pdf

Table 36. Skimmer trawl observer data spanning 2011 to 2016 with additional Louisiana data for 2020. It applies to all skimmer trawl states and federal fisheries unless specified. Shrimp species are marked in green (target catch). Main associated species are highlighted in blue. Minor associated species are highlighted in yellow. Note, weighted average excludes the N/As from the calculated average of the percentages from the six datasets.

Common and Scientific name	Pulver 2012 kg	Pulver 2012 %	Pulver 2013 kg	Pulver 2013 %	Scott-Denton 2014 kg	Scott-Denton 2014 %	Scott-Denton 2020 kg	Scott-Denton 2020 %	Observer data (2017-2022) (kg)	Observer data (2017-2022) (%)	LDWF 2020 (kg)	LDWF 2020 (%)	Weighted Average %	Cumulative Catch Percentage
Fish (superclass), <i>Pisces</i>	3,530	35.8	2,175	25.9	1,616.9	40.96	7635.8	32.7	2,295.7	31.0	164	7.46	29.13	29.1
Brown shrimp, <i>Farfantepenaeus aztecus</i>	3,782	38.3	2,561	30.5	1,019.2	25.82	7,575	32.6	1,192.0	16.1	99	4.48	24.77	53.9
White shrimp, <i>Litopenaeus setiferus</i>	622	6.3	1,132	13.5	321.1	8.13	2249.4	9.6	2,446.9	33.1	922	41.86	18.84	72.7
Atlantic croaker <i>Micropogonias undulatus</i>	798	8.1	768	9.1	794.4	20.13	2473.6	10.6	644.0	8.7	121	5.48	10.41	83.1
Crustacean	640	6.5	252	3	64.9	1.64	985.9	4.2	373.3	5.0	1	0.03	3.42	86.6
Gulf Menhaden <i>Brevoortia patronus</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	346	15.69	2.63	89.2
Debris (rocks, logs, etc.)	144	1.5	94	1.1	26.6	0.67	279.7	1.2	167.2	2.3	93	4.21	1.83	91.0
SeatROUT (genus) <i>Cynoscion sp</i>	128	1.3	131	1.6	57.2	1.45	343.1	1.5	121.7	1.6	42	1.93	1.58	92.6
Penaeid shrimp (brown, white, pink) <i>Penaeus spp.</i>	N/A	N/A	675	8	0.5	0.01	N/A	N/A	N/A	N/A	N/A	N/A	1.34	94.0
Invertebrate	53	0.5	78	0.9	7.2	0.18	137.7	0.6	55.8	0.8	66	3.00	0.99	94.9
Cownose ray <i>Rhinoptera bonasus</i>	N/A	N/A	305	3.6	N/A	N/A	412.2	1.8	10.2	0.1	7	0.30	0.98	95.9
Blue Crab <i>Callinectes sapidus</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	89	4.04	0.68	96.6
Spot <i>Leiostomus xanthurus</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	83	3.79	0.63	97.2
Atlantic Cutlassfish <i>Trichiurus lepturus</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	52	2.37	0.40	97.6
Hardhead Catfish <i>Ariopsis felis</i>	N/A	N/A	N/A	N/A	N/A	N/A	21.2	0.1	N/A	N/A	47	2.14	0.38	98.0
Spanish mackerel <i>Scomberomorus maculatus</i>	32	0.3	26	0.3	10.7	0.27	69.4	0.3	18.8	0.3	13	0.58	0.34	98.3
Gafftopsail Catfish <i>Bagre marinus</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	43	1.94	0.33	98.7
Spotted seatROUT <i>Cynoscion nebulosus</i>	20	0.2	39	0.5	5.4	0.14	65.2	0.3	6.5	0.1	10	0.44	0.28	98.9

Common and Scientific name	Pulver 2012 kg	Pulver 2012 %	Pulver 2013 kg	Pulver 2013 %	Scott-Denton 2014 kg	Scott-Denton 2014 %	Scott-Denton 2020 kg	Scott-Denton 2020 %	Observer data (2017-2022) (kg)	Observer data (2017-2022) (%)	LDWF 2020 (kg)	LDWF 2020 (%)	Weighted Average %	Cumulative Catch Percentage
Southern flounder <i>Paralichthys lethostigma</i>	19	0.2	4	0.1	22.3	0.56	48.2	0.2	7.8	0.1	2	0.11	0.21	99.2
Sheepshead <i>Archosargus probatocephalus</i>	N/A	N/A	39	0.5	N/A	N/A	44.5	0.2	2.3	0.0	3	0.13	0.14	99.3
Black drum <i>Pogonias cromis</i>	27	0.3	5	0.1	N/A	N/A	32.5	0.1	21.5	0.3	1	0.03	0.14	99.4
Blacktip shark <i>Carcharhinus limbatus</i>	25	0.3	23	0.3	N/A	N/A	48.1	0.2	N/A	N/A	0	0.02	0.14	99.6
Alligator gar <i>Atractosteus spatula</i>	N/A	N/A	40	0.5	N/A	N/A	39.8	0.2	N/A	N/A	N/A	N/A	0.12	99.7
Shrimp disards (brown, white, pink)	12	0.1	10	0.1	N/A	N/A	43.9	0.2	4.0	0.1	N/A	N/A	0.08	99.8
Atlantic sharpnose shark <i>Rhizoprionodon terraenovae</i>	17	0.2	10	0.1	N/A	N/A	26.2	0.1	0.8	0.0	N/A	N/A	0.07	99.8
Paddlefish <i>Polyodon spathula</i>	N/A	N/A	21	0.3	N/A	N/A	21.2	0.1	N/A	N/A	0	0.00	0.07	99.9
Red drum <i>Sciaenops ocellatus</i>	2	0	4	0	0.5	0.01	6.1	0	23.4	0.3	N/A	N/A	0.06	100.0
Bull shark <i>Carcharhinus leucas</i>	6	0.1	3	0	N/A	N/A	9.5	0	8.6	0.1	N/A	N/A	0.04	100.0
Bonnethead shark <i>Sphyrna tiburo</i>	1	0	1	0	N/A	N/A	1.6	0	0.7	0.0	N/A	N/A	0.00	100.0
King mackerel <i>Scomberomorus cavalla</i>	0	0	N/A	N/A	0.3	0.01	0.3	0	N/A	N/A	N/A	N/A	0.00	100.0
Lane snapper <i>Lutjanus synagris</i>	4	0	N/A	N/A	N/A	N/A	3.8	0	N/A	N/A	N/A	N/A	0.00	100.0
Cobia <i>Rachycentron canadum</i>	0	0	N/A	N/A	N/A	N/A	0.2	0	N/A	N/A	N/A	N/A	0.00	100.0

Butterfly net (used in Louisiana state waters only) data was available from 1 source:

1. Louisiana Shrimp Bycatch Study 2020⁴²³ using LA state waters data collected from June 2019 to July 2020 (note, the data was then provided disaggregated to the Assessment Team for use in specific gear types).

Table 37. Butterfly net (Louisiana UoAs only) observer data for 2019-2020. Shrimp species are marked in green (target catch). Main associated species are highlighted in blue. Minor associated species are highlighted in yellow.

Species	Total kg	% kg	Numbers	Mean kg	Cumulative Catch Percentage
WHITE SHRIMP	36.440	44.6			44.6
JELLYFISH SP.	7.579	9.3			53.8
HARDHEAD CATFISH	5.920	7.2	410	0.014	61.1
SAND SEATROUT	5.490	6.7	366	0.015	67.8
GAFFTOPSAIL CATFISH	5.030	6.2	159	0.032	73.9
GULF MENHADEN	4.950	6.1	536	0.009	80.0
BLUE CRAB	4.030	4.9	227	0.018	84.9
BROWN SHRIMP	3.055	3.7	10	0.306	88.6
ATLANTIC STINGRAY	1.480	1.8	1	1.480	90.5
ATLANTIC THREAD HERRING	1.400	1.7	138	0.010	92.2
HIGHFIN GOBY	1.000	1.2	37	0.027	93.4
SPOT	0.750	0.9	50	0.015	94.3
DEBRIS	0.730	0.9			95.2
SOUTHERN KINGFISH	0.600	0.7	1	0.600	95.9
SOUTHERN FLOUNDER	0.560	0.7	1	0.560	96.6
BAY WHIFF	0.502	0.6	21	0.024	97.2
THREADFIN SHAD	0.480	0.6	5	0.096	97.8
ATLANTIC CROAKER	0.351	0.4	45	0.008	98.3
BAY ANCHOVY	0.274	0.3	150	0.002	98.6
SILVER PERCH	0.261	0.3	13	0.020	98.9
VIOLET GOBY	0.250	0.3	3	0.083	99.2
HOGCHOKER	0.142	0.2	26	0.005	99.4
PINFISH	0.100	0.1	2	0.050	99.5
SPOTTED SEATROUT	0.090	0.1	2	0.045	99.6
GRAY SNAPPER	0.080	0.1	3	0.027	99.7
BAYOU KILLIFISH	0.040	0.0	2	0.020	99.8
MOJARRA SP.	0.040	0.0	3	0.013	99.8
BLUE CATFISH	0.030	0.0	2	0.015	99.8
LEAST PUFFER	0.030	0.0	3	0.010	99.9
STRIPED ANCHOVY	0.021	0.0	12	0.002	99.9
INSHORE LIZARDFISH	0.020	0.0	1	0.020	99.9
STRIPED MULLET	0.020	0.0	1	0.020	100.0
CREVALLE JACK	0.012	0.0	7	0.002	100.0
ATLANTIC CUTLASSFISH	0.010	0.0	1	0.010	100.0
ATLANTIC SPADEFISH	0.010	0.0	1	0.010	100.0

⁴²³ Cagle P. and West J. 2020. Evaluation of Commercial Shrimp Fishery Bycatch in Louisiana Waters, November 2020. Office of Fisheries Louisiana Department of Wildlife and Fisheries. https://www.wlf.louisiana.gov/assets/Resources/Publications/Commercial_Fishing_Seafood/Evaluation-of-Bycatch-in-the-Louisiana-Shrimp-Fishery_final.pdf

Fish (Pisces), Crustacea, and Invertebrate super groupings

In the federal observer data, the “*Fish (superclass), Pisces*” grouping that appears in the otter and skimmer trawl data is a categorization of fish species that are caught in very small amounts by fishing vessels. Due to logistic constraints onboard in terms of time and man-power, it is impossible to identify all species to the species level. The observer programs define which species are most common and therefore place more emphasis on training observers to identify those species. For the less common species, identification for onboard observers is more challenging and thus those species are grouped into one larger group of less common species.

The total number of species that is grouped into the fish superclass is unknown. The assessment team used the single year study produced by LGL to help determine the number and identity of the species contained within this grouping.⁴¹⁷ The assessment team concluded that there are 261 species at a minimum, but the maximum is unknown and can be greater than 500 total species. In the federal observer data, this fish grouping is 28.1% to 31.7% of the otter trawl observed catch. This would indicate that each species within this grouping has an average contribution of 0.12%.

The same can be said for the crustacea and invertebrate groupings. The crustacea group excludes all shrimp species for their classification as those are identified to species or genus. The invertebrate grouping excludes all crustaceans (and shrimp species) as those are identified to at least phylum. There are at least 92 species that comprised the crustacea grouping and 106 species included in the invertebrate grouping. Again, the possible number of species actually included in these taxonomic groupings are likely much higher and these values merely represent a minimum value taken from a one-year sample. Crustacea represents between 6% and 12% in the observer data the assessment team obtained which indicates that each species represents less than 0.13% of the total catch. Invertebrates represent between 3.8% and 5.3% in the observer data the assessment team obtained which indicates that each species represents less than 0.05% of the total catch.

9.5.1.3 Supporting Clause 12.2.1.

12.2.1. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on main associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.	
Relevance:	Relevant
Evaluation Parameters	
Process: <i>There is a process that accounts for the most probable adverse impacts of the unit of certification on main associated species. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk, the more generic evidence based on similar fishery situations, then, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP or bycatch of nontarget fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear-habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.</i>	<input checked="" type="checkbox"/>
EVIDENCE: <u>All UoAs:</u> NOAA and The Council have processes that that accounts for the most probable adverse impacts of the unit of certification on main associated species. In the Southeast Region, there are 5 NOAA observer programs under the Southeast Fisheries Science Center. ⁴²⁴ NOAA Fishery observers collect catch and bycatch data from US commercial fishing and processing vessels, as well as from shore-side processing plants and receiving vessels. The data they collect are used to monitor federal fisheries, assess fish populations, set fishing quotas, inform management of those fisheries, and support compliance with fishing and safety regulations. The Southeast Fisheries Observer Program accumulated 3,461 sea days of 6 fisheries in 2018 with a total of 82 observers. ⁴²⁵ Of this total, 1,814 sea days of observations were expended on the commercial shrimp fishery. The observer program collects data on the frequently caught fish and invertebrate species as well as monitor interactions between the fleet and protected species. These reports are published periodically by NOAA to document the bycatch taken by the fleet. ^{426,427}	
Current status/Appropriateness/Effectiveness: <i>There is evidence that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on main associated species (e.g. recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.</i>	<input checked="" type="checkbox"/>

⁴²⁴ <https://www.fisheries.noaa.gov/southeast/fisheries-observers/fishery-observer-programs-southeast>

⁴²⁵ <https://spo.nmfs.noaa.gov/sites/default/files/TMSPO206.pdf>

⁴²⁶ Scott-Denton E., Cryer P.F., Duffy M.R., Gocke J.P., Harrelson M.R., Kinsella D.L., Nance J.M., Pulver J.R., Smith R.C., Williams J.A. 2012. Characterization of the US Gulf of Mexico and South Atlantic penaeid and rock shrimp fisheries based on observer data. Mar. Fish. Rev., 82 (2020), pp. 17-47.

<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/MFR/mfr744/mfr7441.pdf>

⁴²⁷ Scott-Denton E., Cryer P.F., Duffin B.V., Duffy M.R., Gocke J.P., Harrelson M.R., Whatley A.J., Williams J.A. 2020. Characterization of the US Gulf of Mexico and South Atlantic Penaeidae and rock shrimp (Sicyoniidae) fisheries through mandatory observer coverage, from 2011 to 2016. Mar. Fish. Rev., 82, pp. 17-47.

<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/mfr821-22.pdf>

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EVIDENCE:

All UoAs:

For all UoAs, we note that brown, white and pink shrimp species assessed under Key Component B as target species. Each specific species has their own UoA for which they are assessed as a target stock. In the UoAs where they are not assessed, they are considered main associated species. For example, in any UoA where brown shrimp is target (assessed under P1), the catch of white and pink shrimp will be main associated species, and so on. This assumption is made for two reasons, 1) in the tables above (Table 33, Table 34, and Table 35) shrimp may be grouped under one penaeid group without specification of what percentages each shrimp makes up (hence assumptions need to be made), and 2) independently of percentages in the bycatch tables, it is more precautionary to treat each shrimp species as main associated species since they are generally targeted and retained (as opposed to treating them as minor associated).

Based on the above tables and the rationale on shrimp as main associated species we can conclude that all three shrimp species are not managed using a stock assessment and thus require the use of the Data Deficient Framework to assess these species as main associated species.

The bulk of the information on these species can be found in Key Component B above (Fundamental Clauses 4 through 7). All of these species are essentially an annual crop and do not live more than 18 months. As they have such a short life span, most of the productivity traits for all three species are highly productive. They grow to small sizes, live a short lifespan, have high population and intrinsic growth, are highly fecund, and mature at a young age/size. The susceptibility traits are more variable, but overall, there is low risk in terms of these traits.

The scores for the shrimp species are as follows:

Species	Productivity Score	Susceptibility Score	Vulnerability Score
Brown Shrimp	2.91	2.67	1.67
White Shrimp	2.91	2.67	1.67
Pink Shrimp	3	2.67	1.67

In all, all three species have a low-risk vulnerability score. The brown shrimp (*Farfantepenaeus aztecus*) received a vulnerability score of 1.67. The white shrimp (*Litopenaeus setiferus*) received a vulnerability score of 1.67. And the pink shrimp (*Farfantepenaeus duorarum*) received a vulnerability score of 1.67. These low vulnerability scores indicate that these species are not at risk to be threatened by the most probable adverse impacts of the fishery. Thus, they meet the requirements for this supporting clause.

Otter trawl UoAs:

The main associated species for the otter trawl UoAs are Atlantic croaker (*Micropogonias undulatus*) and sand/silver seatrout (*Cynoscion spp.*) (Table 33).

Atlantic Croaker (*Micropogonias undulatus*):

There is not a formal stock assessment for Atlantic croaker in the Gulf of Mexico, therefore abundance and fishing mortality estimates cannot be determined. Although there is not information on current stock status, the shrimp fishery tracks CPUE for Atlantic Croaker.

Gulf of Mexico Atlantic croaker populations shows ties to the annual effort within the shrimping fishery. There is an apparent exponential decay relationship between data collected as part of the Southeast Area Monitoring and Assessment Program (SEAMAP) CPUE and shrimping effort measured in nominal days per year (Figure 42A). In years that there is more effort, the CPUE of Atlantic croaker is much lower than lower effort years. In recent years, lower shrimping effort has been observed in the Gulf of Mexico. Historically, fishing pressure within the Gulf of Mexico shrimp fishery was at its highest from the mid-80's to 2002. From 2003 onward,

12.2.1. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on main associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.

there has been fishing pressure has been at about one-third of the historical average from the high effort period (Figure 42B). As a result of multiple years of low shrimping effort, Atlantic croaker CPUE has continued to show a general increasing trend.

With such a highly productive life history, the Atlantic croaker populations and biomass are able to respond positively and rapidly recover to reductions in fishing effort. All in all, Atlantic croaker is not a risk for overfishing resulting from the US GOM shrimp fishery.

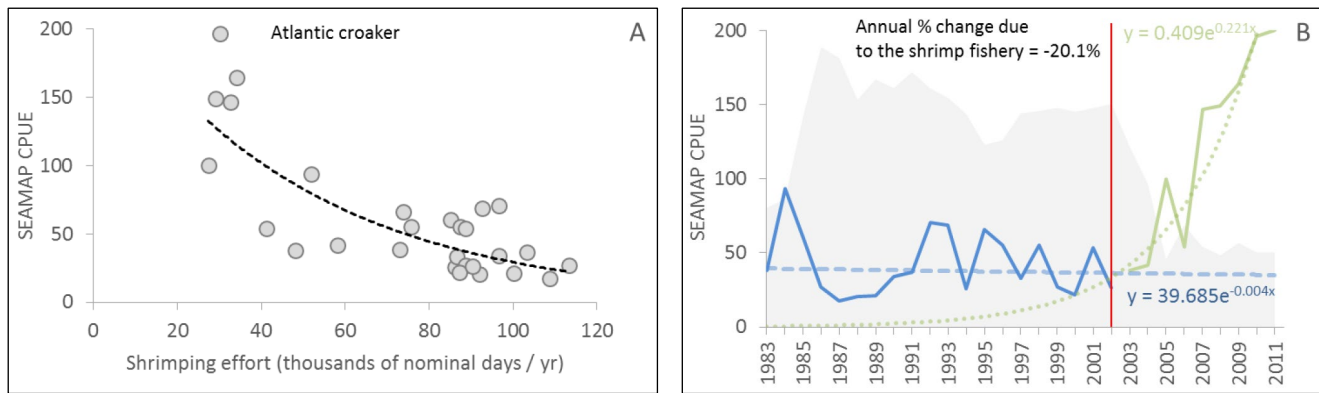


Figure 42. Atlantic croaker CPUE from the SEAMAP (fisheries-independent) trawl program as a function of penaeid shrimp trawling effort (A) and year (B). Exponential trends are given as dashed lines. The shaded background in Graph B indicates the pattern in total shrimping effort for the Gulf of Mexico (scale not shown); the red vertical line highlights the most recent point from which shrimping effort declined (Source: Raborn *et al.*, 2014)⁴²⁸.

Sand/Silver Seatrout (*Cynoscion spp.*):

There are three species of seatrout that occur in the Gulf of Mexico shrimp fishery: the sand seatrout (*C. arenarius*), the silver seatrout (*C. nothus*), and the spotted seatrout (*C. nebulosus*). The term “*Cynoscion sp.*” that appears in the catch record only refers to the sand and silver seatrout as they are commonly mistaken for one another whereas the spotted seatrout is easily distinguished from the others⁴²⁹. Within the seatrout complex where taxonomic resolution is challenging, the more common of the two species is the silver seatrout.⁴³⁰ Both the sand seatrout⁴³¹ and silver seatrout⁴³² are classified as Least Concern by the IUCN redlist and have stable population trends.

This summary/assessment will only consider sand and silver seatrout when referencing *Cynoscion spp.* and will exclude the spotted seatrout (*C. nebulosus*) unless explicitly stated. Also, spotted seatrout is specifically required to be documented individually through the observer program, so it is separated out in the observer data and not aggregated in the *Cynoscion spp.* category.

⁴²⁸ Raborn, S., B. Gallaway and J. Cole. 2014. Descriptive assessment of the most prevalent finfish species in the US Gulf of Mexico Penaeid shrimp fishery bycatch. Ecological Research Associates, Inc.

⁴²⁹ GSMFC. 2011. THE SAND AND SILVER SEATROUT FISHERY OF THE GULF OF MEXICO, UNITED STATES: A Fisheries Profile. GULF STATES MARINE FISHERIES COMMISSION, 2404 Government Street, Ocean Springs, Mississippi 39564. <https://www.gsmfc.org/publications/GSMFC%20Number%20197.pdf>

⁴³⁰ Scott-Denton, E., P. Cryer, M. Duffy, J. Gocke, M. Harrelson, D. Kinsella, J. Nance, J. Pulver, R. Smith, and J. Williams. 2012. Characterization of the U.S. Gulf of Mexico and South Atlantic penaeid and rock shrimp fisheries based on observer data. Marine Fisheries Review 74:1-27. <https://aquadocs.org/bitstream/handle/1834/30409/mfr7441.pdf?sequence=1>

⁴³¹ Espinosa-Perez, H. & Robertson, R. 2020. *Cynoscion arenarius*. The IUCN Red List of Threatened Species 2020: e.T196690A79104403. <https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T196690A79104403.en>. <https://www.iucnredlist.org/es/species/196690/79104403>

⁴³² Chao, L., Collette, B.B., Espinosa-Perez, H., Jelks, H., Tolan, J. & Vega-Cendejas, M. 2015. *Cynoscion nothus* (Gulf of Mexico assessment). The IUCN Red List of Threatened Species 2015: e.T47147574A69532642. <https://www.iucnredlist.org/es/species/47147574/69532642>

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There is not a formal stock assessment for seatrout in the Gulf of Mexico, therefore abundance and fishing mortality estimates cannot be determined. Despite the lack of information for *Cynoscion spp.*, both state and federal management authorities track the abundance for the spotted seatrout (*C. nebulosus*). Although there is not information on current stock status, the shrimp fishery tracks CPUE for *Cynoscion spp.*

Gulf of Mexico seatrout populations do not show significant population changes in response to shrimping effort. The fitted regression curve is largely horizontal which implies no causality relationship, however there is a slight negative trend with an average rate of change equal to ~ 0.1 SEAMAP CPUE per 1000 nominal days per year (Figure 43A). While there may not be a strong causal relationship between effort and CPUE, there is still a noticeable trend between time and CPUE (Figure 43B). In recent years, lower shrimping effort has been observed in the Gulf of Mexico. Historically, fishing pressure within the Gulf of Mexico shrimp fishery was at its highest from the mid-80's to 2002. From 2003 onward, there has been fishing pressure has been at about one-third of the historical average from the high effort period (Figure 43B). After the reduction in shrimping effort in 2003, the abundance of seatrout in the Gulf of Mexico (proxied by CPUE) has shown growth over time, albeit with a lot of interannual variability.

With such a highly productive life history, the seatrout populations and biomass are able to respond positively and rapidly recover to reductions in fishing effort. *Cynoscion spp.* are not a risk for overfishing resulting from the US GOM shrimp fishery.

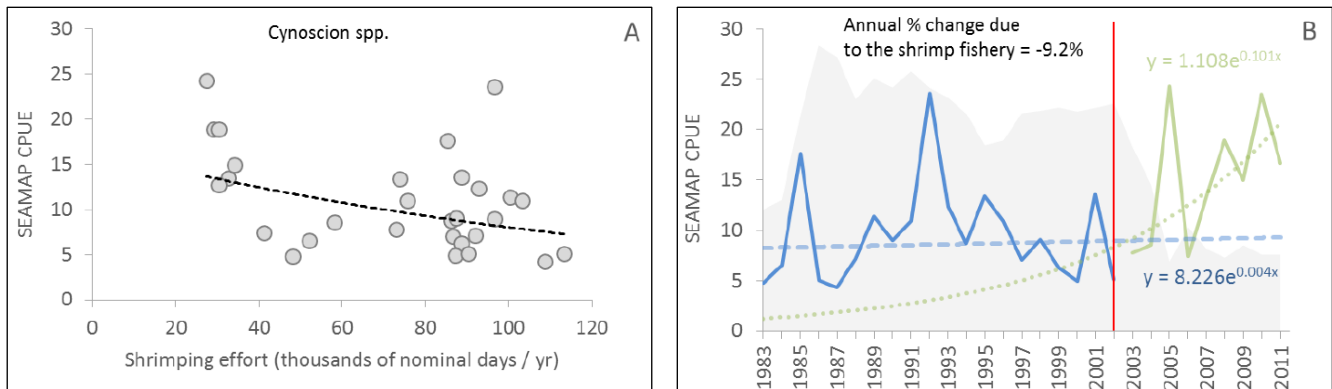


Figure 43. Seatrout CPUE from the SEAMAP program as a function of penaeid shrimp trawling effort (A) and year (B). Exponential trends are given as dashed lines. The shaded background in Graph B indicates the pattern in total shrimping effort for the Gulf of Mexico (scale not shown); the red vertical line highlights the most recent point from which shrimping effort declined (Source: Raborn *et al.*, 2014)⁴²⁸.

Skimmer Trawl UoAs

There are no main associated species for the skimmer trawl UoAs (Table 34)

Butterfly net UoAs:

The main associated species for the otter trawl UoAs are hardhead and Gafftopsail catfishes, sand seatrout (*Cynoscion arenarius*), and Gulf menhaden (*Brevoortia patronus*) (Table 35).

Hardhead and Gafftopsail catfishes:

Hardhead and Gafftopsail catfish do not have stock assessments or reference point-based management across the Gulf of Mexico, hence these species are assessed through the RFM Data Deficient Framework. This framework assesses the level of vulnerability of species based on behavioural and life history characteristics and how those interact with the fishing gear.

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The Gafftopsail catfish is most commonly found in the western central Atlantic Ocean, the Gulf of Mexico, and the Caribbean Sea. Its spines are venomous and cause painful wounds, which often discourages fishermen from catching them. Its diet consists chiefly of crustaceans: crabs, shrimp, and prawns. The hardhead catfish is most commonly found near the shores of the Western Atlantic Ocean, particularly in the Gulf of Mexico, the Florida Keys, and the southeast coast of the US. It gets its name from the signature bony plate extending from its eyes to the dorsal fin. Its diet consists of crustaceans, algae, sea grasses, and a variety of small fish⁴³³.

Hardhead catfish (*Ariopsis felis*) are found in the nearshore waters and brackish estuaries of the southeast US Atlantic coast and the Gulf coast from Cape Cod to the Yucatan. They prefer sandy or muddy bottoms and tolerate a wide range of salinity from the open ocean to nearly fresh. They are found in coastal waters from spring through fall. During winter they move into deeper waters. Hardhead catfish are considered particularly abundant and widespread in Louisiana⁴³³. Occasional mass mortalities are observed on the Gulf Coast as a result of disease and low oxygen levels, which are often associated with algae blooms⁴³⁴.

The Gulf of Mexico population quickly rebounds from these mortality events and is not declining. Data from angler surveys and industrial trawls in the southeastern US and Gulf of Mexico likely underestimated catches of hardhead sea catfish, as they are frequently discarded at sea. In the Gulf of Mexico, this species is widely distributed, common and abundant where it occurs in shallow coastal and estuarine areas. It frequently occurs as bycatch in trawl fisheries and in recreational saltwater rod and line fisheries but is purposefully avoided for nuisance reasons. Due to its wide distribution and stable population in the Gulf of Mexico, it is not considered to be experiencing significant overall declines. Therefore, it is listed as Least Concern in the Gulf of Mexico, with stable population, based on a 2014 assessment.

Most important for this assessment, catfish are considered to be very hardy fish (Peyton Cagle, LDWF Crustacean Program pers. comm). This can be also deducted from Table 3 of the GULF RFM Louisiana Blue crab fishery 3rd Surveillance report⁴³⁵ where, of all of the catfish species caught in derelict crab traps (i.e., lost traps with very high soak time) in Pontchartrain, Barataria and Terrebonne Basins from 2016-2017, 89% were found alive. The post capture mortality in (mostly passive) butterfly nets, considering the 1-2 hours soak time, is conceivably higher if not at least comparable to that a derelict trap mortality. Hardhead and Gafftopsail catfish are not generally retained and are therefore released back in the water. The effective bycatch and mortality of these catfish species is therefore considered nominal.

Both species have fairly similar life history characteristics. They have slow population growth, with moderate individual growth and natural mortality rates.⁴³⁶ The hardhead catfish lives marginally longer (18-24 years vs. 9-10 years), but grows to a smaller maximum size (50 cm to 70 cm) than the Gafftopsail catfish.⁴³⁷ Both species are mouth brooders where the male will carry eggs (~86 for hardhead and ~33 for Gafftopsail) in their mouth until hatching.⁴³⁸ Both are opportunistic feeders and will wait for prey to either swim or walk by before feeding giving them trophic levels between 3.2 and 3.5.⁴³⁶

⁴³³ Courtney J. Klinkmann T., Torano J., Courtney M. 2012. Weight-Length Relationships in Gafftopsail Catfish (*Bagre marinus*) and Hardhead Catfish (*Ariopsis felis*) in Louisiana Waters <https://arxiv.org/ftp/arxiv/papers/1210/1210.3062.pdf>

⁴³⁴ <http://gcrf.usm.edu/public/fish/hardhead.catfish.php>

⁴³⁵ Ciccio Romito V., Lipcius R. 2020. Audubon Nature Institute Gulf United For Lasting Fisheries (G.U.L.F.) Responsible Fisheries Management Certification Scheme 3rd Surveillance Assessment Report For The Louisiana Blue Crab Commercial Fishery <https://www.audubongulf.org/wp-content/uploads/2020/05/Form-9i-1-GULF-RFM-LA-Blue-Crab-3rd-Surveillance-FINAL-28Jan2020.pdf>

⁴³⁶ Froese, R. and D. Pauly. Editors. 2023. Hardhead catfish, *Ariopsis felis* and Gafftopsail catfish, *Bagre marinus*. FishBase. World Wide Web electronic publication. www.fishbase.org, (06/2023)

⁴³⁷ Flynn, S., Midway, S. and Ostrowski, A. (2019), Age and Growth of Hardhead Catfish and Gafftopsail Catfish in Coastal Louisiana, USA. Mar Coast Fish, 11: 362-371. <https://doi.org/10.1002/mcf2.10089>

⁴³⁸ Pensinger L. G. 2020. Reproductive Biology and Trophic Niche of Hardhead Catfish in the Northern Gulf of Mexico. LSU Master thesis. https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=6089&context=gradschool_theses#:~:text=Mean%20fecundity%20is%2086%20oocytes,range%20of%2035%2D196%20oocytes.

12.2.1. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on main associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.

Both species exhibit high similarity in terms of susceptibility as well. There is limited management for these species in some of the Gulf states. With geographic ranges that don't extend beyond the western central Atlantic Ocean and GOM, there is moderate areal and geographic overlap.⁴³⁶ But as this species is a coastal benthic species, there is high overlap with the shrimping gear used in all of the UoAs.

In all, both species have a low-risk vulnerability score. The hardhead catfish (*Arius felis*) scored 2.0 for productivity and 2.5 for susceptibility for the PSA. The final vulnerability score is 1.8. The Gafftopsail catfish (*Barge marinus*) scored 1.78 for productivity and 2.7 for susceptibility as part of the PSA. The final vulnerability score for the Gafftopsail catfish is a 2.09. These low vulnerability scores indicate that these species are not at risk of being threatened by the most probable adverse impacts of the fishery. Thus, they meet the requirements for this supporting clause.

Sand seatrout:

Refer to the Sand/Silver Seatrout evidence provided in the otter trawl UoA section of this Evaluation Parameter.

Gulf menhaden:

Gulf menhaden (*Brevoortia patronus*) support the largest fishery (i.e., a reduction fishery for fishmeal and fishoil) by yield in the Gulf of Mexico (GOM) and are a key forage species for many marine predators. It occurs largely within Louisiana state waters. Gulf menhaden in the Gulf of Mexico are considered to be part of a single stock. While other menhaden species are caught in the fishery, Gulf menhaden account for >99% of landings. For assessment purposes, the Gulf menhaden population is, therefore, considered to represent the total population of menhaden in the Gulf of Mexico (SEDAR 2013).⁴³⁹ Gulf menhaden are a short-lived, highly fecund species, whose high productivity allows them to replenish their population annually. When taken in isolation, Gulf menhaden harvests might seem quite high, generally between 400,000 and 600,000 mt annually in recent years; however, harvest volumes must be considered in the context of the total number of menhaden in the Gulf population.

The Gulf of menhaden fishery is managed on the basis of single-species reference points. The 40% of the stock level that would be expected in the absence of fishing (i.e. 40%B₀) was used in the MSC assessment of Gulf menhaden (see 1st and 2nd surveillance reports at <https://fisheries.msc.org/en/fisheries/u.s.-gulf-of-mexico-menhaden-purse-seine/@@assessments>) as the level at which the point where serious ecosystem impacts could be expected to occur. This was consistent with the level chosen in the MSC Initial Assessment (2019)⁴⁴⁰.

Based on the results from the 2021 update assessment, see the 1+ biomass in the terminal year $1+Biomass_{2020} > 40\%B_0$.⁴⁴¹ Furthermore, the stock is estimated to have been below 40%B₀ only once since the time-series began in 1977 (Figure 44).

Therefore, Gulf menhaden are not at risk from overfishing from the US GOM shrimp fishery.

⁴³⁹ SEDAR. 2013. SEDAR 32A Stock Assessment Report Gulf of Mexico Menhaden September 2013. (eds) Schueller, A., Smith, J., and VanderKooy, S. <https://sedarweb.org/documents/sedar-32a-stock-assessment-report-gulf-of-mexico-menhaden/>

⁴⁴⁰ Dignan S., Mateo I., Allain B. 2019. MSC Public Certification Report of the U.S Gulf of Mexico menhaden purse seine fishery. Global Trust Certification Ltd (then part of SAI Global). 360 pp. <https://fisheries.msc.org/en/fisheries/u.s.-gulf-of-mexico-menhaden-purse-seine/@@assessments>

⁴⁴¹ GDAR 03. 2021. Gulf Menhaden Stock Assessment Update. Gulf States Marine Fisheries Commission, 73 pp. <https://www.gsmfc.org/publications/GSMFC%20Number%20308.pdf>

12.2.1. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on main associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.

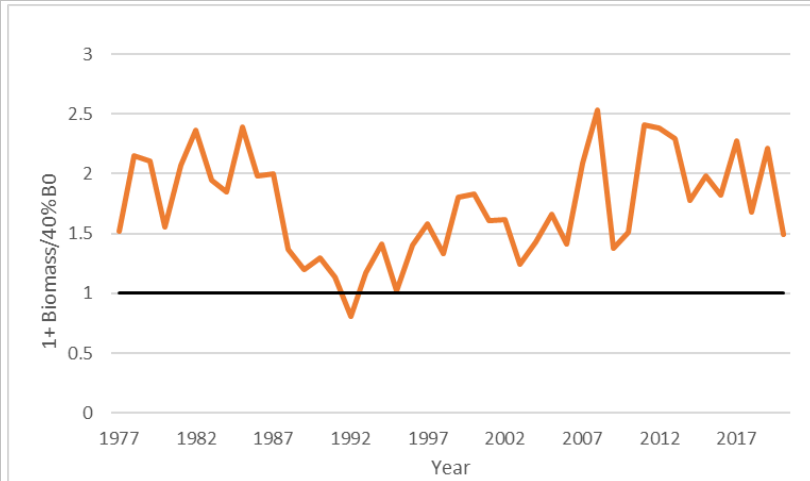


Figure 44. Stock status with respect to the point where serious ecosystem impacts could occur (i.e., 40%B0) for the Gulf menhaden stock (1977–2020) (Source: Data from GDAR 03 2021).⁴⁴¹

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on main associated species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these nontarget species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.



EVIDENCE:
 Refer to the evidence provided in the *Process and Current status/Appropriateness/Effectiveness* Evaluation Parameters above.

References:	Refer to embedded footnotes		
Numerical score:	Starting score	- (Number of EPs <u>NOT</u> met x 3) =	Overall score
	10	(0 x 3) =	10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance		
Non-conformance Number (if applicable):	N/A		

9.5.1.4 Supporting Clause 12.2.2.

12.2.2. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.

Relevance: **Relevant**

Evaluation Parameters	Met?
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<p>Process: <i>There is a process that accounts for the most probable adverse impacts of the unit of certification on minor associated species. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations (proxies), then, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear-habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.</i></p>	<input checked="" type="checkbox"/>
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EVIDENCE:
All UoAs:
 NOAA and The Council have processes that accounts for the most probable adverse impacts of the unit of certification on main associated species. In the Southeast Region, there are 5 NOAA observer programs under the Southeast Fisheries Science Center.⁴⁴² NOAA Fishery observers collect catch and bycatch data from US commercial fishing and processing vessels, as well as from shore-side processing plants and receiving vessels. The data they collect are used to monitor federal fisheries, assess fish populations, set fishing quotas, inform management of those fisheries, and support compliance with fishing and safety regulations. The Southeast Fisheries Observer Program accumulated 3,461 sea days of 6 fisheries in 2018 with a total of 82 observers.⁴⁴³ Of this total, 1,814 sea days of observations were expended on the commercial shrimp fishery.

The observer program collects data on the frequently caught fish and invertebrate species as well as monitor interactions between the fleet and protected species. These reports are published periodically by NOAA to document the bycatch taken by the fleet.^{444,445}

<p>Current status/Appropriateness/Effectiveness: <i>There is evidence that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on minor associated species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.</i></p>	<input checked="" type="checkbox"/>
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⁴⁴² <https://www.fisheries.noaa.gov/southeast/fisheries-observers/fishery-observer-programs-southeast>

⁴⁴³ <https://spo.nmfs.noaa.gov/sites/default/files/TMSPO206.pdf>

⁴⁴⁴ Scott-Denton E., Cryer P.F., Duffy M.R., Gocke J.P., Harrelson M.R., Kinsella D.L., Nance J.M., Pulver J.R., Smith R.C., Williams J.A. 2012. Characterization of the US Gulf of Mexico and South Atlantic penaeid and rock shrimp fisheries based on observer data. Mar. Fish. Rev., 82 (2020), pp. 17-47.

<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/MFR/mfr744/mfr7441.pdf>

⁴⁴⁵ Scott-Denton E., Cryer P.F., Duffin B.V., Duffy M.R., Gocke J.P., Harrelson M.R., Whatley A.J., Williams J.A. 2020. Characterization of the US Gulf of Mexico and South Atlantic Penaeidae and rock shrimp (Sicyoniidae) fisheries through mandatory observer coverage, from 2011 to 2016. Mar. Fish. Rev., 82, pp. 17-47.

<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/mfr821-22.pdf>

12.2.2. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.

EVIDENCE:

Otter trawl UoAs:

The minor associated species for the otter trawl UoAs are Gulf menhaden (*Brevoortia patronus*), longspine porgy (*Stenotomus caprinus*), blue crab (*Stenotomus caprinus*), beltfish (*Trichiurus lepturus*), spot croaker (*Leiostomus xanthurus*), Gafftopsail catfish (*Bagre marinus*), box jellyfish (*Carybdeidae*), hardhead catfish (*Arius felis*), bigeye searobin (*Prionotus longispinosus*), swimming crab (*Portunus spinimanus/gibbesii*), cownose ray (*Rhinoptera bonasus*), Gulf butterflyfish (*Peprilus burti*), and pinfish (*Lagodon rhomboides*) (Table 33).

The **longspine porgy, beltfish, spot croaker, box jellyfish, bigeye searobin, gulf butterflyfish, and pinfish** are all classified as having low fishing vulnerability from Cheung *et al.* (2005).⁴⁴⁶ The system and calculation take species' life history traits and ecological characteristics to assess their level of vulnerability to marine fishery exploitation. These low vulnerability levels combined with low overall catch levels by the UoAs indicate that these species are not at risk of being threatened by the most probable adverse impacts of the fishery. Thus, they meet the requirements for this supporting clause.

The **Gafftopsail and hardhead catfish** were assessed as main associated species under Supporting Clause 12.2.1 in the butterfly net UoAs (both species). These species satisfied the requirements for Supporting Clause 12.2.1 and thus the meet the requirements for this supporting clause. Refer to the otter trawl and butterfly net UoA sections in the 12.2.1 *Current status/Appropriateness/Effectiveness* Evaluation Parameter for detailed evidence.

Blue crab:

Louisiana blue crab is actively managed by the Louisiana Department of Wildlife and Fisheries (LDWF). Assessment of stock status is conducted annually based on indices of exploitable biomass generated by the LDWF fishery-independent blue crab survey, and on estimates of fishing mortality generated using harvest data from the LDWF Trip Ticket system and exploitable biomass estimates. The data and information are used in stock assessments conducted at regular intervals (West *et al.* 2011, 2014), and in updates to the stock assessment in 2016, 2018, 2019 and 2022. The most recent update stock assessment was conducted in 2022. The previous update stock assessment was conducted in early 2019 due to the overfished status of the fishery in 2015 and to high fishing mortality near the limit reference point in 2014. Since 2016 the stock has neither been overfished nor has overfishing occurred (West *et al.* 2022).⁴⁴⁷

The previous benchmark assessment (West *et al.*, 2011) established precautionary limits to fishing by requiring that exploitable biomass not fall below the three lowest levels observed (1968 – 2009) where the stock demonstrated sustainability (i.e., no observed declines in recruitment over a wide-range of exploitable biomasses). This is equivalent to maintaining the stock above a limit spawning potential ratio (SPR; Goodyear, 1993). Louisiana blue crab data do not allow for reliable estimates of MSY. The assessment, therefore, defined a limit based upon the history of the fishery (i.e., a 17.6% SPR_{limit}). The fishing mortality rate limit F_{limit} and SSB_{limit} that are equivalent to this SPR_{limit} were estimated as 1.02 year⁻¹ and 15.53 million lb, respectively (West *et al.* 2011). To define the targets of fishing (i.e., SSB, F, and SPR) sufficiently far from the limits as a buffer from random variability of the environment, the biomass target reference point (SSB_{target}) is defined as SSB_{limit} × 1.5 = 23.30 million lb. This biomass is achieved when there is an equilibrium SPR_{target} of 26.4% and F_{target} of 0.80 year⁻¹. These reference points are revised during each update stock assessment.

In the 2022 stock assessment update (West *et al.*, 2022) the SPR_{limit} was revised to 23.6%. The fishing mortality rate limit F_{limit} and SSB_{limit} that are equivalent to this SPR_{limit} were estimated as 0.86 year⁻¹ and 24.5 million lb, respectively. To define the targets of fishing (i.e., SSB, F, and SPR) sufficiently far from the limits as a buffer from random variability of the environment, the biomass target

⁴⁴⁶ Cheung, W.W., Pitcher, T.J. and Pauly, D., 2005. A fuzzy logic expert system to estimate intrinsic extinction vulnerabilities of marine fishes to fishing. *Biological conservation*, 124(1), pp.97-111. <https://www.sciencedirect.com/science/article/pii/S000632070500042X>

⁴⁴⁷ West, J., Lang E., and P. Cagle. 2022. Update Assessment of Blue Crab *Callinectes sapidus* in Louisiana waters. Louisiana Department of Wildlife and Fisheries, Report. https://www.wlf.louisiana.gov/assets/Resources/Publications/Stock_Assessments/Blue_Crab/2022-Update-Assessment-of-Blue-Crab.pdf

12.2.2. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.

reference point (SSB_{target}) was revised to $SSB_{limit} \times 1.5 = 36.7$ million lb. This biomass is achieved when there is an equilibrium SPR_{target} of 35.4% and F_{target} of 0.63 year^{-1} . The revised reference points are now more conservative than those in previous years (West *et al.* 2011, 2014, 2016, 2018, 2019). Updates have been provided of the time series of fishing mortality rates and exploitable biomass relative to the targets and limits of each reference point.

Fishing mortality rates exceeding F_{limit} indicate overfishing; stock biomasses below SSB_{limit} indicate an overfished condition. The 2015 to 2020 estimates of F were below the target F_{target} and far lower than the limit F_{limit} , suggesting that the stock has not been experiencing overfishing recently. Similarly, the 2016 to 2021 estimates of SSB were also near or above the target SSB_{target} and much higher than the limit SSB_{limit} (Figure 45), suggesting that the stock has not been overfished recently. These current estimates of fishing mortality and exploitable biomass suggest that the fishery is sustainably exploiting the blue crab stock and that recent management measures have had some positive effects, although the adult and juvenile indices of abundance and biomass remain below historical high levels, indicates that cautious management should continue to be employed.

The levels for SSB and F indicate that these species are not at risk of being threatened by the most probable adverse impacts of the fishery. Thus, they meet the requirements for this supporting clause.

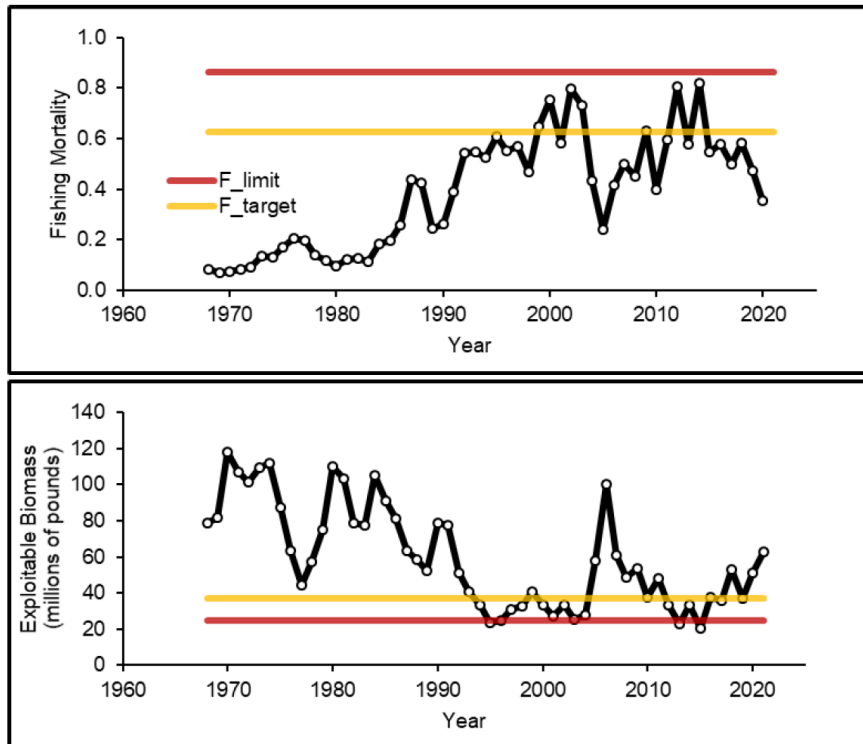


Figure 45. Time-series of catch-survey model fishing mortality rates and exploitable biomass estimates relative to management benchmarks.

12.2.2. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.

Cownose ray:

The cownose ray is a benthopelagic species known to occur in coastal marine ecosystems and coastal bays and estuaries where there is lower salinity.⁴⁴⁸ It is a decently productive, highly studied species in the GOM.⁴⁴⁹ It reaches sexual maturity at approximately 3 years and lives to be at least 20 years old and 100.8 cm in size.^{450,449} It has a population growth, individual growth, and natural mortality coefficients of <0.15, 0.19, and 0.076, respectively.⁴⁴⁹ Females give live birth and produce between one and two pups per pregnancy, and this k-selective reproductive strategy gives high rates of offspring survival.⁴⁵¹ This species feeds on benthic invertebrates such as mussels, clams, crabs, and small fishes giving it a trophic level of 3.2.⁴⁵⁰

This species is not actively managed by any coastal states nor is it actively targeted by commercial or recreational harvesters, however localities place limits on catches for unmanaged fishes, for which the cownose ray falls into.^{452,453} It is known to occur across all tropical, subtropical and temperate latitudes in the western Atlantic Ocean and GOM.⁴⁵⁴ This species forms large schools which can interact with the fishery, but due to the magnitude is often avoided by harvesters as it is picked up by onboard sonar equipment; the schooling behavior does not indicate it is more or less susceptible to be caught. However, the installation of TEDs on skimmer and otter trawl nets should exclude most of the possible encounters of this species.⁴⁵¹ When they are captured, there is a high chance of post capture survival.⁴⁵⁵

The American cownose ray scored 1.9 for productivity and 2.56 for susceptibility as part of the PSA. The final vulnerability score for this species is a 1.91, which indicates that these species are not at risk to be threatened by the most probable adverse impacts of the fishery. Thus, they meet the requirements for this supporting clause.

Skimmer Trawl UoAs

The minor associated species for the skimmer trawl UoAs are Atlantic croaker (*Micropogonias undulatus*), Gulf menhaden (*Brevoortia patronus*), and sand/silver sea trout (*Cynoscion spp.*) (Table 34)

All three of these species were assessed as main associated species under Supporting Clause 12.2.1 in the otter trawl UoAs (Atlantic croaker and sand/silver seatrout) and the butterfly net UoAs (Gulf menhaden). These species satisfied the requirements for Supporting Clause 12.2.1 and thus the meet the requirements for this supporting clause. Refer to the otter trawl and butterfly net UoA sections in the 12.2.1 *Current status/Appropriateness/Effectiveness* Evaluation Parameter for detailed evidence.

Butterfly net UoAs:

The main associated species for the otter trawl UoAs are blue crab (*Stenotomus caprinus*), Atlantic stingray (*Hypanus sabinus*, formerly *Dasyatis sabinus*), Atlantic threat herring (*Opisthonema oglinum*), highfin goby (*Gobionellus oceanicus*), and spot croaker (*Leiostomus xanthurus*) (Table 35).

⁴⁴⁸ Last, P., Naylor, G., Séret, B., White, W., de Carvalho, M. and Stehmann, M. eds., 2016. Rays of the World. CSIRO publishing.

⁴⁴⁹ Grubbs, R.D., Carlson, J.K., Romine, J.G., Curtis, T.H., McElroy, W.D., McCandless, C.T., Cotton, C.F. and Musick, J.A., 2016. Critical assessment and ramifications of a purported marine trophic cascade. Scientific reports, 6(1), p.20970.

⁴⁵⁰ Froese, R. and D. Pauly. Editors. 2023. American cownose ray, *Rhinoptera bonasus*. FishBase. World Wide Web electronic publication. www.fishbase.org, (06/2023).

⁴⁵¹ Poulakis, G.R., 2013. Reproductive biology of the cownose ray in the Charlotte Harbor estuarine system, Florida. Marine and Coastal Fisheries, 5(1), pp.159-173.

⁴⁵² <https://myfwc.com/fishing/saltwater/recreational/unregulated/>

⁴⁵³ <https://tpwd.texas.gov/regulations/outdoor-annual/fishing/saltwater-fishing/bag-length-limits/catfish-bag-length-limits-saltwater>

⁴⁵⁴ Schwartz, F.J., 1990. Mass migratory congregations and movements of several species of cownose rays, genus *Rhinoptera*: A world-wide review. *Journal of the Elisha Mitchell Scientific Society*, pp.10-13

⁴⁵⁵ Broadhurst, M.K. and Cullis, B.R., 2020. Mitigating the discard mortality of non-target, threatened elasmobranchs in bather-protection gillnets. Fisheries Research, 222, p.105435.

12.2.2. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.

The **Atlantic thread herring, highfin goby, and spot croaker** are all classified as having low fishing vulnerability from Cheung *et al.* (2005).⁴⁴⁶ The system and calculation take species' life history traits and ecological characteristics to assess their level of vulnerability to marine fishery exploitation. These low vulnerability levels combined with low overall catch levels by the UoAs indicate that these species are not at risk of being threatened by the most probable adverse impacts of the fishery. Thus, they meet the requirements for this supporting clause.

Blue crab:

Refer to the blue crab evidence provided in the otter trawl UoA section of this Evaluation Parameter.

Atlantic stingray:

The Atlantic stringray (*Hypanus sabinus*) is coastal benthic species that tolerate a range of salinities which allows it to traverse into freshwater rivers along the Gulf Coast.⁴⁵⁶ It is a decently productive species, however this species gives live birth and follows a k-selected growth curve.⁴⁴⁸ Gestation lasts approximately four months and each female gives birth to two to three pups per pregnancy and because of this reproductive strategy, the pups have a very high chance of survival after birth.⁴⁵⁷ Individuals mature between the ages of two and three years and can live to be at least 10 years old and approximately 61cm in length.⁴⁴⁸ Intrinsic growth (k) and natural mortality (M) coefficients are 0.26-0.31 and 0.3, respectively.⁴⁵⁶ Finally, the species feeds on crustaceans, shrimp, and marine worms giving it a trophic level equal to 3.5.⁴⁴⁸

This species is not managed by any of the coastal states nor the federal government as it is not generally considered a desirable species to retain, however localities place limits on catches for unmanaged fishes, for which the cownose ray falls into.^{456,458} The Atlantic stingray is only known to occur in the western central and western northern Atlantic Ocean giving it low areal and geographic overlap with the fishery.⁴⁴⁸ As this species is a benthic species, there is high vertical overlap with the GOM shrimp fishery. Finally, this species preys on shrimp and there is often a seasonal migration to match annual shrimp migrations.⁴⁵⁹

The Atlantic stingray scored 2.00 for productivity and 2.33 for susceptibility as part of the PSA. The final vulnerability score for this species is 1.67, which indicates that this species are not at risk to be threatened by the most probable adverse impacts of the fishery. Thus, it meets the requirements for this supporting clause.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on minor associated species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.



EVIDENCE:

Refer to the evidence provided in the *Process and Current status/Appropriateness/Effectiveness* Evaluation Parameters above.

References:

Refer to embedded footnotes

⁴⁴⁶ Florida. FFWCC – Stringrays: Atlantic Stingray. <https://myfwc.com/research/saltwater/sharks-rays/ray-species/atlantic-stingray/>

⁴⁴⁷ Johnson, M.R. and Snelson Jr, F.F., 1996. Reproductive life history of the Atlantic stingray, *Dasyatis sabina* (Pisces, Dasyatidae), in the freshwater St. Johns River, Florida. *Bulletin of Marine Science*, 59(1), pp.74-88.

⁴⁴⁸ <https://tpwd.texas.gov/regulations/outdoor-annual/fishing/saltwater-fishing/bag-length-limits/catfish-bag-length-limits-saltwater>

⁴⁴⁹ Ramsden, S., Cotton, C.F. and Curran, M.C., 2017. Using acoustic telemetry to assess patterns in the seasonal residency of the Atlantic stingray *Dasyatis sabina*. *Environmental biology of fishes*, 100, pp.89-98.

12.2.2. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									N/A

9.5.1.5 Supporting Clause 12.2.3.

12.2.3. There shall be outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible).	
Relevance:	Relevant
Evaluation Parameters	Met?
Process: <i>There is a process to set outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible).</i>	<input checked="" type="checkbox"/>
EVIDENCE: Amendment 4 for the GOM Shrimp fishery FMP (1988) ⁴⁶⁰ incorporated the following fishery-specific management objectives: <ul style="list-style-type: none"> • Optimize the yield from shrimp recruited to the fishery. • Encourage habitat protection measures to prevent undue loss of shrimp habitat. • Coordinate the development of shrimp management measures by the Council with the shrimp management programs of the several states, where feasible. • Promote consistency with the Endangered Species Act and the Marine Mammal Protection Act. • Minimize the incidental capture of finfish by shrimpers, when appropriate. • Minimize conflicts between shrimpers and stone crab fishermen. • Minimize adverse effects of obstructions to shrimp trawling. • Provide a statistical reporting system. <p>The fourth and fifth bullets aim to reduce catch of unwanted species (ETP and finfish).</p>	
Current status/Appropriateness/Effectiveness: <i>There is evidence that outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible) have been achieved. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.</i>	<input checked="" type="checkbox"/>
EVIDENCE: There have been large scale changes to the fishery in the past two to three decades to improve the cleanliness of the fishery. The implementation of BRDs and TEDs have helped in achieving reduced ETP bycatch. BRDs are regulated by the entity that has jurisdiction over the particular waters. BRDs are required in federal waters and waters of the states of Texas and Florida, not in Louisiana, Mississippi or Alabama. As of today, TEDs are required on all otter and skimmer trawl gears over 40 ft as mandated by the United States ESA. They became required for offshore otter trawls in 1987 and for inshore waters in 1993. The regulation for TEDs by the skimmer trawl fleet was implemented in 2021. Prior to 2021, gear without TEDs were restricted by tow times to promote turtle survivability; skimmer trawl vessels <40 ft are still subject to tow time limits. Price and Gearhart (2011) reported an average of 5% shrimp loss associated with TED usage and bycatch reduction of greater than 27%. ⁴⁶¹ The mandatory observer program that remains active in this fishery to document total fishery bycatch also document the effectiveness of TEDs and BRDs.	
<p>There are currently five certified BRDs recognized the state and federal governments: fisheye, Jones Davis, modified Jones Davis, cone fish deflector composite panel, and square mesh panel composite panel. In order to be certified, a BRD must reduce bycatch by at least 30%.</p> <p>Research into these devices began in the early 90s and into the 2000s. Rogers <i>et al.</i> (1997) tested four variations of BRDs for their effectiveness at reducing finfish bycatch, including a variation of the fisheye BRD that is certified today.⁴⁶² Louisiana and Texas Sea</p>	

⁴⁶⁰ GMFMC. 1988. Amendment Number 4 to the FMP for the shrimp fishery in the GoM United States Waters. <https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/SHRIMP/SHRIMP%20Amend-04%20Final%201988-08.pdf>

⁴⁶¹ Price, B. and Gearhart, J., 2011. Evaluations of turtle excluder device (TED) performance in the US southeast Atlantic and Gulf of Mexico skimmer trawl fisheries. https://repository.library.noaa.gov/view/noaa/3988/noaa_3988_DS1.pdf

⁴⁶² Rogers, D.R., Rogers, B.D. and Wright, V.L., 1997. Effectiveness of four industry-developed bycatch reduction. *Fishery Bulletin*, 95, pp.552-565. https://www.researchgate.net/profile/Donna-Rogers-4/publication/237137650_Effectiveness_of_four_industry-developed_bycatch_reduction_devices_in_Louisianas_inshore_waters/links/5699496c08aeeee985946a16/Effectiveness-of-four-industry-developed-bycatch-reduction-devices-in-Louisianas-inshore-waters.pdf

12.2.3. There shall be outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible).

Grant programs currently has a funded project titled *Better Bycatch Reduction Device Project*.⁴⁶³ This project received federal funding (as well as industry and private) from NOAA to conduct research on new BRD designs and testing those designs for certification. The 2021/2022 Annual Report outlines the five key areas of research that this project aims to address: communication and outreach, research, and development, new BRD rollout, vessel support, and monitoring.⁴⁶⁴

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible). Examples may include fishery management reports, and stock or ecosystems assessment reports.



EVIDENCE:
 Refer to evidence provided in previous Evaluation Parameters.

References: Refer to embedded footnotes

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									N/A

⁴⁶³ <https://www.laseagrant.org/outreach/projects/better-brds/>

⁴⁶⁴ Better Bycatch Reduction Devices Annual Report 2021 & 2022. <https://www.laseagrant.org/wp-content/uploads/BetterBRD-Public-Annual-Report-2021-22.pdf>

9.5.1.6 Supporting Clause 12.2.4.

12.2.4. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

Relevance: Relevant

Evaluation Parameters	Met?
<p>Process: <i>There is a process that accounts for the most probable adverse impacts of the unit of certification on ETP species. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations (proxies) can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.</i></p>	<input checked="" type="checkbox"/>

EVIDENCE:
 There are well defined processes defined for each of the five gulf states and the federal government for listing endangered, threatened, and protected (ETP) species. At the state level, each of the five jurisdictions have published lists and listing procedure based on best available science, relevant monitoring, and stakeholder input (the five states are Texas⁴⁶⁵, Louisiana⁴⁶⁶, Mississippi⁴⁶⁷, Alabama⁴⁶⁸, and Florida⁴⁶⁹). At the federal level, NMFS and USFWS are responsible for maintaining lists of species that meet the definition of threatened or endangered under the ESA. NMFS is responsible for maintaining the list for most marine species and managing those species once they are listed.⁴⁷⁰ The USFWS is responsible for maintaining the list for terrestrial and freshwater species and their management.

The ETP species (state and federal) that are found in the GOM and have the potential to interact with the US GOM shrimp fishery are listed in the table below.

Common name	Scientific name	Type	CITES (Appendix I, II, or III) ⁴⁷¹	Unites States ESA ¹⁹ 1	United States MMPA ⁴⁷²	Texas ESA ¹⁹ 2	Louisiana ESA ¹⁹³	Mississippi ESA ¹⁹⁴	Alabama ESA ¹⁹⁵	Florida ESA ¹⁹⁶	IUCN REDLIST
Green turtle	<i>Chelonia mydas</i>	Reptile	Appx. 1	X		X	X	X		X	EN
Hawksbill turtle	<i>Eretmochelys imbricata</i>	Reptile	Appx. 1	X		X	X	X		X	CR
Kemp’s Ridley turtle	<i>Lepidochelys kempii</i>	Reptile	Appx. 1	X		X	X	X		X	CR
Leatherback turtle	<i>Dermochelys coriacea</i>	Reptile	Appx. 1	X		X	X	X		X	VU
Loggerhead Turtle	<i>Caretta caretta</i>	Reptile	Appx. 1	X		X	X	X		X	VU
Bottlenose Dolphin	<i>Tursiops truncatus</i>	Mammal			X						LC

⁴⁶⁵ TPWD. 2023. Listed species Texas. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/listed-species/
⁴⁶⁶ LDWF. 2023. Rare species and natural communities by parish <https://www.wlf.louisiana.gov/page/rare-species-and-natural-communities-by-parish>
⁴⁶⁷ MDWFP. 2018. Mississippi listed species 2018. <https://www.mdwfp.com/media/255911/ms-listed-species-2018.pdf> <https://www.mdwfp.com/media/255911/ms-listed-species-2018.pdf>
⁴⁶⁸ OA. Nongame fishes, protected species Alabama regulations Outdoor Alabama. <https://www.outdooralabama.com/hunting-wildlife-regulations/nongame-fishes-protected-alabama-regulations>
⁴⁶⁹ FWC. 2023. Threatened and Endangered Species. Fish and Wildlife Service <https://myfwc.com/media/1945/threatened-endangered-species.pdf>
⁴⁷⁰ NOAA. 2023. Threatened and Endangered species <https://www.fisheries.noaa.gov/species-directory/threatened-endangered>
⁴⁷¹ CITES. 2023. CITES Appendices <https://cites.org/eng/app/appendices.php>
⁴⁷² NOAA. 2023. Marine Mammal Protection Act <https://www.fisheries.noaa.gov/topic/marine-mammal-protection>

12.2.4. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

Brown Pelican	<i>Pelecanus occidentalis</i>	Bird					X			LC
Smalltooth sawfish	<i>Pristis pectinata</i>	Chondrichthyan	Appx. 1	X		X	X		X	CR
Giant manta ray	<i>Manta birostris</i>	Chondrichthyan	Appx. 2	X						EN
Gulf sturgeon	<i>Acipenser oxyrinchus</i>	Fish	Appx. 2	X			X	X	X	VU

These species are not uniformly distributed across the gulf and thus only pertain to certain UoAs. The turtle, manta, and dolphin species will apply to all five states and the federal jurisdiction UoAs. The brown pelican will only be considered ETP in the Mississippi UoAs. The smalltooth sawfish will only be considered ETP in the Florida and federal UoAs. The Gulf sturgeon will only be considered ETP in Louisiana, Mississippi, Alabama, and Florida.

Current status/Appropriateness/Effectiveness:

There is evidence that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on ETP species (e.g. negatively impacting rebuilding efforts), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these impacts are monitored and do not impede, slow, or reduce likelihood of recovery of the species to target levels (or other planned outcomes). If such impacts arise, effective remedial actions are taken.



EVIDENCE:

The Gulf of Mexico Shrimp FMP (which covers all jurisdictions) is in place and has components aimed to ensure the longevity of ETP species.⁴⁷³ All US fisheries management, including the US GOM Shrimp fishery, must be consistent with the Magnuson-Stevens Act (MSA), the Marine Mammal Protection Act (MMPA)⁴⁷², and the US Endangered Species Act (ESA)⁴⁷⁰. Each of these acts establishes management guidelines, objectives, and legal protections for threatened and endangered species.

The purpose of the ESA is to conserve threatened and endangered species and their ecosystems. There are more than 1,900 species listed under the ESA. A species is considered endangered if it is in danger of extinction throughout all or a significant portion of its range. A species is considered threatened if it is likely to become endangered in the future. USFWS and NMFS share responsibility for implementing the ESA. Within NOAA Fisheries, the Office of Protected Resources (OPR)⁴⁷⁴ has jurisdiction over more than 150 endangered and threatened marine species, from whales to sea turtles and salmon to Johnson’s Sea grass.

There have been large scale changes to the fishery in the past two to three decades to improve the cleanliness of the fishery. The implementation of BRDs and TEDs have helped in achieving reduced ETP bycatch. BRDs are regulated by the entity that has jurisdiction over the particular waters. BRDs are required in federal waters and waters of the states of Texas and Florida, not in Louisiana, Mississippi or Alabama. As of today, TEDs are required on all otter and skimmer trawl gears over 40 ft as mandated by the United States ESA. They became required for offshore otter trawls in 1987 and for inshore waters in 1993. The regulation for TEDs by the skimmer trawl fleet was implemented in 2021. Prior to 2021, gear without TEDs were restricted by tow times to promote turtle survivability; skimmer trawl vessels <40 ft are still subject to tow time limits. Price and Gearhart (2011) reported an average of 5% shrimp loss associated with TED usage and bycatch reduction of greater than 27%.⁴⁷⁵ The mandatory observer program that remains active in this fishery to document total fishery bycatch also document the effectiveness of TEDs and BRDs.

The effectiveness of these devices is considered to be very high for commercial trawl gear, and Putman *et al.* (2023) describes the recreational fishing industry as the largest contributor to turtle bycatch in the south eastern United States.⁴⁷⁶ The modeled bycatch of Kemp’s Ridley and Green turtles shows a 10-fold greater bycatch risk by recreation fishers compared to shrimp trawling. The

⁴⁷³ Gulf of Mexico Shrimp Fishery Management Plan. <https://www.fisheries.noaa.gov/management-plan/gulf-mexico-shrimp-fishery-management-plan>

⁴⁷⁴ <https://www.fisheries.noaa.gov/about/office-protected-resources>

⁴⁷⁵ Price, B. and Gearhart, J., 2011. Evaluations of turtle excluder device (TED) performance in the US southeast Atlantic and Gulf of Mexico skimmer trawl fisheries. https://repository.library.noaa.gov/view/noaa/3988/noaa_3988_DS1.pdf

⁴⁷⁶ Putman, N.F., Richards, P.M., Dufault, S.G., Scott-Dention, E., McCarthy, K., Beyea, R.T., Caillouet Jr, C.W., Heyman, W.D., Seney, E.E., Mansfield, K.L. and Gallaway, B.J., 2023. Modeling juvenile sea turtle bycatch risk in commercial and recreational fisheries. *iScience*, p.105977. <https://www.sciencedirect.com/science/article/pii/S2589004223000548/pdf?md5=1bd26d9c1c2454c4738004b10a497063&pid=1-s2.0-S2589004223000548-main.pdf>

12.2.4. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

model, however, does not account for the severity of bycatch, such as mortality, individual stress level, physical damage. Although bycatch rates for the recreational fishery is increasing in recent year, the mortality rate of these interactions are low if appropriate handling in used.^{477,478} The observed mortality of turtles in the GOM shrimp fishery is between 20% and 30%.

Turtles (All UoAs)

Although there are five sea turtles that are encountered by the GOM shrimp fleet, only three (Kemp’s Ridley, loggerhead, and green) are commonly caught (hawksbill and leatherback are not commonly encountered).^{479,480}

The green turtle is frequently encountered by the GOM shrimp fishery and there is no species-specific stock assessment conducted for the green turtle in the GOM, but populations are monitored by proxy indicators. In the early 2000s, the GOM shrimp fishery experienced a significant drop in effort (reduced by over 50% by 2006) and the green turtle population has seen an increase in counted nests since 2009⁴⁸¹ (Figure 46). There is much variability within the data that seems to be on a biennial cycle which coincides with the frequency that green turtles come ashore to nest.⁴⁸² Despite the variability, there is an apparent increasing trend in observed nests and thus an increase in reproductive females within the GOM population.

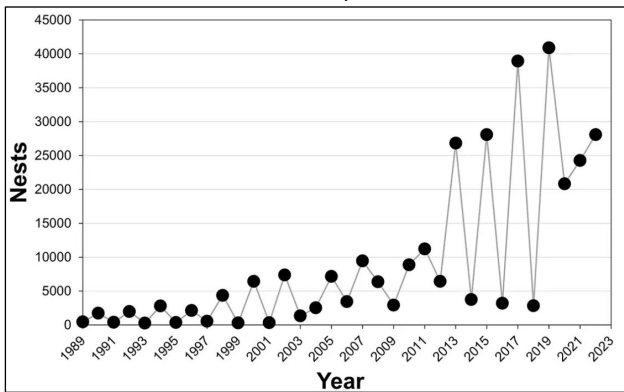


Figure 46. Number of green turtle nests counted on core index beaches in Florida from 1989 to 2022. Source: FFWCC 2023⁴⁸¹.

Babcock *et al.* (2018) could not model the hawksbill and leatherback turtles because their rate of capture was too low.⁴⁸³ The hawksbill turtle is studied at Buck Island Reef National Monument and has seen an overall population growth starting prior to 1990 (Figure 47).⁴⁸⁴ The study counts and tags females as they come ashore to nest throughout the nesting season. In recent years there has been a slight decline in observed females, but this coincides with an observed decline in neophytes whereas the number of observed

⁴⁷⁷ Rose, S.A., Bates, E.B., McNaughton, A.N., O'Hara, K.J. and Barco, S.G., 2022. Characterizing Sea Turtle Bycatch in the Recreational Hook and Line Fishery in Southeastern Virginia, USA. *Chelonian Conservation and Biology: Celebrating 25 Years as the World's Turtle and Tortoise Journal*, 21(1), pp.63-73. <https://doi.org/10.2744/CCB-1476.1>

⁴⁷⁸ NOAA. 2019. Careful Release Protocols for Sea Turtle Release with Minimal Injury <https://www.fisheries.noaa.gov/resource/document/careful-release-protocols-sea-turtle-release-minimal-injury>

⁴⁷⁹ Scott-Denton, E., Cryer, P.F., Duffy, M.R., Gocke, J.P., Harrelson, M.R., Kinsella, D.L., Nance, J.M., Pulver, J.R., Smith, R.C. and Williams, J.A., 2012. Characterization of the US Gulf of Mexico and South Atlantic penaeid and rock shrimp fisheries based on observer data. <https://aquadocs.org/bitstream/handle/1834/30409/mfr7441.pdf?sequence=1>

⁴⁸⁰ Scott-Denton, E., Cryer, P.F., Duffin, B.V., Duffy, M.R., Gocke, J.P., Harrelson, M.R., Whatley, A.J. and Williams, J.A., 2020. Characterization of the US Gulf of Mexico and South Atlantic Penaeidae and Rock Shrimp (Sicyoniidae) Fisheries through Mandatory Observer Coverage, from 2011 to 2016. *Marine Fisheries Review*, 82(1-2), pp.17-47.

⁴⁸¹ FFWCC. 2023. Index nesting beach survey totals (1989-2022). Accessed 2 April 2023. <https://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/>

⁴⁸² STC. 2023. Information About Sea Turtles: Green Sea Turtle, Sea Turtles Conservancy <https://conserveturtles.org/information-sea-turtles-green-sea-turtle/>

⁴⁸³ Babcock, E.A., Barnette, M.C., Bohnsack, J.A., Isely, J.J., Porch, C.E., Richards, P.M., Sasso, C. and Zhang, X., 2018. Integrated Bayesian models to estimate bycatch of sea turtles in the Gulf of Mexico and southeastern US Atlantic coast shrimp otter trawl fishery. https://repository.library.noaa.gov/view/noaa/19775/noaa_19775_DS1.pdf

⁴⁸⁴ Gulick, A.G., Ewen, K.A., Pollock, C.G. and Hillis-Starr, Z.M., 2022. Trends in abundance and reproductive success of the hawksbill turtle nesting population at Buck Island Reef National Monument, St. Croix, US Virgin Islands. *Endangered Species Research*, 48, pp.191-198. <https://www.int-res.com/articles/esr2022/48/n048p191.pdf>

12.2.4. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

emigrants continues to increase. This could indicate that there are population abundance declines elsewhere in their range that are not being observed in the GOM.

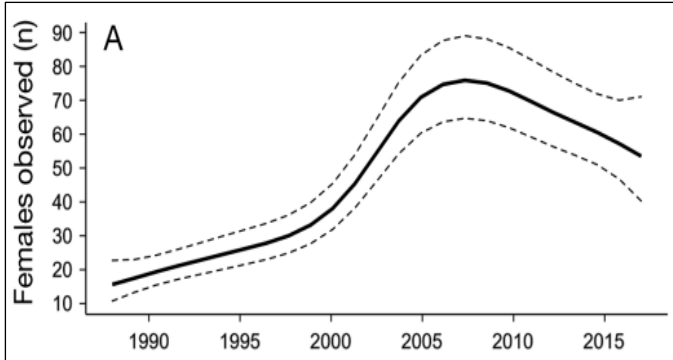


Figure 47. Effort-adjusted annual counts of female hawksbill turtles *Eretmochelys imbricata* and nests observed at Buck Island Reef National Monument. Saturation tagging was conducted for 29 year (1988–2017) (Source: Gulick *et al.*, 2022).⁴⁸⁴

Leatherback proxy abundance has shown overall growth from the time that FFWCC has started counting nests on indexed beaches (Figure 48).⁴⁸¹ The number of nest counted over the period of sampling has increased at an exponential trend with respect to time. The number of nests peaked from 2009-2015 but has shown a promising increase in recent years after a steep decline in from 2015 to 2017. Because total nests typically are only a few hundred each year, and females can lay 10 or more clutches per season, the observed variability can be a result of very small change in number of females.

Due to the low rate of encounter and overall population growth in the Gulf of Mexico, there is little cause for concern that the GOM shrimp fishery is hindering the recovery of leatherback turtles.

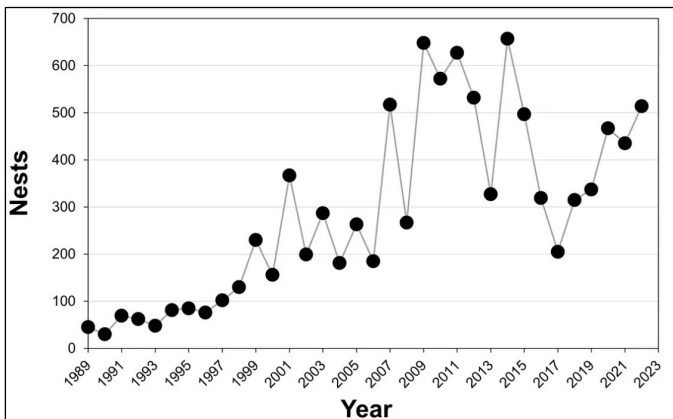


Figure 48. Number of leatherback turtle nests counted on core index beaches in Florida, from 1989 through 2022. Source: FFWCC 2023⁴⁸¹.

Most of the population of adult females nest on the beaches of Rancho Nuevo, Mexico.⁴⁸⁵ When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals.⁴⁸⁶ By the mid-1980s, however, nesting numbers from Rancho Nuevo and adjacent Mexican beaches were below 1,000, with a low of 702 nests in 1985. From that low point, the number of observed nests has steadily increased. Gladys Porter Zoo has tracked the nesting abundance of

⁴⁸⁵ Pritchard, P.C., 1969. The survival status of ridley sea-turtles in American waters. *Biological Conservation*, 2(1), pp.13-17.

⁴⁸⁶ Hildebrand, H.H., 1963. *Hallazgo del área de anidación de la tortuga marina "Iora", Lepidochelys kempi (Garman), en la costa occidental del Golfo México: Rept., Chel.* Secretaría de Educación Pública.

12.2.4. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

the Kemp’s Ridley turtle in recent years.⁴⁸⁷ There was an observed steady growth in number of nests to 2008 when approximately 21,000 nests were observed. Since then, the number of nests has been fluctuating between 10,000 and 20,000 nests with a high of 24,570 in 2017 (At this time, it is unclear whether the increases and declines in nesting seen over the past decade represents a population oscillating around an equilibrium point or if nesting will decline or increase in the future.⁴⁸⁸).

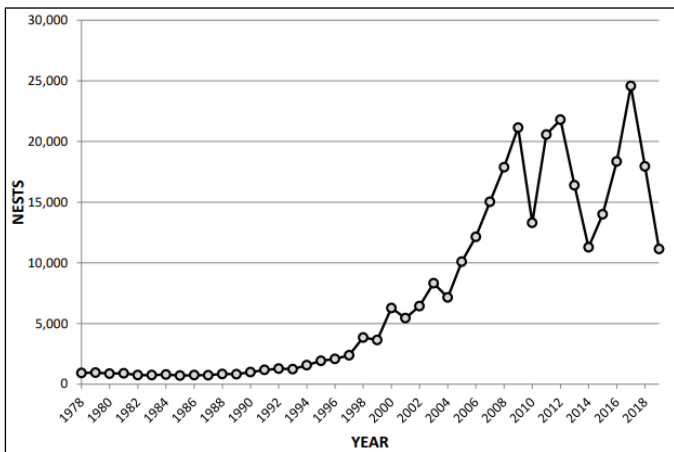


Figure 49. Kemp’s ridley nest totals from Mexican beaches (Gladys Porter Zoo nesting database) (Source: NOAA 2021).⁴⁸⁸

Because there is no species-specific stock assessment conducted for the loggerhead turtle in the GOM, proxy indicators are used to evaluate changes in population size. Since nesting data collection began in 1989, the loggerhead turtle population has remained high and relatively stable (Figure 50). There is much variability within the data that seems to be on a two-to-three-year cycle which coincides with the frequency that loggerhead turtles come ashore to nest (every 2 to four years).⁴⁸⁹ Despite the variability, there is an apparent horizontal trends that indicates that the population is neither growing nor shrinking.

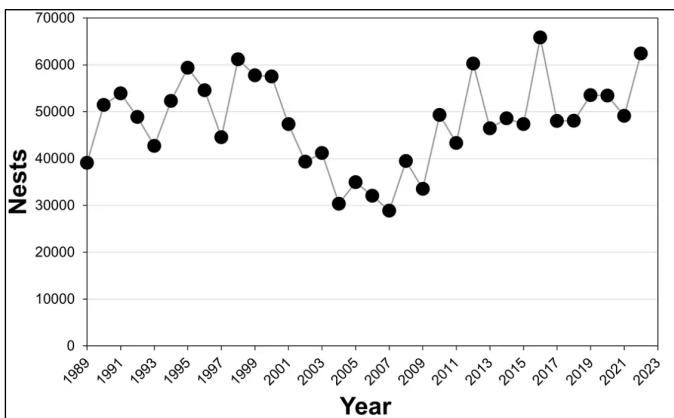


Figure 50.Number of loggerhead turtle nests counted on core index beaches in peninsular Florida, from 1989 through 2022. Source: FWCC 2023⁴⁸¹.

⁴⁸⁷ GPZ. 2022. Kemp’s ridley project, Gladys Porter Zoo <https://gladysporterzoo.org/kemps-ridley-project/>

⁴⁸⁸ NOAA. 2021. Endangered Species Act (ESA) - Section 7 Consultation Biological Opinion. Endangered Species Act (ESA) - Section 7 Consultation Biological Opinion Reinitiation of Endangered Species Act (ESA) Section 7 Consultation on the Implementation of the Sea Turtle Conservation Regulations under the ESA and the Authorization of the Southeast U.S. Shrimp Fisheries in Federal Waters under the Magnuson-Stevens Fishery Management and Conservation Act (MSFMCA). National Marine Fisheries Service (NMFS), Southeast Regional Office (SERO), St. Petersburg, Florida. 297p. <https://doi.org/10.25923/vw00-sq03>

⁴⁸⁹ STC. 2023. Information About Sea Turtles: Loggerhead Sea Turtle, Sea Turtles Conservancy <https://conserveturtles.org/information-sea-turtles-loggerhead-sea-turtle/>

12.2.4. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

Bottlenose dolphin

The bottlenose dolphin is provided protection in the Gulf of Mexico by the US MMPA. There are four bottlenose dolphin stocks in the GOM that interact with the GOM shrimp fishery: northern GOM continental shelf, eastern coastal, northern coastal, and western coastal. Hayes *et al.* (2022) has estimated the abundance of each of these stocks and estimated potential biological removal.⁴⁹⁰ The 10% PBR is the threshold for determining insignificant mortality.

The primary source of bycatch is due to entanglement in the lazy line, tickler chain, or TED. Mortality or serious injury is high regardless of gear and dolphin stock.⁴⁹¹

Table 38. Most recent abundance estimation of the four bottlenose dolphin stocks, potential biological removal, level of insignificant mortality (10% PBR), and estimated annual mortality from the GOM shrimp fishery (Source: Hayes *et al.*, 2022).

Stock	Estimated Abundance 2011/12	Estimated Abundance 2017/18	PBR	Insignificant mortality	Estimated annual GOM shrimp mortality
Northern Continental Shelf (NSC)	48,060	63,280	556	55.6	64
Eastern Coastal (EC)	12,181	16,407	114	11.4	7.6
Northern Coastal (NC)	7,569	11,543	89	8.9	6.5
Western Coastal (WC)	19,381	20,759	167	16.7	32

The only bottlenose dolphin stocks that are currently exceeding insignificant levels of mortality is the northern continental shelf stock and the western coastal stock. The GOM shrimp fishery causes “insignificant mortality” for the other two coastal stocks. The current population trend for the NSC has increased over the last two times it was surveyed, although the statistical power to detect a trend is poor due to the relative imprecision on abundance estimations and long intervals between surveys.⁴⁹² The same uncertainty regarding imprecision and time between survey estimates exists for the other three stocks.⁴⁹² As the removal from the collective GOM shrimp fishery are estimated to be around 10% of the PBR for each stock, it is highly likely that the UoAs are within PBR limits. Also, in accordance with RFM guidance in Appendix 1 Part 4, the bottlenose dolphin shall receive a full score as they are managed with recovery plan and are followed with effective management measures.

Brown Pelican

The brown pelican is no longer considered endangered by the US ESA but remains protected by the Migratory Bird Treaty Act.⁴⁹³ It was initially listed under the ESA in 1970 as population levels dropped so low as a result of not being able to reproduce due to the pesticide DDT.⁴⁹⁴ DDT caused the brown pelicans to lay eggs with very thin shelled which broke during incubation. DDT was banned in 1972 and the species was delisted in 2009 because the population has shown strong recovery without the presence of DDT in estuarian and coastal waters. The IUCN Redlist assessed the brown pelican as least concern. There have only been four total reports in observer bycatch data from 2011 to 2016 for which there were two mortalities.

There is no long-term monitoring conducted for this species in the GOM, although they have been identified as a high priority species by the Gulf of Mexico Avian Monitoring Network.⁴⁹⁵

⁴⁹⁰ Hayes, S.A., Kosephson, E., Maze-Foley, K., Rosel, P.E., Wallace, J. 2022. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments 2021. <https://media.fisheries.noaa.gov/2022-08/U.S.%20Atlantic%20and%20Gulf%20of%20Mexico%202021%20Stock%20Assessment%20Report.pdf>.

⁴⁹¹ Soldevilla, M.S., L.P. Garrison, E. Scott-Denton and J. Primrose. 2021. Estimated bycatch mortality of marine mammals in the Gulf of Mexico shrimp otter trawl fishery during 2015 to 2019. NOAA Tech. Memo. NMFSEFSC-749. 78pp. https://repository.library.noaa.gov/view/noaa/30721/noaa_30721_DS1.pdf

⁴⁹² Garrison, L.P., Ortega-Ortiz, J. and Rappucci, G., 2021. Abundance of Coastal and Continental Shelf Stocks of Common Bottlenose and Atlantic Spotted Dolphins in the Northern Gulf of Mexico: 2017-2018. https://repository.library.noaa.gov/view/noaa/43721/noaa_43721_DS1.pdf.

⁴⁹³ FWS. 2023. Migratory Bird Act 1918. Fish and Wildlife Service <https://www.fws.gov/law/migratory-bird-treaty-act-1918>

⁴⁹⁴ TPWD. 2023. Brown pelican page. <https://tpwd.texas.gov/huntwild/wild/species/bpelican/>

⁴⁹⁵ Jodice, P.G.R., E.M. Adams, J.S. Lamb, and Y. Satge. 2019. Gulf of Mexico Avian Monitoring Network Strategic Monitoring Plan: Seabirds. In Lyons et al. (eds.). Gulf of Mexico Avian Monitoring Network Strategic Monitoring Plans. Mississippi State University Press. https://tigerprints.clemson.edu/cgi/viewcontent.cgi?article=4124&context=all_theses

12.2.4. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

The most recent population estimate suggests that there are 300,000 total individuals.^{496,497} This species has undergone a large and statistically significant increase over the last 40 years in North America (712% increase over 40 years, equating to a 68.8% increase per decade).⁴⁹⁸ Accordingly, there is a high degree of confidence that there are no significant detrimental direct effects of the shrimp UoAs on the brown pelican.

Smalltooth sawfish

This species lacks long-term monitoring data which makes it difficult to estimate population size.⁴⁸⁸ Despite the lack of scientific data, recent encounters with YOY, older juveniles, and sexually mature smalltooth sawfish indicate that the US population is currently reproducing.^{499,500,501}

In the mandatory observer data from Scott Denton *et al.* (2012 and 2020), there were six reported sawfish catches from 2007 to 2010 and four from 2011 to 2016.^{479,480} These papers did not go in much depth as to the post capture condition of these 10 individuals, but it was stated that there was one occurrence where three individuals were caught on the same tow and two were released alive. There is a documented history of low observer coverage in the GOM shrimp fishery, however the interannual variation is low for much of the finfish bycatch species.^{479,480} Keeping this in mind, in the calculations below, we show projected interaction and mortalities for full coverage in the fishery.

NMFS determined that implemented conservation measures should result in 5% population growth. The estimated number of individuals bycaught by the southeastern United States shrimp fishery (both GOM and south Atlantic) will be 3,612 individuals over the next 10-year span.⁵⁰² With the mortality rate of 50% as described previously, it is expected that US shrimp fisheries will produce 1,806 mortalities over the next 10 years (180.6 per year). From this 10-year projection, NMFS has projected maximum takes for sawfish to be 1,806 bycaught individuals from the entire southeastern US shrimp fishery, with 50% resulting in mortality, over any running 5-year period.⁵⁰² Therefore, the NOAA 2021 Biological Opinion on sawfish indicated that the nonlethal take on average of 181 smalltooth sawfish per year (1,806 / 10 = 180.6 per year) will not result in population level impacts nor will it change their distribution.

Carlson (2020) reported 17 occurrences of smalltooth sawfish in the GOM and south Atlantic shrimp fisheries combined, as reported by observers from 2007 to 2019. Due to lack of information regarding post capture mortality for smalltooth sawfishes, the estimated mortality rate was increased to 50% in the most recent Consultation Biological Opinion (increased from 36.4% in the 2014 Opinion).⁵⁰² Based on the above, the extrapolated take of smalltooth sawfish in the GOM shrimp fishery is estimated to be 176 from the 2021 Biological Opinion (range: 21 to 331 from Carlson, 2020) animals per year, BiOp maximum allowable mortalities per year (180.6 individuals per year).⁵⁰³

⁴⁹⁶ BirdLife International. 2018. *Pelecanus occidentalis*. The IUCN Red List of Threatened Species 2018: e.T22733989A132663224.

<https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22733989A132663224.en>.

⁴⁹⁷ Delany, S. and Scott, D. 2006. *Waterbird population estimates*. Wetlands International, Wageningen, The Netherlands.

⁴⁹⁸ Butcher, G.S. and Niven, D.K., 2007. Combining data from the Christmas Bird Count and the Breeding Bird Survey to determine the continental status and trends of North America birds.

⁴⁹⁹ Seitz, J.C., and Poulakis, G.R., 2002. Recent occurrence of sawfishes (Elasmobranchiomorphi: Pristidae) along the southwest coast of Florida (USA). *Florida Scientist*, pp.256-266. http://www.fossilsawfish.com/uploads/3/4/8/7/34873745/seitz_poulakis_2002.pdf

⁵⁰⁰ Simpfordorfer, C.A., 2003. Abundance, movement and habitat use of the smalltooth sawfish. *Final Report. Mote Marine Laboratory Mote Technical Report*, (929). <https://fortuna.mote.org/handle/2075/238>

⁵⁰¹ Feldheim, K.A., Fields, A.T., Chapman, D.D., Scharer, R.M. and Poulakis, G.R., 2017. Insights into reproduction and behavior of the smalltooth sawfish *Pristis pectinata*. *Endangered Species Research*, 34, pp.463-471. <https://www.int-res.com/articles/esr2017/34/n034p463.pdf>

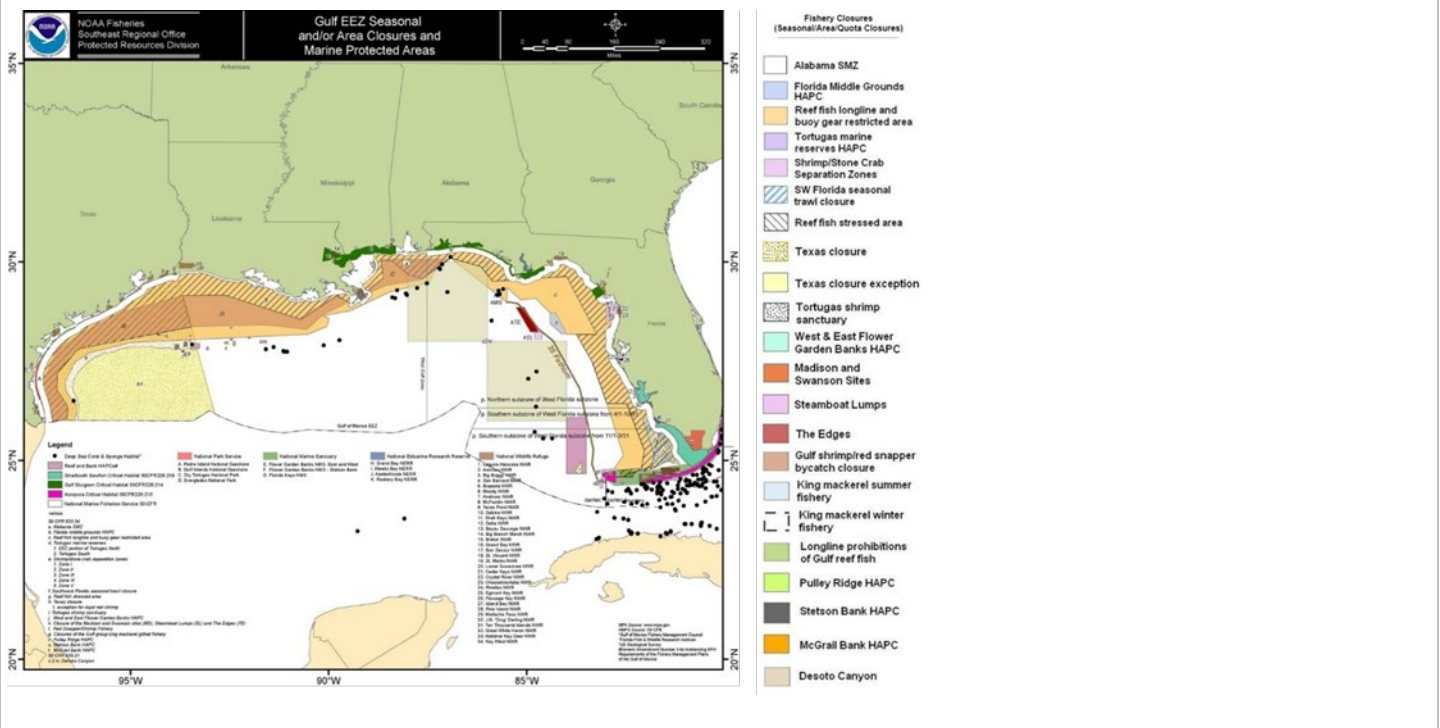
⁵⁰² NOAA. 2021. Endangered Species Act (ESA) - Section 7 Consultation Biological Opinion. Endangered Species Act (ESA) - Section 7 Consultation Biological Opinion Reinitiation of Endangered Species Act (ESA) Section 7 Consultation on the Implementation of the Sea Turtle Conservation Regulations under the ESA and the Authorization of the Southeast U.S. Shrimp Fisheries in Federal Waters under the Magnuson-Stevens Fishery Management and Conservation Act (MSFMCA). National Marine Fisheries Service (NMFS), Southeast Regional Office (SERO), St. Petersburg, Florida. 297p. <https://doi.org/10.25923/vw00-sq03>

⁵⁰³ Carlson, J.K. 2020. Estimated Incidental Take of Smalltooth Sawfish (*Pristis pectinata*) and Giant Manta Ray (*Manta birostris*) in the South Atlantic and Gulf of Mexico Shrimp Trawl Fishery. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Panama City, Florida. Panama City Laboratory Contribution Series 20-03.

12.2.4. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

Furthermore, the assessment team is aware that the ESA 7 process has been initiated to revise the 2021 Biological Opinion based on new information for sawfish that highlights trawl threats to the species.⁵⁰⁴ Although this process has been initiated, we note the current Biological Opinion **is still valid**. Based on the Carlson (2020), mortalities are below the maximum allowable mortality threshold of 180.6 (NOAA, 2021 BiOp). Hence, there is confidence that the GOM shrimp fishery is not hindering recovery of the smalltooth sawfish and the most probable adverse impacts of the UoA are considered.

In terms of management, the Florida net ban passed in 1995 has led to a reduction in the number of smalltooth sawfish incidentally captured, "...by prohibiting the use of gill and other entangling nets in all Florida waters and prohibiting the use of other nets larger than 500 square ft in mesh area in nearshore and inshore Florida waters" 12 (FLA. CONST. art. X, § 16). Despite the net ban, the threat of bycatch currently remains in commercial fisheries (e.g., Gulf of Mexico and South Atlantic shrimp fisheries, federal shark fisheries of the South Atlantic, and the Gulf of Mexico reef fish fishery)⁵⁰⁵. Additionally, there is identified sawfish critical habitat for which shrimping effort does not take place in. These areas are Charlotte Harbor Estuary Unit and Ten thousand Islands/ Everglades Unit (Figure 51; Top). The key conservation objective for the critical habitat units is to facilitate recruitment into the adult population by protecting juvenile nursery areas. The essential features of smalltooth sawfish critical habitat are: 1) red mangroves; and 2) shallow, euryhaline (fluctuating salinity) habitats characterized by water depths between mean high water and 3 ft measured at mean lower low waterline. The ELB data from the GOM shrimp fishery confirm that there is no effort taking place in these critical habitats (Figure 51; Bottom). Finally, there is an overall reduction in shrimp harvesting effort in south Florida from Hurricane Ian in September 2022. This storm had significant damage to the pink shrimp fleet and experts in the area claim that it is unlikely that these ever vessels will rejoin the fleet. These effects do not impede, slow, or reduce likelihood of recovery of the species to target levels.



⁵⁰⁴ Gulf Council. 2023. Reinitiation of ESA Section 7 Consultation on the Authorization of the Southeast U.S. Shrimp Fisheries in Federal Waters, Giant Manta Ray and Shrimp Trawl Interactions, and Next Steps. Tab D No. 4a Presentation by Jennifer Lee to the Gulf Council on 16 August 2023. <https://gulfcouncil.org/wp-content/uploads/D-4a-August-16-Shrimp-Committee-Meeting-Presentation.pdf>

⁵⁰⁵ NOAA. 2020. Endangered Species Act (ESA) - Section 7 Consultation Biological Opinion <https://media.fisheries.noaa.gov/2021-04/2021%20SHRIMP%20OPINION.pdf?null>

12.2.4. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

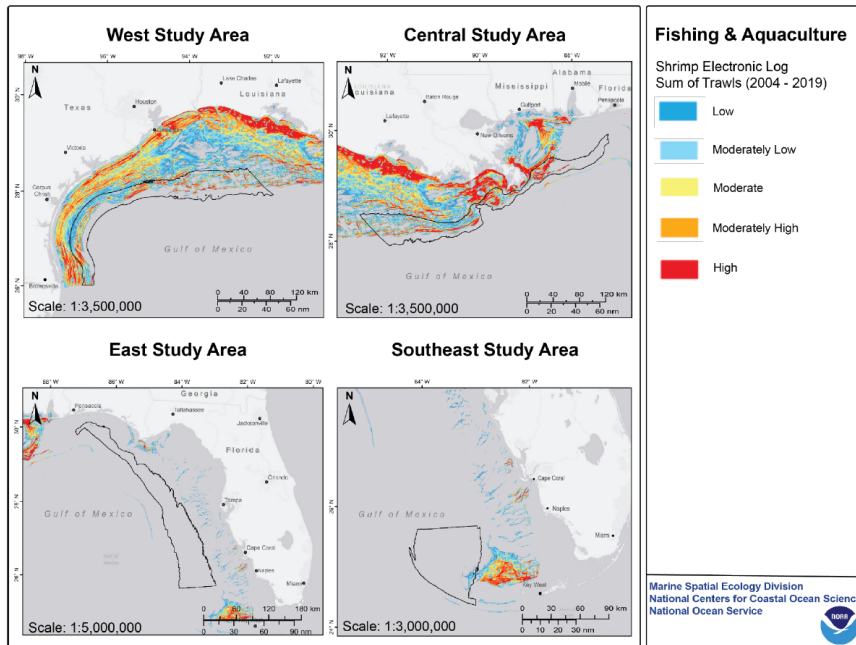


Figure 51. Top: Existing seasonal, areal, and quota-based closures in the Gulf of Mexico: NOAA Southeast 2021. Bottom: Geographic distribution of the GOM commercial shrimping effort based on ELB data from 2004-2019 for the four geographic study regions. Blue colors represent less effort in the time period examined, while orange and red colors represent relatively higher trawling effort. Data and maps reflect the resolution at which data can be displayed to the public to ensure protection of confidential data components (Source: Riley *et al.*, 2021⁵⁵⁷).

Giant Manta Ray

The giant manta ray is a long-lived, slow growing species that is known to occur in temperate and tropical waters around the world. As they are filter feeders, they are most often observed in offshore waters or coastal areas with high productivity.⁵⁰⁶ Their daily migration often follows the vertical migration of copepods and other planktivorous organisms. Populations of these animals are typically small and regionally driven and often show fragmentation between distinct populations. There are two known species of manta ray, but the smaller reef manta (*Manta alfredi*) is not known to occur in the GOM.

Mantas can grow to 9 m from wing tip to wing tip, but the more common size is 7 m across. This large size benefits them from having very few predators, however their slow, gliding movements do not allow for much escapability from those predators that are able to prey upon them⁵⁰⁶ These same attributes contribute to the same results if a manta were to interact with the GOM shrimp fishery. Their large size excludes them from being captured by nets, however their immobility prevents them from avoiding the net like other large animals.

As most of the GOM encounters occur in Louisiana, there are all three gear types to consider. There are no documented encounters between mantas and skimmer gear and butterfly nets. Butterfly nets are used primarily in inshore waters and tidal passes and consist of a pair of rigid rectangular metal frames and are pushed along each side the boat or mounted to a fixed dock. These nets are too small to possibly encounter mantas and are operated in locations where mantas are known to be absent from. Skimmer nets are typically mounted on both sides of a vessel and the nets are supported by a tubular metal frame on three sides (top and sides) or L shaped frame that skims over the bottom on a weighted skid, holding the net along the bottom. Skimmers are usually used in shallower nearshore areas of 10 ft or less. The triangular frame on a skimmer net do not create large enough openings for a manta to pass through and are operated in too shallow waters to encounter manta rays. Both skimmer and butterfly nets have no

⁵⁰⁶ <https://www.fisheries.noaa.gov/species/giant-manta-ray>

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documented interactions and there is a low probability of encounter, so giant manta rays will only be considered ETP species for otter trawl UoAs.

At this time, the assessment team is aware that NOAA reinitiated ESA Section 7 consultation for the south eastern US shrimp fishery (including both the Atlantic and GOM) for the interactions between the giant manta ray and smalltooth sawfish with the south eastern shrimp trawl fishery⁵⁰⁷. This process was reinitiated because of the multiple observed mortalities of giant mantas in recent years and new information for sawfish that highlights trawl threats to the species. In the coming years, NOAA plans to reevaluate the impact of the southeastern shrimp fishery on these two species. This will be completed in the form of gathering data on bycatch estimates and conducting population viability analysis for both species. However, at the time of assessment, this process has not published results and therefore cannot be used in the assessment process.

Historically, there are low observed interactions with the GOM shrimp fishery. Scott-Denton *et al.* (2012; 2020) published records for observer data in the US GOM shrimp fishery^{414,415}. Giant mantas (identified to species) only began in 2019 after it was listed as an ESA.^{414,415} Additionally, Beyea *et al.* (2022) reported catches from observer data down to the lowest taxonomic classification possible for all species (Scott-Denton *et al.* (2012; 2020) grouped large number of sparsely occurring fish into a single fish superclass grouping) in 2021 and from 1992-1994.^{414,415,417} There was very low observed occurrence (1 individual every 1.5 million hours of effort) from the 1992-1994 observer data, but there were zero recorded interactions with giant mantas in 2021.⁴¹⁷

The only published interactions between the southeastern shrimp fishery (both GOM and Atlantic) and giant mantas were presented by Carlson (2020) using observer data from 2007 to 2019.⁵⁰⁸ 2019 was the only year where interactions between the fishery and mantas occurred and there were 8 documented interactions from the south Atlantic and GOM; only two of these interaction were observed in the GOM.⁵⁰⁸ The Biological Opinion states that it is very possible that some of the 8 reported captures may have been recaptures because six of the captures occurred over the same two day span on the same observer trip.⁵⁰⁹ The extrapolated take of mantas by the fishery for 2019 were 140.1 individuals for the GOM, for which Carlson (2020) notes that these estimates should be considered highly uncertain and most likely represent overestimates of the total bycatch.⁵⁰⁹ It is believed that post incident mortality is not a significant factor for the annual estimated bycatch of the giant manta ray based on available information and informed judgement. Carlson (2020), which also used the federal observer data just as Beyea *et al.* (2022) and Scott-Denton *et al.* (2012 & 2020), does note that 2019 was the first year that mantas were identified to the species level.⁵⁰⁸

Studies indicate local to regional subpopulations range widely from 100-1,875 individuals (Miller and Klimovich, 2017; Beale *et al.*, 2019). The Biological Opinion considers the south Atlantic and GOM to be considerably larger than the areas considered in the published literature, thus they consider 1,875 to be a viable population estimate for the south Atlantic and GOM combined region. According to the 2021 Biological Opinion, the maximum allowable encounter (lethal and non-lethal) rate is 1,678 individuals per year for the entire southeastern shrimp fishery (GOM and Atlantic) based on zero mortalities observed.⁵⁰⁹ There was very low observed occurrence (1 individual every 1.5 million hours of effort) from the 1992-1994 observer data, but there were zero recorded interactions with giant mantas in 2021 (Beyea *et al.*, 2022). It is estimated that 1,678 captures of giant manta ray per year is not expected to have any measurable impact on the reproduction, numbers, or distribution of this species. The individuals are expected to fully recover such that no reductions in reproduction or numbers of this species are anticipated. Since these captures may occur throughout the action area and would be released within the general area where caught, no change in the distribution of this species is anticipated. Additionally, it documented in the Biological Opinion that Post Incident mortality (PIM), due to capture stress and injuries, is not a significant factor for the annual estimated bycatch of the giant manta. Therefore, the Biological Opinion believes the nonlethal take on average of 1,678 giant manta rays per year will not result in population level impacts nor will it change their

⁵⁰⁷ NOAA. 2023. Fiscal year 2023, Quarter 1, Fishery Management Council Report. NOAA Fisheries Office of Law Enforcement Southeast Division. https://safmc.net/documents/noaa-ole-council-report_fy-2023_q1-pdf/

⁵⁰⁸ Carlson, J.K. 2020.. Estimated Incidental Take of Smalltooth Sawfish (*Pristis pectinata*) and Giant Manta Ray (*Manta birostris*) in the South Atlantic and Gulf of Mexico Shrimp Trawl Fishery. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Panama City, Florida. Panama City Laboratory Contribution Series 20-03.

⁵⁰⁹ NOAA. 2020. Endangered Species Act (ESA) - Section 7 Consultation Biological Opinion <https://media.fisheries.noaa.gov/2021-04/2021%20SHRIMP%20OPINION.pdf?null>

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distribution. The 1,678 giant manta captures are split between the Atlantic (n=1,538) and GOM (n=140), thus the maximum allowable captures of giant manta ray in the GOM should not be greater than 140 individuals.

According to the 2021 Biological Opinion, it is believed that the local and regional giant manta ray population can range in size between 100 and 1875 individuals. Given that the southeastern fishery covers a large geographic area, it is assumed that the **current population size is 1875 individuals in the GOM and South Atlantic**.⁵¹⁰ The assessment received additional information regarding the capture of giant manta rays from 2019 to April 2023 from NOAA presentation to the Gulf Council on reinitiating ESA Section 7. From the data provided in the presentation, it is noted there were two mortalities in 2021 and three in 2023 from the southeastern shrimp fishery (Atlantic and GOM). Given these data presented by Ms. Jennifer Lee in the reinitiation of ESA Section 7 presentation, the 34 encounters (from 2019 to April 2023) resulted in 5 mortalities (mortality rate of 18.5%, although we calculated 5 mortalities in 34 observed interactions to be 14.7%).⁵¹⁰ Given the estimated 2% observer coverage and the mortality rate given by Gulf Council (2023), this results in an average of 392.60 encounters per year and an estimated 72.63 deaths. With the population size of 1875 individuals, the southeastern shrimp fishery potentially causes a reduction of 3.8% in population annually (72.63/1875).

Dulvy *et al.* (2014)⁵¹¹ presents two intrinsic growth rates for the species based on current knowledge. The two r_{max} values reflect estimated life history parameters, but out of precaution, the assessment team will only consider the minimum r_{max} value to ensure the effects of the fishery are considered in the worst case scenario. The minimum r_{max} value presented by Dulvy *et al.* (2014) is 0.079, which equates to 8.22% population growth annually. Additionally, given the population size of 1875 individuals (GOM and Atlantic), this 8.22% growth leads to the addition of 154 animals annually. Given that the rate of growth exceeds the rate of fishing mortality and that the number of added animals exceeds the estimated encounters by the GOM fishery annually, it can be said that the GOM is likely not hindering recovery of the giant manta and the most probable adverse impacts of the UoA on the ETP species are considered by the management organization.

The Final Listing Rule (83 FR 2916, January 22, 2018) noted that overall, current management measures that are in place for fishers under US jurisdiction appear to directly and indirectly contribute to the infrequency of interactions between US fishing activities and the threatened giant manta ray.⁵¹² Flower Garden Banks National Marine Sanctuary (FGBNMS) in the northern GOM is protected and has a network of closed fishing areas where juvenile mantas use this area as a nursery habitat (Figure 52).⁵¹³ In addition to this, there are several other management measures across the GOM including effort controls, closed areas, TEDs (for excluding juveniles only).

There are specific handling and release procedures for giant manta rays designed by NOAA to assist fisherman to release animals with minimal harm and loss of life.⁵¹⁴ This is confirmed, at least in part, by the live released observed by the observer program. Furthermore, otter trawls operate only a couple of meters off the seafloor whereas the giant manta ray can be found in the entirety of the water column, but primarily spends time at the surface feeding, the encounterability of manta rays by otter trawls will be low.

There are indirect measures in place for giant manta ray that minimize mortality. The overall reduction of effort from Hurricane Ian and the limited entry fishing license system has led to a reduction in the fleet size over the past decade. Giant mantas exist throughout the entirety of the water column, however they occupy the surface waters and shallows when feeding.⁵¹⁵ This creates a

⁵¹⁰ Gulf Council. 2023. Reinitiation of ESA Section 7 Consultation on the Authorization of the Southeast U.S. Shrimp Fisheries in Federal Waters, Giant Manta Ray and Shrimp Trawl Interactions, and Next Steps. Tab D No. 4a Presentation by Jennifer Lee to the Gulf Council on 16 August 2023. <https://gulfcouncil.org/wp-content/uploads/D-4a-August-16-Shrimp-Committee-Meeting-Presentation.pdf>

⁵¹¹ Dulvy, N.K., Pardo, S.A., Simpfendorfer, C.A. and Carlson, J.K., 2014. Diagnosing the dangerous demography of manta rays using life history theory. *PeerJ*, 2, p.e400. <https://peerj.com/articles/400/>

⁵¹² NMFS. 2018. Endangered and Threatened Wildlife and Plants; Final Rule To List the Giant Manta Ray as Threatened Under the Endangered Species Act. <https://www.federalregister.gov/documents/2018/01/22/2018-01031/endangered-and-threatened-wildlife-and-plants-final-rule-to-list-the-giant-manta-ray-as-threatened>

⁵¹³ Stewart, J.D., Nuttall, M., Hickerson, E.L. and Johnston, M.A., 2018. Important juvenile manta ray habitat at Flower Garden Banks National Marine Sanctuary in the northwestern Gulf of Mexico. *Marine Biology*, 165(7), pp.1-8. <https://link.springer.com/article/10.1007/s00227-018-3364-5>

⁵¹⁴ NOAA. 2021. Giant Manta Ray Handling and Release Procedures for Hook and Line Gears. <https://www.fisheries.noaa.gov/resource/outreach-materials/giant-manta-ray-handling-and-release-procedures-hook-and-line-gears>

⁵¹⁵ NOAA. 2023. Giant manta ray page, species directory. <https://www.fisheries.noaa.gov/species/giant-manta-ray>

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degree of low overlap with trawl gear (otter and skimmer), and thus lowers the encounter rate with this species. Finally, despite adult mantas being too large to be excluded by TEDs, juvenile mantas are of the appropriate size to pass through the throat of the trawl and be excluded by TED.

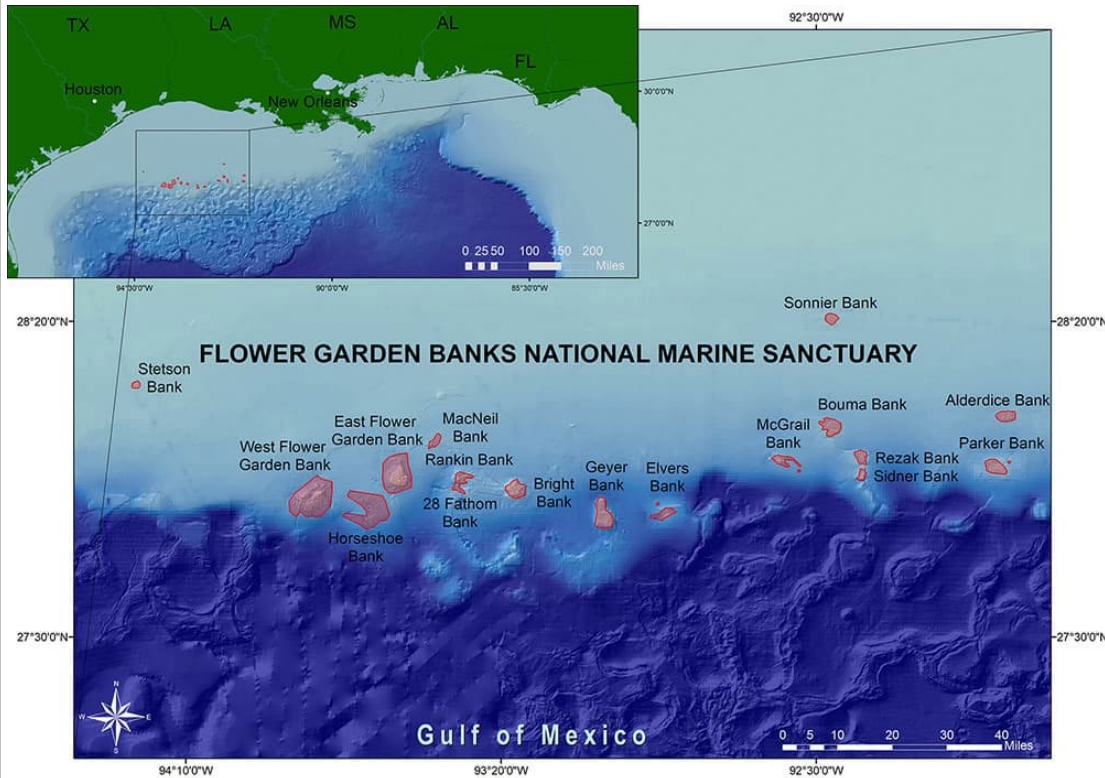


Figure 52. HAPCs in the Flower Garden Banks National Marine Sanctuary.

Gulf sturgeon

There are seven known reproducing populations of Gulf sturgeon in the GOM.⁵¹⁶ All but the Yellow and Escambia rivers have shown either stable or growing population sizes since their last available data. Overall, total population growth has exceeded 65%, however more standardized sampling and broader coverage is needed to confirm the population trends.

In observer data from July 2007 to December 2016, there is only one occurrence of Gulf sturgeon captured by the GOM shrimp fishery.^{479,480} The single occurrence was observed in December 2009. Due to the low rate of encounters, the GOM shrimp fishery is highly likely to not hinder recovery of the Gulf sturgeon. Since the implementation of TEDs in the skimmer and the otter trawl fleets, there have been no occurrences of sturgeon catch in the observer records or conversations had with stakeholders. An adult sturgeon (keeping in mind that juveniles sturgeon spend the first year of their life in freshwater) if of the appropriate size to be filtered by the TED and directed out of the catch via the flap.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on ETP species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks



⁵¹⁶ Heublein, J.C. and Kaeser, A.J., 2022. Gulf sturgeon (*Acipenser oxyrinchus desotoi*) 5-Year Review: Summary and Evaluation. https://repository.library.noaa.gov/view/noaa/41670/noaa_41670_DS1.pdf

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with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action are taken. Examples may include various stock and ecosystems assessment reports.

EVIDENCE:

Aside from the references and data sources provided above in the process and Current status/Appropriateness/Effectiveness sections, the NOAA observer program staffs observers on the skimmer and otter trawl vessels around the GOM. The program has been in place for approximately 20 years and has approximately 2% coverage on the fishery. Although this coverage is low, it provides management authorities sufficient insight to achieve management objectives.

References: See Footnotes inserted into text

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x 3	)	=	Overall score
	10			10				10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								N/A

9.5.1.7 Supporting Clause 12.2.5.

12.2.5. There shall be outcome indicator(s) consistent with achieving management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

Relevance: Relevant

Evaluation Parameters	Met?
Process: <i>There is a process in place that allowing creation of effective outcome indicators seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.</i>	<input type="checkbox"/>

EVIDENCE:
 There are well defined processes defined for each of the five gulf states and the federal government for listing endangered, threatened, and protected (ETP) species. At the state level, each of the five jurisdictions have published lists and listing procedure based on best available science, relevant monitoring, and stakeholder input (the five states are Texas⁵¹⁷, Louisiana⁵¹⁸, Mississippi⁵¹⁹, Alabama⁵²⁰, and Florida⁵²¹). At the federal level, NMFS and USFWS are responsible for maintaining lists of species that meet the definition of threatened or endangered under the ESA. NMFS is responsible for maintaining the list for most marine species and managing those species once they are listed.⁵²² The USFWS is responsible for maintaining the list for terrestrial and freshwater species and their management.

The ETP species (state and federal) that are found in the GOM and have the potential to interact with the US GOM shrimp fishery are listed in the table below.

Common name	Scientific name	Type	CITES (Appendix I, II, or III) ⁵²³	Unites States ESA ¹⁹¹	United States MMPA ⁵²⁴	Texas ESA ¹⁹ ₂	Louisiana ESA ¹⁹³	Mississippi ESA ¹⁹⁴	Alabama ESA ¹⁹⁵	Florida ESA ¹⁹⁶	IUCN REDLIST
Green turtle	<i>Chelonia mydas</i>	Reptile	Appx. 1	X		X	X	X		X	EN
Hawksbill turtle	<i>Eretmochelys imbricata</i>	Reptile	Appx. 1	X		X	X	X		X	CR
Kemp's Ridley turtle	<i>Lepidochelys kempii</i>	Reptile	Appx. 1	X		X	X	X		X	CR
Leatherback turtle	<i>Dermochelys coriacea</i>	Reptile	Appx. 1	X		X	X	X		X	VU
Loggerhead Turtle	<i>Caretta caretta</i>	Reptile	Appx. 1	X		X	X	X		X	VU
Bottlenose Dolphin	<i>Tursiops truncatus</i>	Mammal			X						LC
Brown Pelican	<i>Pelecanus occidentalis</i>	Bird						X			LC
Smalltooth sawfish	<i>Pristis pectinata</i>	Chondrichthyan	Appx. 1	X		X	X			X	CR
Giant manta ray	<i>Manta birostris</i>	Chondrichthyan	Appx. 2	X							EN
Gulf sturgeon	<i>Acipenser oxyrinchus</i>	Fish	Appx. 2	X			X	X	X	X	VU

⁵¹⁷ TPWD. 2023. Listed species Texas. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/listed-species/

⁵¹⁸ LDWF. 2023. Rare species and natural communities by parish <https://www.wlf.louisiana.gov/page/rare-species-and-natural-communities-by-parish>

⁵¹⁹ MDWFP. 2018. Mississippi listed species 2018. <https://www.mdwfp.com/media/255911/ms-listed-species-2018.pdf> <https://www.mdwfp.com/media/255911/ms-listed-species-2018.pdf>

⁵²⁰ OA. Nongame fishes, protected species Alabama regulations Outdoor Alabama. <https://www.outdooralabama.com/hunting-wildlife-regulations/nongame-fishes-protected-alabama-regulations>

⁵²¹ FWC. 2023. Threatened and Endangered Species. Fish and Wildlife Service <https://myfwc.com/media/1945/threatened-endangered-species.pdf>

⁵²² NOAA. 2023. Threatened and Endangered species <https://www.fisheries.noaa.gov/species-directory/threatened-endangered>

⁵²³ CITES, 2023. CITES Appendices <https://cites.org/eng/app/appendices.php>

⁵²⁴ NOAA. 2023. Marine Mammal Protection Act <https://www.fisheries.noaa.gov/topic/marine-mammal-protection>

12.2.5. There shall be outcome indicator(s) consistent with achieving management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

These species are not uniformly distributed across the gulf and thus only pertain to certain UoAs. The turtle, manta, and dolphin species will apply to all five states and the federal jurisdiction UoAs. The brown pelican will only be considered ETP in the Mississippi UoAs. The smalltooth sawfish will only be considered ETP in the Florida and federal UoAs. The Gulf sturgeon will only be considered ETP in Louisiana, Mississippi, Alabama, and Florida.

Turtles, bottlenose dolphin, smalltooth sawfish, giant manta, and Gulf sturgeon

Each species listed under the US Endangered Species Act (ESA) is assessed with information that include, as appropriate and available, information on current range, candidate information, federal Register documentation (e.g. notice of 5-year reviews, determination of Endangered/Threatened status, proposal to list), recovery plans, 5-year status reviews, biological opinions, critical habitats and conservation plans. As part of the ESA, endangered species cannot be retained and must be released to their environment with the least possible harm.⁵²⁵

NOAA Fisheries and the US Fish and Wildlife Service share responsibility for implementing the Endangered Species Act. NMFS manages the marine species, and the FWS manages the remainder of the listed species, the terrestrial and freshwater species. Their responsibilities include:

- listing and delisting species,
- designating critical habitat,
- developing recovery plans, and
- evaluating the status of the species every 5 years in five-year reviews.

Under the ESA, a species is considered:

- Endangered if it is in danger of extinction throughout all or a significant portion of its range
- Threatened if it is likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

The law requires federal agencies, in consultation with the US Fish and Wildlife Service and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes the "taking" of any listed species of endangered fish or wildlife. Likewise, import, export, interstate, and foreign commerce of listed species are all generally prohibited.

NOAA Fisheries is responsible for the protection, conservation, and recovery of more than 160 endangered and threatened marine and anadromous species under the Endangered Species Act.⁵²⁶

Once a species is listed, NOAA/FWS monitor their population and review their status every 5 years to ensure that the listing is still accurate. These 5-year reviews may kick off the process for reclassifying or delisting a species.

One of the main goals of the ESA is to conserve the areas or habitat features that threatened and endangered species depend on for survival and recovery. Examples of these critical habitats include nursing, pupping, or breeding sites or foraging areas.

Critical habitat designations only apply to federal actions. They do not affect land ownership or restrict private citizens' use of the area. Once critical habitat is designated, federal agencies are required to consult with NOAA to ensure any actions they fund, authorize, or take part in are not likely to destroy or harm the critical habitat.

⁵²⁵ <https://www.epa.gov/endangered-species/endangered-species-species-information-factsheets>

⁵²⁶ NOAA. 2023. Endangered Species Conservation: ESA Implementation. <https://www.fisheries.noaa.gov/topic/endangered-species-conservation/endangered-species-act-implementation>

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Endangered and threatened species have different needs that require different conservation strategies to achieve recovery. NOAA sets goals for each species' recovery, which are laid out in recovery plans. Each plan outlines the tasks required to reduce or eliminate threats and restore or establish self-sustaining wild populations, so that they no longer require ESA protections.

Recovery actions depend on the particular species, its life history needs, and the threats it faces. Examples of the wide range of conservation measures implemented include:

- [Restoring habitats](#)
- Reducing [bycatch in fisheries](#)

NOAA/FWS work with local, state, and other federal agencies to [enforce ESA rules and regulations](#) in US federal, state, and territorial waters.

Notable actions cascading down from ESA management in the Gulf include, to name but a few, the development and deployment of TEDs⁵²⁷ and BRDs⁵²⁸ in the GOM shrimp fishery, creation and implementation of habitat closures and critical habitats for species such as those specific to Smalltooth sawfish, Gulf sturgeon, and a suite of regulations to limit and reduce bycatch of endangered species.

For marine mammal species such as bottlenose dolphin, the Marine Mammal Protection Act MMPA offers a level of protection comparable to that of the ESA.

NOAA's work to protect and conserve marine mammal species includes:

- Managing the take of marine mammals through [permits and authorizations](#) (sections 101 and 104 of the MMPA).
- Investigating and prosecuting violations of the MMPA (section 107).
- [Partnering with other nations](#) to make sure they hold international fishing to our standards according to the MMPA (section 108).
- Evaluating the status of marine mammals to determine whether they should be designated as depleted and [developing conservation plans for depleted species](#) or stocks (section 115).
- [Developing stock assessment reports](#)—with scientific information on a species' or stock's geographic range, population structure, abundance, and threats—to evaluate stock status (section 117).
- [Managing incidental marine mammal interactions with commercial fisheries through authorization and reporting](#), by assessing the level of [mortality and injury in commercial fisheries](#), and by developing [take reduction plans](#) (section 118).
- [Collaborating with Alaska Native organizations to conserve marine mammal populations in Alaska](#) (section 119).
- [Coordinating a national network to respond to marine mammal strandings](#) (section 403).
- Investigating and responding to [marine mammal unusual mortality events](#) (section 404).

Considering the limited impacts explored in detail in the previous scoring clause, and the management actions in place for this fishery, including their historical effects (e.g., decrease of turtle bycatch and mortality, closures affecting multiple species) we can determine that there is a process in place that allowing creation of effective outcome indicators seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

Smalltooth sawfish

In terms of management, the Florida net ban passed in 1995 has led to a reduction in the number of smalltooth sawfish incidentally captured, "...by prohibiting the use of gill and other entangling nets in all Florida waters and prohibiting the use of other nets larger than 500 square ft in mesh area in nearshore and inshore Florida waters" 12 (FLA. CONST. art. X, § 16). Despite the net ban, the

⁵²⁷ NOAA. 2023. TED regulations. <https://www.fisheries.noaa.gov/southeast/bycatch/turtle-excluder-device-regulations>

⁵²⁸ NOAA. 2023. Bycatch Reduction Devices - Gulf of Mexico and South Atlantic. <https://www.fisheries.noaa.gov/southeast/bycatch/bycatch-reduction-devices-gulf-mexico-and-south-atlantic>

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threat of bycatch currently remains in commercial fisheries (e.g., Gulf of Mexico and South Atlantic shrimp fisheries, federal shark fisheries of the South Atlantic, and the Gulf of Mexico reef fish fishery)⁵²⁹.

Also, we note that the large teal-colored areas located in South Florida (see Figure 52 in Supporting Clause 12.2.4) implemented in 2009 are identified as critical habitat in place to protect smalltooth sawfish habitat. The critical habitat consists of two units: the Charlotte Harbor Estuary Unit, which comprises approximately 221,459 acres (346 mi²) of coastal habitat, and the Ten Thousand Islands/Everglades Unit, which comprises approximately 619,013 acres (967 mi²) of coastal habitat in southwest Florida. There does not appear to be any shrimp effort based ELB data available to date in either of these identified critical habitats. The key conservation objective for the critical habitat units is to facilitate recruitment into the adult population by protecting juvenile nursery areas. The essential features of smalltooth sawfish critical habitat are: 1) red mangroves; and 2) shallow, euryhaline (fluctuating salinity) habitats characterized by water depths between mean high water and 3 ft measured at mean lower low waterline.

We finally note that a sawfish population viability analysis of sawfish will likely to be published in 2023 (it is currently being reviewed within the government). Furthermore, industry representatives have highlighted that there has been considerable damage to pink shrimp vessels in Florida after the latest hurricane (about 50 vessels were stranded in the Ft. Meyers, FL area after Hurricane Ian). As of March 2023, about 20 vessels still are not functioning and unlikely to return to the water. This may be a temporary reduction in effort (and potential negative effects to the sawfish population) as these permits could eventually be transferred to different boats. It should be noted that these 20 boats were likely high volume pink shrimp producers due to their close geographical proximity to the main Florida pink shrimp grounds, and if these permits are transferred to different vessels they may not remain in this area.

All in all, when considering collectively the NOAA analysis on bycatch and projected annual takes, a precautionary 5% annual increase rate, the current management measures in place (i.e. avoidance of South Florida Ten Thousand Islands/Everglades critical areas, Florida net ban, and the likely reduction in pink shrimp effort resulting from Hurricane Ian's damage) to minimize the UoA-related mortality of smalltooth sawfish, and are highly likely to achieve national and international requirements for the protection of this species.

Giant Manta Ray

The Final Listing Rule (83 FR 2916, January 22, 2018) noted that overall, current management measures that are in place for fishers under US jurisdiction appear to directly and indirectly contribute to the infrequency of interactions between US fishing activities and the threatened giant manta ray.⁵³⁰ Flower Garden Banks National Marine Sanctuary (FGBNMS) in the northern GOM is protected and has a network of closed fishing areas where juvenile mantas use this area as a nursery habitat (Figure 52).⁵³¹ In addition to this, there are several other management measures across the GOM including effort controls, closed areas, TEDs (for excluding juveniles only).

There are specific handling and release procedures for giant manta rays designed by NOAA to assist fisherman to release animals with minimal harm and loss of life.⁵³² This is confirmed, at least in part, by the live released observed by the observer program. Furthermore, otter trawls operate only a couple of meters off the seafloor whereas the giant manta ray can be found in the entirety of the water column, but primarily spends time at the surface feeding, the encounterability of manta rays by otter trawls will be low.

⁵²⁹ NOAA. 2020. Endangered Species Act (ESA) - Section 7 Consultation Biological Opinion <https://media.fisheries.noaa.gov/2021-04/2021%20SHRIMP%20OPINION.pdf?null>

⁵³⁰ NMFS. 2018. Endangered and Threatened Wildlife and Plants; Final Rule To List the Giant Manta Ray as Threatened Under the Endangered Species Act. <https://www.federalregister.gov/documents/2018/01/22/2018-01031/endangered-and-threatened-wildlife-and-plants-final-rule-to-list-the-giant-manta-ray-as-threatened>

⁵³¹ Stewart, J.D., Nuttall, M., Hickerson, E.L. and Johnston, M.A., 2018. Important juvenile manta ray habitat at Flower Garden Banks National Marine Sanctuary in the northwestern Gulf of Mexico. *Marine Biology*, 165(7), pp.1-8. <https://link.springer.com/article/10.1007/s00227-018-3364-5>

⁵³² NOAA. 2021. Giant Manta Ray Handling and Release Procedures for Hook and Line Gears. <https://www.fisheries.noaa.gov/resource/outreach-materials/giant-manta-ray-handling-and-release-procedures-hook-and-line-gears>

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There are indirect measures in place for giant manta ray that minimize mortality. The overall reduction of effort from Hurricane Ian and the limited entry fishing license system has led to a reduction in the fleet size over the past decade. Giant mantas exist throughout the entirety of the water column, however they occupy the surface waters and shallows when feeding.⁵³³ This creates a degree of low overlap with trawl gear (otter and skimmer), and thus lowers the encounter rate with this species. Finally, despite adult mantas being too large to be excluded by TEDs, juvenile mantas are of the appropriate size to pass through the throat of the trawl and be excluded by the TED.

Brown Pelican

The brown pelican was delisted from the federal ESA in 2009 after DDT was banned and the species made a remarkable recovery. However, it still remains under federal protection by the Migratory Bird Treaty Act.⁵³⁴ There is no long-term monitoring conducted for this species in the GOM, although they have been identified as a high priority species by the Gulf of Mexico Avian Monitoring Network.⁵³⁵ There have only been four total reports in observer bycatch data from 2011 to 2016 for which there were two mortalities.

The most recent population estimate suggests that there are 300,000 total individuals. This species has undergone a large and statistically significant increase over the last 40 years in North America (712% increase over 40 years, equating to a 68.8% increase per decade). Accordingly, it is highly unlikely that the few catches from the GOM shrimp fishery will hinder stock recovery and thus there is no explicit need for management preventing adverse impacts from the fishery.

Current status/Appropriateness/Effectiveness:

There is evidence for established outcome indicators (e.g., in a fishery management plan or other regulation) seeking to ensure that ETP species are protected (through States or international regulations) from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored. Overall, fishing activity does not impede, slow, or reduce likelihood of recovery of the species to target levels or other planned outcomes. Management objectives shall be achieved accordingly. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.



EVIDENCE:

There are established outcome indicators consistent with ensuring that ETP species are protected from adverse impacts resulting from interactions with BSAI crab fisheries (including recruitment overfishing or other impacts) that are likely to be irreversible or very slowly reversible. Ongoing programs that monitor outcome indicators, including the federal observer program, help to ensure that adverse impacts to ETP species do not arise.

Each ESA species is subject to a 5-year status review.⁵³⁶ As part of these reviews, biological information is updated based on new available scientific research and current population trends are revised based on long-term monitoring or reliable indicators. Many ESA species do not have long-term monitoring in place (like the giant manta and smalltooth sawfish) but use a variety of methods to estimate population trends and document current threats. The long-term monitoring of turtles come in the form of nest

⁵³³ NOAA. 2023. Giant manta ray page, species directory. <https://www.fisheries.noaa.gov/species/giant-manta-ray>

⁵³⁴ FWS. 2023. Migratory Bird Act 1918. Fish and Wildlife Service <https://www.fws.gov/law/migratory-bird-treaty-act-1918>

⁵³⁵ Jodice, P.G.R., E.M. Adams, J.S. Lamb, and Y. Satge. 2019. Gulf of Mexico Avian Monitoring Network Strategic Monitoring Plan: Seabirds. In Lyons et al. (eds.). Gulf of Mexico Avian Monitoring Network Strategic Monitoring Plans. Mississippi State University Press. https://tigerprints.clemson.edu/cgi/viewcontent.cgi?article=4124&context=all_theses

⁵³⁶ <https://www.fisheries.noaa.gov/national/endangered-species-conservation/endangered-species-act-5-year-reviews>

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abundance.^{537,538,539} Each of the five species have known nesting aggregations and these sites are monitored annually to provide an indication for population status.⁵⁴⁰

The Marine Mammal Protection Act (MMPA) requires stock assessment reports to be reviewed annually for stocks designated as strategic, annually for stocks where there is significant new information available, and at least once every three years for all other stocks. Each stock assessment includes, when available, a description of the stock's geographic range, a minimum population estimate, current population trends, current and maximum net productivity rates, optimum sustainable population levels and allowable removal levels, and estimates of annual human-caused mortality and serious injury through interactions with commercial fisheries.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicators seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Examples may include fishery management plans, or stock and ecosystems assessment reports.



EVIDENCE:

These species are not uniformly distributed across the gulf and thus only pertain to certain UoAs. The turtle, manta, and dolphin species will apply to all five states and the federal jurisdiction UoAs. The brown pelican will only be considered ETP in the Mississippi UoAs. The smalltooth sawfish will only be considered ETP in the Florida and federal UoAs. The Gulf sturgeon will only be considered ETP in Louisiana, Mississippi, Alabama, and Florida.

Turtles, Dolphins, Sturgeon, and Pelican

There is sufficient evidence provided in the above Evaluation Parameters and the EPs provided in Supporting Clause 12.2.4 to conclude that there are effective indicators seeking to ensure the above listed ETP species are protected from adverse impact resulting from interactions with the GOM shrimp fishery.

Quantitative data available resulting from recent observer reports on the shrimp fishery in the Gulf of Mexico. Examples include:

1. Pulver *et al.* 2012⁵⁴¹ using NOAA observer data on skimmer trawl gear for 2012 sampled from LA, MS, AL.
2. Pulver *et al.* 2014⁵⁴² using NOAA observer data on skimmer trawl gear for 2013 sampled from LA, MS, AL.
3. Scott-Denton *et al.* 2014⁵⁴³ using NOAA observer data on skimmer trawl gear for 2013 sampled from LA, MS, AL here considered to be representatives for state and Gulf waters.

⁵³⁷ FFWCC. 2023. Index nesting beach survey totals (1989-2022). Accessed 2 April 2023. <https://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/>

⁵³⁸ NOAA. 2021. Endangered Species Act (ESA) - Section 7 Consultation Biological Opinion. Endangered Species Act (ESA) - Section 7 Consultation Biological Opinion Reinitiation of Endangered Species Act (ESA) Section 7 Consultation on the Implementation of the Sea Turtle Conservation Regulations under the ESA and the Authorization of the Southeast U.S. Shrimp Fisheries in Federal Waters under the Magnuson-Stevens Fishery Management and Conservation Act (MSFMCA). National Marine Fisheries Service (NMFS), Southeast Regional Office (SERO), St. Petersburg, Florida. 297p. <https://doi.org/10.25923/vw00-sq03>

⁵³⁹ Gulick, A.G., Ewen, K.A., Pollock, C.G., Hillis-Starr, Z.M., 2022. Trends in abundance and reproductive success of the hawksbill turtle nesting population at Buck Island Reef National Monument, St. Croix, US Virgin Islands. *Endangered Species Research*, 48, pp.191-198. <https://www.int-res.com/articles/esr2022/48/n048p191.pdf>

⁵⁴⁰ Babcock, E.A., Barnette, M.C., Bohnsack, J.A., Isely, J.J., Porch, C.E., Richards, P.M., Sasso, C. and Zhang, X., 2018. Integrated Bayesian models to estimate bycatch of sea turtles in the Gulf of Mexico and southeastern US Atlantic coast shrimp otter trawl fishery. https://repository.library.noaa.gov/view/noaa/19775/noaa_19775_DS1.pdf

⁵⁴¹ Pulver, J.R., E. Scott-Denton and J.A. Williams. 2012. Characterization of the U.S. Gulf of Mexico skimmer trawl fishery based on observer coverage. NOAA Technical Memorandum NMFS-SEFSC-636, 27 p. <https://repository.library.noaa.gov/view/noaa/4782>

⁵⁴² Pulver, J.R., E. Scott-Denton and J.A. Williams. 2014. Observer coverage of the 2013 Gulf of Mexico skimmer trawl fishery. NOAA Technical Memorandum NMFS-SEFSC-654, 25 p. <http://doi.org/10.7289/V5BG2KXX>

⁵⁴³ Scott-Denton, E., J.A. Williams and Pulver, J. R. 2014. Observer Coverage of the 2014 Gulf of Mexico Skimmer Trawl Fishery. NOAA Technical Memorandum NMFS-SEFSC-666. <http://dx.doi.org/10.7289/V5416V1R>

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4. Scott-Denton *et al.* 2012⁵⁴⁴ using observer data from 2007 to 2010 (sampled from all state and federal waters)
5. Scott-Denton *et al.* 2020⁵⁴⁵ using observer data on otter and skimmer trawl from 2011 to 2016 (sampled from all state and federal waters).
6. Louisiana Shrimp Bycatch Study 2020⁵⁴⁶ using LA state waters data collected from June 2019 to July 2020 (note, the data was then provided disaggregated to the Assessment Team for use in specific gear types, e.g. butterfly net)

In addition to these observer reports, there is quantitative information adequate to assess the UoA related mortality and impact:

- a) status of sea turtles abundance (e.g. see number of nests for all sea turtle species, see Figure 46, Figure 47, Figure 48, Figure 49, Figure 50);
- b) bycatch data, population growth parameters, precautionary bycatch projections, critical habitat closures (see Figure 26), gear bans (e.g., refer to [Smalltooth sawfish section](#) and references therein e.g., NOAA 2020⁵⁴⁷);
- c) bycatch reduction devices such as TEDs⁵⁴⁸ and BRDs⁵⁴⁹, bycatch data, survey indices/population estimates and or PBR calculations (e.g., bottlenose dolphin, brown pelican⁵⁵⁰, Gulf sturgeon see Figure 39).
- d) data on sawfish were published in Carlson (2020)⁵⁵¹ and the Biological Opinion (NOAA 2021)⁵⁵²
- e) data on giant manta rays were published Carlson (2020)⁵⁵¹ and the Biological Opinion (NOAA 2021)⁵⁵², although at the time of publication there was only species specific data presented for 2019. The species was listed as ESA in 2018 and were grouped with other *mobula* rays to that point. Gulf Council/Lee (2023) provided five years of data on capture and release condition for mantas and the southeastern shrimp fishery.⁵⁵³ This presentation also provided some information on the spatial and temporal information relating to the catches. Despite the short time period of data, there is enough information for NOAA to reinitiate the ESA Section 7 process to evaluate treats to the species (true for both manta and sawfish).

Giant Manta (All UoAs) and Smalltooth Sawfish (Florida and Federal UoAs)

Unlike the other ETP species, there is ambiguity in the level of impact that the GOM shrimp fishery has on these two species. The low observer coverage leads to mortality values with low statistical power and wide ranging confidence intervals. At this time, the assessment team is aware that NOAA reinitiated ESA Section 7 consultation for the south eastern US shrimp fishery (including both the Atlantic and GOM) for the interactions between the giant manta ray and smalltooth sawfish with the south eastern shrimp trawl fishery.⁵⁵³ This process was reinitiated because of the multiple observed mortalities of giant mantas in recent years and new information for sawfish that highlights trawl threats to the species. In the coming years, NOAA plans to reevaluate the impact of the

⁵⁴⁴ Scott-Denton E., Cryer P.F., Duffy M.R., Gocke J.P., Harrelson M.R., Kinsella D.L., Nance J.M., Pulver J.R., Smith R.C., Williams J.A. 2012. Characterization of the US Gulf of Mexico and South Atlantic penaeid and rock shrimp fisheries based on observer data. *Mar. Fish. Rev.*, 82 (2020), pp. 17-47.
<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/MFR/mfr744/mfr7441.pdf>

⁵⁴⁵ Scott-Denton E., Cryer P.F., Duffin B.V., Duffy M.R., Gocke J.P., Harrelson M.R., Whatley A.J., Williams J.A. 2020. Characterization of the US Gulf of Mexico and South Atlantic Penaeidae and rock shrimp (Sicyoniidae) fisheries through mandatory observer coverage, from 2011 to 2016. *Mar. Fish. Rev.*, 82, pp. 17-47.
<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/mfr821-22.pdf>

⁵⁴⁶ Cagle P. and West J. 2020. Evaluation of Commercial Shrimp Fishery Bycatch in Louisiana Waters, November 2020. Office of Fisheries Louisiana Department of Wildlife and Fisheries. https://www.wlf.louisiana.gov/assets/Resources/Publications/Commercial_Fishing_Seafood/Evaluation-of-Bycatch-in-the-Louisiana-Shrimp-Fishery_final.pdf

⁵⁴⁷ NOAA. 2020. Endangered Species Act (ESA) - Section 7 Consultation Biological Opinion <https://media.fisheries.noaa.gov/2021-04/2021%20SHRIMP%20OPINION.pdf?null>

⁵⁴⁸ NOAA. 2023. TED regulations. <https://www.fisheries.noaa.gov/southeast/bycatch/turtle-excluder-device-regulations>

⁵⁴⁹ NOAA. 2023. Bycatch Reduction Devices - Gulf of Mexico and South Atlantic. <https://www.fisheries.noaa.gov/southeast/bycatch/bycatch-reduction-devices-gulf-mexico-and-south-atlantic>

⁵⁵⁰ Butcher, G.S. and Niven, D.K., 2007. Combining data from the Christmas Bird Count and the Breeding Bird Survey to determine the continental status and trends of North America birds.

⁵⁵¹ Carlson, J.K. 2020.. Estimated Incidental Take of Smalltooth Sawfish (*Pristis pectinata*) and Giant Manta Ray (*Manta birostris*) in the South Atlantic and Gulf of Mexico Shrimp Trawl Fishery. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Panama City, Florida. Panama City Laboratory Contribution Series 20-03.

⁵⁵² NOAA. 2020. Endangered Species Act (ESA) - Section 7 Consultation Biological Opinion <https://media.fisheries.noaa.gov/2021-04/2021%20SHRIMP%20OPINION.pdf?null>

⁵⁵³ Gulf Council. 2023. Reinitiation of ESA Section 7 Consultation on the Authorization of the Southeast U.S. Shrimp Fisheries in Federal Waters, Giant Manta Ray and Shrimp Trawl Interactions, and Next Steps. Tab D No. 4a Presentation by Jennifer Lee to the Gulf Council on 16 August 2023. <https://gulfcouncil.org/wp-content/uploads/D-4a-August-16-Shrimp-Committee-Meeting-Presentation.pdf>

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southeastern shrimp fishery on these two species. This will be completed in the form of gathering data on bycatch estimates and conducting population viability analysis for both species.

The uncertainty of the management system indicates that the information provided above (based on currently published information) may not reflect current impacts. As such, it is determined that the quality of evidence for these two species are not sufficient to conclude that the presented outcome indicators are preventing the GOM shrimp fishery from having adverse effects on the giant manta and smalltooth sawfish.

References:	Refer to embedded footnotes			
Numerical score:	Starting score	- (	Number of EPs <u>NOT</u> met	) x 3 =
	10		See indiv. scores	
				Turtles, Dolphins, Sturgeon, and Pelican
				10
				Giant Manta and Smalltooth Sawfish
				7
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)				High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)				Full Conformance
Non-conformance Number (if applicable):				N/A
				3

9.5.1.8 Supporting Clause 12.2.6.

12.2.6. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.	
Relevance:	Relevant
Evaluation Parameters	Met?
<p>Process: <i>There is a process that accounts for the most probable adverse impacts of the unit of certification on habitats. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP species or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.</i></p>	<input checked="" type="checkbox"/>
<p>EVIDENCE: For the Butterfly net UoAs, there is no interaction with habitats, thus this supporting clause is fully met.</p> <p>For skimmer and otter trawl UoAs, the primary habitat that is fished is soft, mud bottoms. The benthic substrate of the Gulf of Mexico is predominantly characterized by soft/mixed sediments with small, patchy outcroppings of rock in the northern range and larger reefs to the east and southeast (Figure 53).⁵⁵⁴ The soft bottom habitats consists of mud and sand; mixed bottom consists of gravel, sand, and mud; and hard bottoms consists of rock, which is typically pavements, pinnacles, and bedrock outcrops. There is a strong division between benthic substrate and geomorphology on the east and west side of the Mississippi River delta. At the mouth of the delta, there is a very narrow continental shelf (due to erosion from the river) that is characterized by mud from silty discharge from the river. To the west, the seafloor is dominated by mud and sand as a result of the westward currents that carry the same silt and river discharge to the habitats off of Texas and Louisiana. Rocky/hard bottom does occur on this western range at the margin of the continental shelf and continental slope, which is likely a result of erosion of soft sediments at the edge of the shelf.⁵⁵⁵</p> <p>To the east, the bottom is composed of much more sand, gravel, and rocky habitats. The deeper parts of the western half are still dominated by muddy bottom, but upper portions of the continental slope are characterized by notable and extensive areas of hard substrate. This hard substrate is largely the delineation between the muddy and sandy/gravel habitat types. The majority of the very wide continental shelf off the coast of Florida is dominated by irregular patchiness of sand and gravel. These sandy and gravel dominated areas can be characterized by seafloor sand waves (or seabed dunes).</p> <p>The fishery primarily interacts with soft mud bottom (and occasionally sandy bottom) as this is the primary habitat for the brown, white, and pink shrimp. There is not overlap between the fishery and any particular vulnerable habitat, but that will be rationalized in the next supporting clause.</p>	

⁵⁵⁴ Jenkins C. Dominant Bottom Types and Habitats in Gulf of Mexico Data Atlas [Internet]. Stennis Space Center (MS): National Centers for Environmental Information; 2011. [5 screens]. Available from: <https://gulfatlas.noaa.gov/>.

⁵⁵⁵ Pratson, L.F., Nittrouer, C.A., Wiberg, P.L., Steckler, M.S., Swenson, J.B., Cacchione, D.A., Karson, J.A., Murray, A.B., Wolinsky, M.A., Gerber, T.P. and Mullenbach, B.L., 2007. Seascape evolution on clastic continental shelves and slopes. *Continental margin sedimentation: from sediment transport to sequence stratigraphy*, pp.339-380.

https://www.academia.edu/download/51234813/Seascape_Evolution_on_Clastic_Continenta20170107-2501-tu55zo.pdf

12.2.6. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

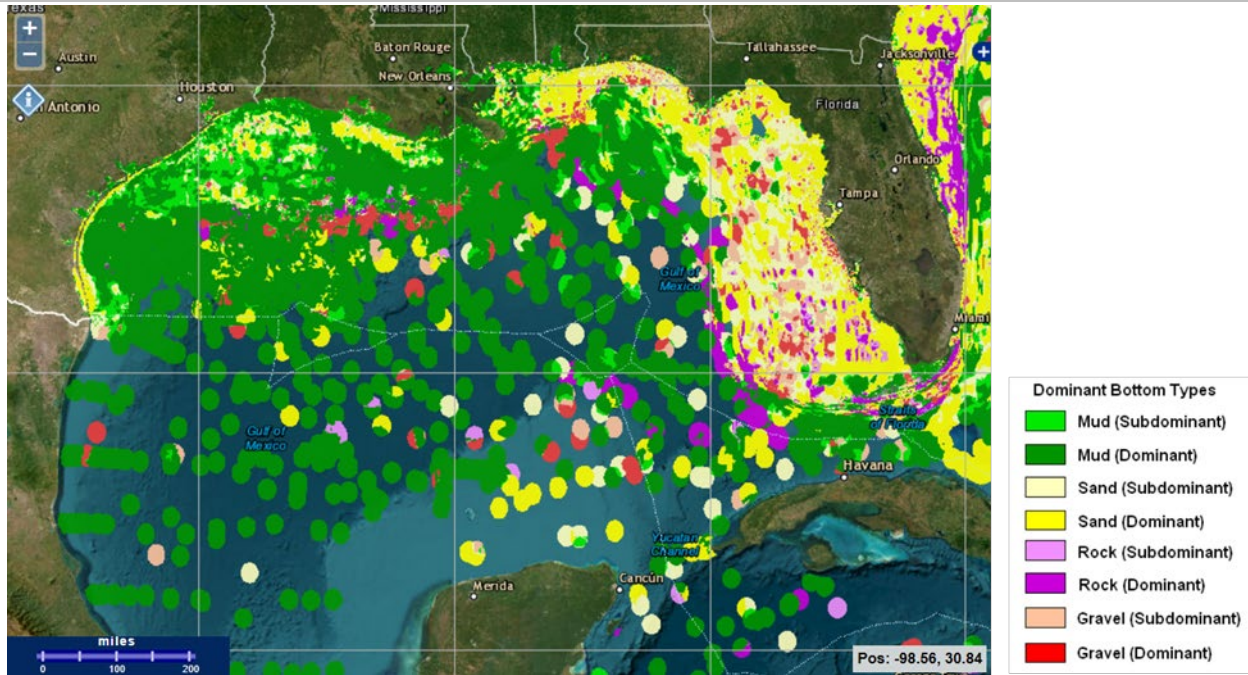


Figure 53. Major substrates on the shelf of Gulf of Mexico (Source: Jenkins, 2011).

Current status/Appropriateness/Effectiveness:

There is evidence that the fishery management organization considers the most probable adverse impacts of the unit of certification on habitats, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, if these impacts are likely to be irreversible or very slowly reversible, effective remedial action is taken (please see Appendix 1 part 5, noting specifically the 3 habitat assessment elements, and part 7 for cumulative effects evaluation). Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.



EVIDENCE:

For the Butterfly net UoAs, there is no interaction with habitats, thus this supporting clause is fully met.

For skimmer and otter trawl UoAs, the fishery trawls over soft bottom habitats and avoids rocky reefs and other hard bottom substrate (including artificial) to avoid damages to the gear. These habitats are not considered sensitive as they are mainly comprised of invertebrate communities.

Habitat Assessment element 1:

The effects of these UoAs on sensitive habitats is minimal. The bulk of trawling effort (otter and skimmer) occurs on the western portion of the GOM, off the waters of Mississippi, Louisiana, and Texas.⁵⁵⁶ Figure 54 shows the fishing effort with higher resolution from ELB points from vessels engaged in fishing activities.⁵⁵⁷ The majority of this effort takes place over muddy flat bottoms as vessels make a strong conscious effort to avoid rocky outcrops because those habitats can destroy the gear, and because brown, white and pink shrimp occur mainly in soft, muddy bottoms (and occasionally sand covered bottoms).⁵⁵⁸ As seen in Figure 54, the fishing effort is absent (or low intensity) in areas that are dominated by sand, gravel, and rocky outcrops as depicted in Figure 53. The fishery

⁵⁵⁶ Scott-Denton, E., Cryer, P.F., Duffin, B.V., Duffy, M.R., Gocke, J.P., Harrelson, M.R., Whatley, A.J. and Williams, J.A., 2020. Characterization of the US Gulf of Mexico and South Atlantic Penaeidae and Rock Shrimp (Sicyoniidae) Fisheries through Mandatory Observer Coverage, from 2011 to 2016. *Marine Fisheries Review*, 82(1-2), pp.17-47.

⁵⁵⁷ Riley, K.L., Wickliffe, L.C., Jossart, J.A., MacKay, J.K., Randall, A.L., Bath, G.E., Balling, M.B., Jensen, B.M., Morris Jr., J.A. 2021. An Aquaculture Opportunity Area Atlas for the U.S. Gulf of Mexico. NOAA Technical Memorandum NOS NCCOS 299: 545p.

⁵⁵⁸ NOAA. 2023. Brown and white shrimp page, species directory. <https://www.fisheries.noaa.gov/species/brown-shrimp> ; <https://www.fisheries.noaa.gov/species/white-shrimp>

12.2.6. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

primarily interacts with mud bottom, especially around the mouth of the Mississippi river which discharges a great deal of mud/silt to the GOM.

The effect on sensitive habitats is considered to be very low (<10%). There is a consensus among harvesters, researchers, and managers that the fishery avoids (or makes their best effort to) sensitive habitats such as seagrass habitat, oyster beds, and coral (and other sensitive invertebrate) communities because these are either habitats where shrimp do not occur (seagrass and oyster beds) or it would cause negative financial impact due to gear damage (biogenic communities).

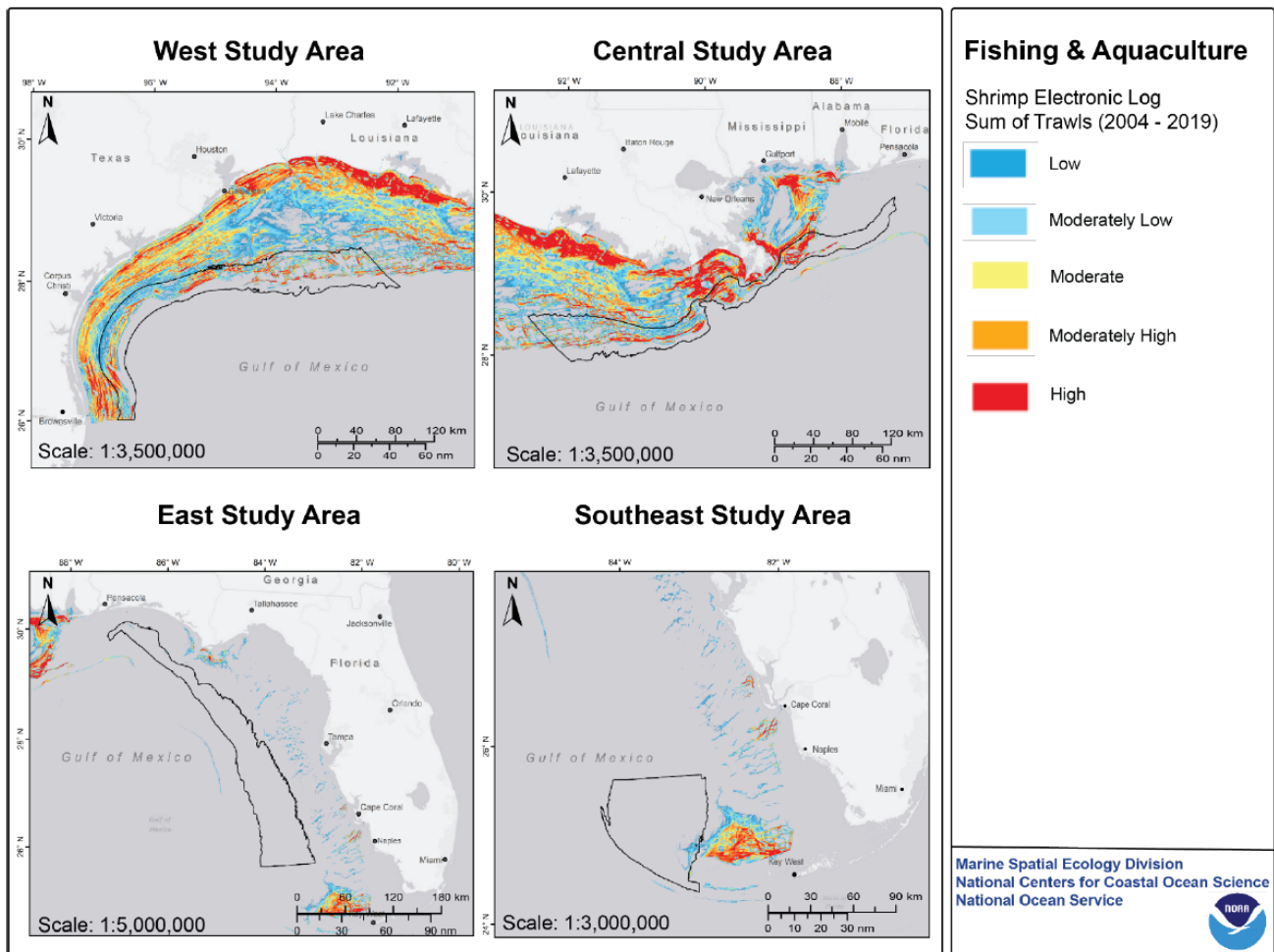


Figure 54. Geographic distribution of the GOM commercial shrimping effort based on ELB data from 2004-2019 for the four geographic study regions. Blue colors represent less effort in the time period examined, while orange and red colors represent relatively higher trawling effort. Data and maps reflect the resolution at which data can be displayed to the public to ensure protection of confidential data components (Source: Riley *et al.*, 2021⁵⁵⁷).

Habitat Assessment Element 2:

There is very little physical structure on muddy/sandy benthos, thus the fishery does not adversely affect physical structure.

12.2.6. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

Regardless of the proximity to shore, the Gulf of Mexico is characterized as having high benthic diversity.⁵⁵⁹ The Department of the Interior authorized the Deep Gulf of Mexico Benthos project in 1999.⁵⁶⁰ Its purpose was to study the structure and function of the biota associated with the seafloor to determine the extent of impact of future oil and gas exploration and exploitation. From this project, a study was produced that characterized the habitats and benthic ecology of infauna/meiofauna, macrofauna, and megafauna/fishes.

Impacts of trawling disturbance on the on benthic invertebrate communities have been widely studied. For example, Hiddink *et al.* 2017⁵⁶¹ in a global analysis of depletion and recovery of seabed biota after bottom trawling disturbance that used 24 comparative and 46 experimental studies in north-western Europe and the north-eastern United States, calculated that trawl gears removed 6–41% of faunal biomass per pass, and recovery times post trawling were 1.9–6.4 y depending on fisheries and environmental context. Recovery rates were estimated from changes in the biomass and numbers of biota across fishing grounds, and therefore, estimates are likely applicable to trawled shelf seas in general (at least in temperate waters where most of the studies were carried out). Their estimates of biomass recovery times are similar to empirical measurements of recovery taken in three areas where commercial trawling was stopped (4–5 y) but longer than estimates from small-scale experimental studies, which are on the order of 25–500 days.

Sciberras *et al.* (2018)⁵⁶² also conducted a meta-analysis, with data from 122 experimental gear impact studies employed in their study, including those that addressed impacts from otter trawling and beam trawling. As with the Hiddink *et al.* (2017) study, the majority of the studies included in this meta-analysis were from north-western Europe and north-eastern United States, including those that addressed impacts from otter trawling and beam trawling. A gear pass reduced benthic invertebrate abundance by 26% and species richness by 19%. Community recovery to control conditions was faster for communities' subject to fishing by gears that penetrated less into the sediment (i.e., beam and otter trawling) than by gears that penetrated deeper in the sediment and killed a larger fraction of biota (i.e., dredging, raking and hydraulic dredge). Sediment composition (% mud and presence of biogenic habitat) and the history of fishing disturbance prior to an experimental fishing event were also important predictors of depletion, with communities in areas that were not previously fished, predominantly muddy, or biogenic habitats being more strongly affected by fishing. Sessile and low mobility biota with longer lifespans such as sponges, soft corals and bivalves took much longer to recover after fishing (>3 year) than mobile biota with shorter lifespans such as polychaetes and malacostracans (<1 year). Recovery times in the studies included by Sciberras *et al.* (2018) were determined to be generally faster because the experimental manipulations generally involved disturbance of smaller areas of seabed.

Skimmer and otter trawl are not causing adverse effects on the benthic biological communities.

Habitat Assessment Element 3:

The Habitat Conservation Policy was last revised in July 2020⁵⁶³ and provides a framework for the NMFS to address the nation's habitat conservation challenges. Habitat conservation includes both protection and restoration of habitat. NMFS will fully exercise its authorities to achieve habitat conservation for fisheries and protected resources by working with partners, advancing habitat science, and applying landscape-scale and ecosystem-based approaches to management. This policy tiers from the NOAA National Habitat Policy (Administrative Order 216-117), which directs NOAA to "utilize the agency's full array of mission interests, mandates,

⁵⁵⁹ Briones, E.E., 2004. Current knowledge of benthic communities in the Gulf of Mexico. *Environmental Analysis of the Gulf of Mexico*; Withers, K., Nippers, M., Eds, pp.108-136.

<https://www.hartheresearch.org/sites/default/files/inline-files/7.pdf>

⁵⁶⁰ Rowe, G.T. and Kennicutt, M.C., 2009. Northern Gulf of Mexico continental slope habitats and benthic ecology study: Final report. *OCS Study MMS*, 39, p.456.

<https://www.fws.gov/doiddata/dwh-ar-documents/1187/DWH-AR0009351.pdf>

⁵⁶¹ Hiddink, J. G., Jennings, S., Sciberras, M., Szostek, C. L., Hughes, K. M., Ellis, N., Rijnsdorp, A. D., McConnaughey, R. A., Mazor, T., Hilborn, R., Collie, J. S., Pitcher, C. R., Amoroso, R. O., Parma, A. M., Suuronen, P., & Kaiser, M. J. 2017. Global analysis of depletion and recovery of seabed biota after bottom trawling disturbance. *Proceedings of the National Academy of Sciences of the United States of America*, 114(31), 8301–8306. <https://doi.org/10.1073/pnas.1618858114>

⁵⁶² Sciberras, M., Hiddink, J.G., Jennings, S., Szostek, C.L., Hughes, K.M., Kneafsey, B., Clarke, L.J., Ellis, N., Rijnsdorp, A.D., McConnaughey, R.A., Hilborn, R., Collie, J.S., Pitcher, C.R., Amoroso, R.O., Parma, A.M., Suuronen, P. & M.J. Kaiser (2018). Response of benthic fauna to experimental bottom fishing: a global meta-analysis. *Fish and Fisheries*, V. 19, pp. 698–715. <https://onlinelibrary.wiley.com/doi/full/10.1111/faf.12283>

⁵⁶³ NOAA. 2020. Habitat Conservation Policy. NMFS Policy 03-101, Effective Date November 25, 1983 https://media.fisheries.noaa.gov/2022-11/PDS_03-101_Habitat%20Conservation%20Policy_RENEWAL%20-%20signed%20JC.pdf

12.2.6. The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

and resources to protect, maintain, and restore habitats that support resilient and thriving marine and coastal resources, communities, and economies.” This policy also affirms the NOAA Habitat Blueprint framework, which guides strategic coordination across the agency and with partner organizations to address the growing challenge of habitat loss and degradation. NMFS is responsible for conserving habitat under a suite of mandates. The Office of Habitat Conservation (OHC) has key responsibilities to implement this policy in partnership with other NMFS headquarters offices, regional and field offices, and science centers. NMFS will work across the agency to implement its habitat conservation authorities in coordination with the habitat science, conservation, and management activities and expertise of other NOAA line offices. In addition, this policy recognizes the authorities and responsibilities of other federal natural resource management agencies, regional fishery management councils (councils), interstate marine fisheries commissions (commissions), states, tribes, and advisory bodies, and will work in partnership with those entities, as appropriate.

The habitat management strategy in the Gulf of Mexico is mainly focused on the management of Marine Protected Areas (MPAs), Essential Fish Habitats (EFH) for the life-cycle of target and non-target species, Habitat Areas of Particular Concern (HAPC) and resulting habitat closures and MPAs (e.g., coral closures and others) to limit the effects on vulnerable ecosystems⁵⁶⁴, and management of overall effort control for target fisheries like Gulf shrimp. Using the best available science, NOAA Fisheries and regional fishery management councils have identified and mapped EFH for each life stage of nearly 1,000 federally-managed species across the US, and 26 representative species across the Gulf⁵⁶⁵. EFH includes all types of aquatic habitat where fish spawn, breed, feed, or grow to maturity, such as: wetlands, coral reefs, seagrasses, and rivers. High priorities for EFH conservation are called Habitat Areas of Particular Concern (HAPC) and merit special attention from NOAA Fisheries. These areas include, for example, coastal estuaries, canopy kelp, shallow corals, seagrass, and rocky reefs. HAPCs meet the following conditions: major ecological functions, sensitivity to decline, stress from development, rare habitat.

NOAA and the Gulf Council implement appropriate actions to mitigate negative effect on sensitive habitats.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on habitats, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.



EVIDENCE:

For the Butterfly net UoAs, there is no interaction with habitats, thus this supporting clause is fully met.

For skimmer and otter trawl UoAs, refer to sources and footnote references provided in the sections above. There is sufficient information on the GOM habitats to allow fishery management to mitigate the most crucial adverse impacts on these habitats.

References:	Refer to footnotes embedded in the text		
Numerical score:	Starting score	– (Number of EPs NOT met x 3)	= Overall score
	10	– (0 x 3)	= 10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance		
Non-conformance Number (if applicable):	N/A		

⁵⁶⁴ NOAA. 2023. Essential Fish Habitat <https://www.fisheries.noaa.gov/national/habitat-conservation/essential-fish-habitat>

⁵⁶⁵ GMFMC. 2023. Essential Fish Habitats <https://gulfcouncil.org/fishery-management-2/implemented-plans/essential-fish-habitat/>

9.5.1.9 Supporting Clause 12.2.7.

12.2.7. There shall be knowledge of the essential habitats for the <i>stock under consideration</i> and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.	
Relevance:	Relevant
Evaluation Parameters	Met?
Process: <i>There is a mechanism in place by which the potential impacts of the fishery upon habitats essential to the stock under consideration and on habitats that are highly vulnerable to damage are identified. This or a similar mechanism shall also be in place to identify habitats that are highly vulnerable to fishery activities by the unit of certification. The information provided by these mechanisms shall be used to produce specific management objectives related to avoiding significant adverse impacts on habitats. The knowledge of the habitats in question can therefore include relevant traditional, fisher, or community knowledge, provided its validity can be objectively verified (i.e., the knowledge has been collected and analysed through a systematic, objective, and well-designed process, and is not just hearsay). When identifying highly vulnerable habitats, their value to ETP species shall be considered, with habitats essential to ETP species being categorized accordingly.</i>	<input checked="" type="checkbox"/>
EVIDENCE: For the Butterfly net UoAs, there is no interaction with habitats, thus this supporting clause is fully met. For skimmer and otter trawl UoAs, the primary habitat that is fished is soft, mud bottoms. The only identified VME habitats in the Gulf of Mexico that can potentially interact with the GOM shrimp industry are seagrass habitats and biogenic reefs (primarily coral). The key and vulnerable habitats in the Gulf of Mexico and Louisiana are document through state, federal and NGO research. For example, the ‘Gulf of Mexico Ecosystem: A Coastal and Marine Atlas’ ⁵⁶⁶ documents all vulnerable habitats in the region including salt marshes, seagrasses, barrier islands, coral, and mangrove habitats. Mapping of seagrass and coral reef habitats are widely publicized and even shared amongst harvesters. The GOM Shrimp fishery is not considered to adversely affect vulnerable habitats in any significant way, as explained in the next Evaluation Parameter.	
Current status/Appropriateness/Effectiveness: <i>Successful management measures have been developed and are in place to achieve the objectives described in the process parameter.</i>	<input checked="" type="checkbox"/>
EVIDENCE: For the Butterfly net UoAs, there is no interaction with habitats, thus this supporting clause is fully met. For skimmer and otter trawl UoAs, the primary habitat that is fished is soft, mud bottoms. There is the potential to interact with seagrass and coral VME habitats. <u>Seagrass habitats</u> Because the analysis by Handley <i>et al.</i> (2002) ⁵⁶⁷ has not identified commercial fishing and more specifically shrimping effort as a significant driver or threat to seagrass habitat health, abundance or decline across Gulf of Mexico state waters from Texas to Florida it is unlikely that effects on these habitats are significant. However, in a recent study of the inshore bait shrimp fishery along the Florida coast, where the most significant seagrass beds are located, Stallings <i>et al.</i> (2014) ⁵⁶⁸ argue that although the inshore shrimp fishery (using roller frame trawl, a modified trawl gear) has been largely overshadowed by the much higher historical efforts on the offshore grounds, the amount of effort in seagrass beds is	

⁵⁶⁶ Love, M., Baldera, A., Yeung, C., & Robbins, C. (2013). The Gulf of Mexico Ecosystem: A Coastal and Marine Atlas. New Orleans, LA: Ocean Conservancy, Gulf Restoration Center. <https://oceanconservancy.org/wp-content/uploads/2017/05/gulf-atlas.pdf>

⁵⁶⁷ Handley, L., Altzman, D., and DeMay, R., eds., 2007, Seagrass Status and Trends in the Northern Gulf of Mexico: 1940–2002: U.S. Geological Survey Scientific Investigations Report 2006–5287, 267 p. <https://pubs.usgs.gov/sir/2006/5287/>

⁵⁶⁸ Stallings, C. D., Brower, J.P., Loch, J.M.H., & Mickle, A. 2014. Commercial trawling in seagrass beds: bycatch and long-term trends in effort of a major shrimp fishery. Marine Ecology Progress Series, 513, 143–153. <https://www.istor.org/stable/24894762>

12.2.7. There shall be knowledge of the essential habitats for the *stock under consideration* and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.

not trivial (i.e. >20% of total effort during months of peak productivity) and appears to increase when many species are using this nursery habitat as juveniles. Moreover, they continue to say that the proportion of total effort in seagrass beds increased sharply in recent years (up to 2014). They note however that the gear employed in the study (i.e., rollerframe trawls) do not cause physical damage to seagrass habitats since they roll over the seabed (Meyer *et al.*, 1999).⁵⁶⁹ Nonetheless, despite fishing risks not appearing to be the main threat to seagrass beds, there are potential risks from otter trawl (and potentially skimmer trawl fishing) on these habitats, if indeed there is some overlap. The direct ploughing and scraping of the otter trawl gear on seagrass could cause mortality from a single pass of an otter trawl. The penetration depth of light otter trawl gear components ranges from 2-10 cm in sand sediments and 2-35 cm in muddier sediment (Eigaard *et al.*, 2016⁵⁷⁰), and could remove the upper layers of sediment on which the seagrasses are reliant for anchoring and nutrient uptake. A single pass of light otter trawl gear could remove the feature and its root structures and further passes could remove the nutrient rich sediment, reducing the likelihood of recolonisation.⁵⁷¹

Skimmer nets are supported by a tubular metal frame on three sides (top and sides) or L shaped frame that skims over the bottom on a weighted skid, holding the net along the bottom, and are usually used in shallower nearshore areas of 10 ft or less. A chained footrope and the tickler chain are used to stir up the bottom and raise the catch into nets ranging from 25 to 72 ft across. While skimmers may have more potential to damage nursery habitats and submerged aquatic vegetation in shallower water, they are expected to impact the bottom less than otter trawls since there are no trawl doors (Barnette, 2001; Nelson, 1993; Steele, 1993).⁵⁷²

Furthermore, there is no overlap between the fishery and mapped seagrass habitats. There is no explicit need for additional legislative protection or specific mitigation measures.

Coral (and other invertebrate) reefs

The GOM is home to many coral reefs growing along coastal Texas, Louisiana, Florida, and Mexico in the upper ~1,500 m, and houses a wide array of deep-sea coral species (as well as other reef builders, such as sponges) found along the continental shelf and slope. Most of these reefs are within managed areas including Dry Tortugas National Park and Veracruzano Coral Reef System National Park, Flower Garden Banks and Florida Keys National Marine Sanctuaries, and Florida’s John Pennekamp Coral Reef State Park. Other coral reefs include Campeche Bank, Tuxpan, Tuxtlas, Yucatan Shelf, Florida Middle Grounds, and Pulley Ridge, the deepest stony coral reef in the US⁵⁷³.

Gil-Agudelo *et al.* (2020)⁵⁷⁴ also notes that shallow reefs in the GOM are calculated to occupy 2,640 km² (<0.2%) while the extent of mesophotic corals, defined as light-dependent corals living at depths between 30–150 m, and deep-sea corals - by comparison - are largely unknown, although recent studies are helping to close this gap. The largest distribution of shallow corals happens on the Florida coast (Florida Keys and Dry Tortugas), and Cuba, with roughly 85% of shallow corals of the GOM, but the uniqueness and singularity of reefs throughout the gulf makes them particularly important for this region. The reefs within the GOM are also highly variable, having both some of the lowest (Florida Keys, just above 10%), and the highest coral cover (Flower Garden Banks, almost 60%) in the Wider Caribbean region (GOM + Caribbean).

⁵⁶⁹ Meyer DL, Fonseca MS, Murphey PL, McMichael RH and others. 1999. Effects of live-bait shrimp trawling on seagrass beds and fish bycatch in Tampa Bay, Florida. Fish Bull 97: 193–199 <https://spo.nmfs.noaa.gov/sites/default/files/18meyerf.pdf>

⁵⁷⁰ Eigaard, O.R., Bastardie, F., Breen, M., Dinesen, G.E., Hintzen, N.T., Laffargue, P., Mortensen, L.O., Nielsen, J.R., Nilsson, Hans C., O’Neill, F.G., Polet, H., Reid, D.G., Sala, A., Skoold, M., Smith, C., Sorensen, T.K., Tully, O., Zengin, M. & Rijnsdorp, A.D. (2016). Estimating seabed pressure from demersal trawls, seines, and dredges based on gear design and dimensions. – ICES Journal of Marine Science, 73: i27–i43. https://academic.oup.com/icesjms/article/73/suppl_1/i27/2573989

⁵⁷¹ GW. 2022. Light Otter Trawl on Seagrass (SACs). Welsh Government. https://www.gov.wales/sites/default/files/publications/2022-05/light-otter-trawl-on-seagrass-sacs_0.pdf

⁵⁷² Audubon. Habitat Impacts – Skimmer Trawls – AL Shrimp. <https://www.audubongulf.org/projects/alabama/alabama-shrimp/skimmer-trawls/#:~:text=While%20skimmers%20may%20have%20more,Nelson%201993%2C%20Steele%201993.>

⁵⁷³ Dee et. al. 2019. The Future of Reef Ecosystems in the Gulf of Mexico: Insights From Coupled Climate Model Simulations and Ancient Hot-House Reefs <https://www.frontiersin.org/articles/10.3389/fmars.2019.00691/full>

⁵⁷⁴ Gil-Agudelo, Diego L., Carlos E. Cintra-Buenrostro, Jorge Brenner, Patricia González-Díaz, William Kiene, Caitlin Lustic, and Horacio Pérez-España. 2020. “Coral Reefs in the Gulf of Mexico Large Marine Ecosystem: Conservation Status, Challenges, and Opportunities.” *Frontiers in Marine Science* 6 (January). <https://doi.org/10.3389/fmars.2019.00807>.

12.2.7. There shall be knowledge of the essential habitats for the *stock under consideration* and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.

Deep-sea corals occur in many shapes and forms and are sessile invertebrates in the Phylum Cnidaria that occur deeper than 50 m in the marine environment. Structure-forming corals have an upright orientation and a rigid, complex branching structure of calcium carbonate, or horn-like protein. The group includes black corals (*Antipatharia*), stony corals (Scleractinia such as *Lophelia pertusa* and *Madrepora oculata*), and octocorals (including sea fans and sea pens), among others. Corals are well adapted to life in the deep sea, where they grow in cold darkness and feed on particles that rain down from above. The coral colonies grow slowly because food is scarce. Colonies may live to be hundreds or thousands of years old, and they are vulnerable to bottom-contact fishing gear. Coral diversity is actually highest in deep water, where 66% of 5080 species are known to occur (Cairns, 2007). Deep-sea corals form important habitat for fish, shrimp, crabs, and sea stars, which are often considered a proxy for biodiversity in the deep sea (Hourigan *et al.*, 2016)⁵⁷⁵.

Data contained in the NOAA National Database of Deep-Sea Corals and Sponges (as of August 2016) is shown in Figure 55. The database aggregates historical records from samples archived in state and federal museums, research institutions, and reported in the scientific literature. These records are augmented by observations collected by submersible vehicles during deep-water benthic surveys conducted by NOAA and other research institutions.

There is a wide range of knowledge on the spatial distribution of corals and corals reefs around south Florida.^{576,577,578} As their locations are well known, these warm water coral reefs are protected by spatial closures and/or fishing practices to avoid gear damage. In the northern and western parts of the GOM, there are large but patchy distributions of deep-sea corals.⁵⁷⁹ These deep-sea corals are very slow growing, are not resistant to disturbances, and live to be upwards of 600 years old.⁵⁸⁰ Protecting these deep-sea corals is a priority for the GMFMC, but the extent of their known spatial distribution is growing, but many locations remain unknown.⁵⁸¹ As the knowledge on known locations continues to increase by either survey or observer coverage, protected areas are designated to protect as many of these VMEs as possible while having the lowest economic impact as possible. There are many areas that have designated to protect deep-sea coral VMEs (Figure 56), but there remains many deep-sea coral VMEs that are unknown and unprotected.

The primary concern with the GOM shrimp fishery, specifically the otter trawl fishery, is interaction with shallow water and deep-water corals and associated reef builders/habitat. Furthermore, considering that a) the shrimp habitat is one of mixed sandy and muddy bottoms, that b) fishermen will attempt to primarily fish those habitats to catch shrimp, while avoiding avoid potential damage on the gear from fishing rocky substrate and outcrops (where these VMEs tend to be found for the most part), and c) that key coral habitats in the Gulf are already protected, the GOM otter trawl fleet is unlikely to have an impact on these ecosystems, although the exact extent of the impact is unknown.

There are management measures in place to mitigate the effects of the UoAs on VME habitats.

⁵⁷⁵ Hourigan, T. F., P. J. Etnoyer, R. P. McGuinn, C. Whitmire, D.S. Dorfman, M. Dornback, S. Cross, D. Sallis. Deep-Sea Corals in Gulf of Mexico Data Atlas [Internet].

Stennis Space Center (MS): National Centers for Environmental Information; 2016. [1 screen]. Available from: <https://gulfatlas.noaa.gov/>

⁵⁷⁶ NOAA. 2023. Fishing Regulations and Seasonal Closures - Gulf of Mexico <https://www.fisheries.noaa.gov/southeast/rules-and-regulations/fishing-regulations-and-seasonal-closures-gulf-mexico>

⁵⁷⁷ Spalding, M., Burke, L., Wood, S.A., Ashpole, J., Hutchison, J. and Zu Ermgassen, P., 2017. Mapping the global value and distribution of coral reef tourism. *Marine Policy*, 82, pp.104-113. <https://www.sciencedirect.com/science/article/pii/S0308597X17300635>

⁵⁷⁸ Guest, J.R., Edmunds, P.J., Gates, R.D., Kuffner, I.B., Andersson, A.J., Barnes, B.B., Chollett, I., Courtney, T.A., Elahi, R., Gross, K. and Lenz, E.A., 2018. A framework for identifying and characterising coral reef "oases" against a backdrop of degradation. *Journal of Applied Ecology*, 55(6), pp.2865-2875.

<https://besjournals.onlinelibrary.wiley.com/doi/pdfdirect/10.1111/1365-2664.13179>

⁵⁷⁹ Etnoyer, P.J., Wagner, D., Fowle, H.A., Poti, M., Kinlan, B., Georgian, S.E. and Cordes, E.E., 2018. Models of habitat suitability, size, and age-class structure for the deep-sea black coral *Leiopathes glaberrima* in the Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography*, 150, pp.218-228.

<https://www.sciencedirect.com/science/article/pii/S0967064517301820>

⁵⁸⁰ Prouty, N.G., Fisher, C.R., Demopoulos, A.W. and Druffel, E.R., 2016. Growth rates and ages of deep-sea corals impacted by the Deepwater Horizon oil spill. *Deep Sea Research Part II: Topical Studies in Oceanography*, 129, pp.196-212.

<https://www.sciencedirect.com/science/article/am/pii/S0967064514002987>

⁵⁸¹ Gulf of Mexico Fishery Management Council. 2020. Coral Amendment 9- Final Rule. <https://portal.gulfcouncil.org/coral9/>

12.2.7. There shall be knowledge of the essential habitats for the *stock under consideration* and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.

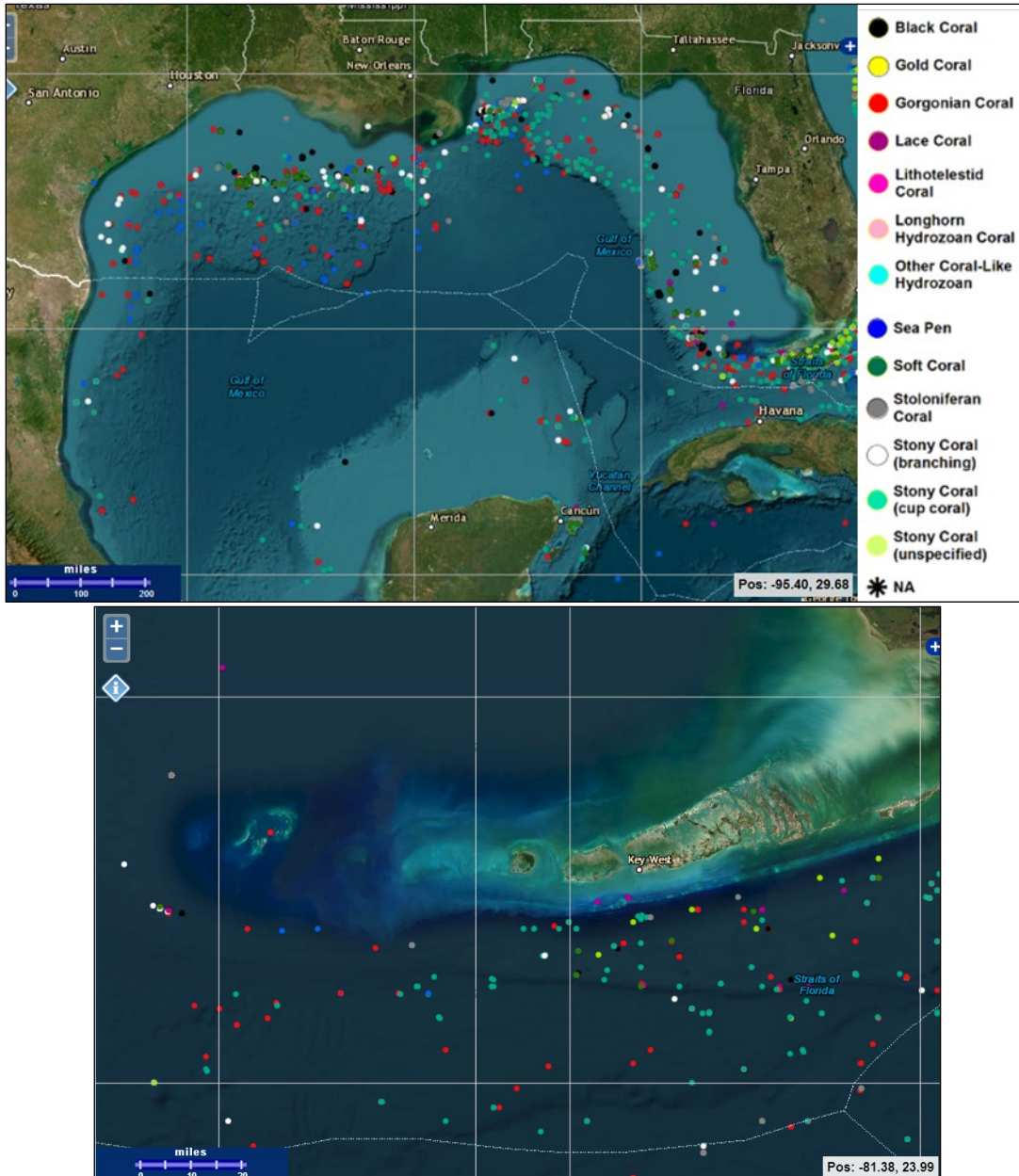


Figure 55. Spatial distribution of known deep-sea coral locations in the Gulf of Mexico (top) with zoomed in area of Key West (bottom) (Source: Hourigan *et al.*, 2016²³²) Note dots are not to scale, they get smaller as zooming in occurs in the map.

12.2.7. There shall be knowledge of the essential habitats for the stock under consideration and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.

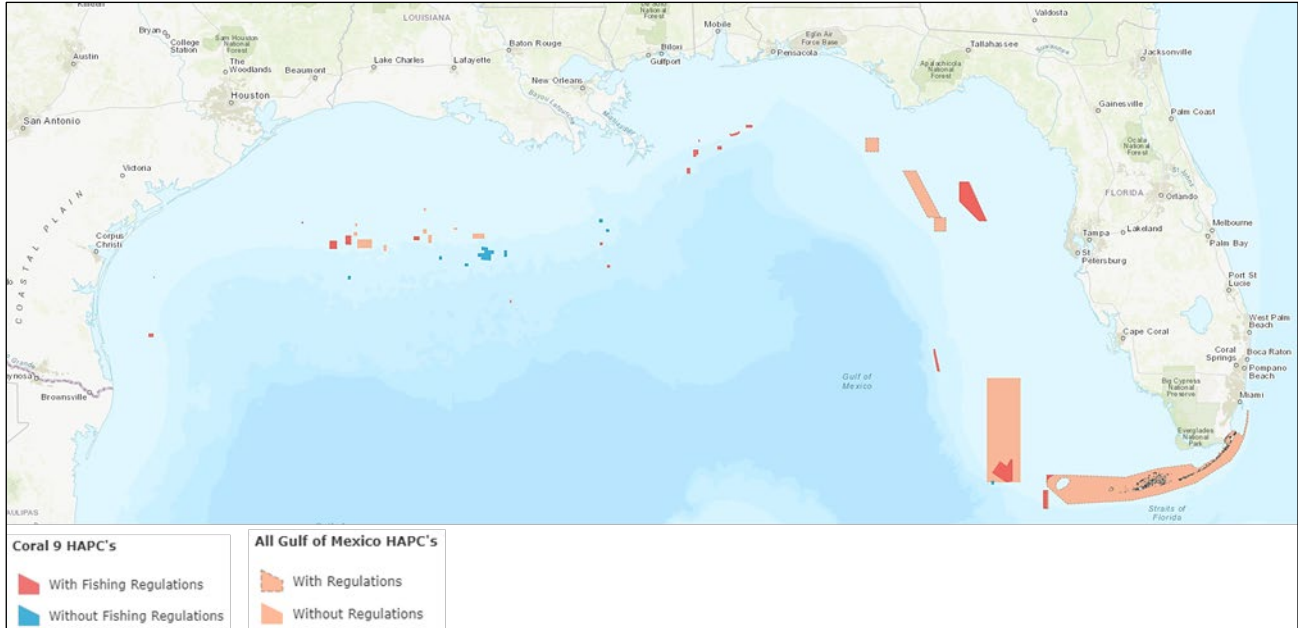


Figure 56. Vulnerable habitats and protected areas as identified by Coral Amendment 9 by the GOM Fishery Management Council (Source: GMFMC, 2020⁵⁸¹).

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is knowledge of the essential habitats for the stock under consideration and potential fishery impacts on them. Impacts on essential habitats and on habitats that are highly vulnerable to damage by the fishing gear involved are avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat is considered, not just the part of the spatial range that is potentially affected by fishing. Examples may include various regulations, data, and reports.



EVIDENCE:

For the Butterfly net UoAs, there is no interaction with habitats, thus this supporting clause is fully met.

For skimmer and otter trawl UoAs, the primary habitat that is fished is soft, mud bottoms. There is evidence that there is no overlap between the shrimp industry and mapped seagrass habitat. Also, there have been harvesters, researchers, and managers that have stated with high confidence that shrimping is not occurring over seagrass habitats.

With regard to coral, there is also a strong feeling that these VME habitats are avoided despite implemented management measures. Harvesters are well aware of bottom protrusions and actively avoid these locations to prevent damage to their gear. These bottom protrusions include, but aren't limited to, natural & artificial reefs, sunken debris (vessels or other anthropogenic discard), derelict oil equipment, etc. All these types of substrates, including natural reefs, can provide the necessary habitat for corals to grow and form biogenic structure. The avoidance of these habitats and structures by the shrimping industry is critical to the long term health of coral and other biogenic habitats.

During the site visit, numerous stakeholders made the assessment team aware of a database of “hang locations” which was organized by Mr. Gary Graham (Texas Sea Grant). The purpose of this database was to promote a collaborative effort between harvesters to share locations where fishing gear could get caught (or hang up) on bottoms with hard protrusions. The incentive for the harvesters to participate is to gain and share information that prevents themselves and others away from costly repairs that results from being torn on protrusions. As the assessment team understands it, these “hang locations” can be downloaded from one harvesters ELB to

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a thumb drive and transferred to another harvester. As each harvester transfers the database to another, it grows as it adds the hang locations from each new vessel.

During creation and implementation process for Coral Amendment 9 to the FMP, 13 new habitat areas of particular concern were established.⁵⁸² During the process, the proposed (at the time) habitat areas were compared against historic ELB data (2004-2013) from the shrimping industry.⁵⁸² For example, in the Pulley Ridge South Portion HAPC, ELB data returned one data point from one shrimping vessel.⁵⁸² In the West Florida Wall HAPC, there were no historical points recorded in the geographic extent of the HAPC.⁵⁸² At a stakeholder meeting during the site visit, Ms. Leann Bosarge (former Gulf Council Chair) stated that prior to HAPC implementation, looking at the historical ELB tracks from the shrimp fleet would identify coral habitat because the harvesters are aware of their location (though generational knowledge and the “hang location” database) and actively avoid these habitats to prevent financial loss due to net damage.⁵⁸³

A comparison between ELB data from 2014-2021 and known coral locations shows low overlap between reefs and effort (Figure 57). There is very low overlap between these coral locations and trawling effort. The data shown are aggregate data over a 0.04° by 0.04° grid cell, thus where there is overlap does not imply that trawls occurred over coral reef, simply that it occurs within the same grid cell.

HAPCs created by Coral Amendment 9 (2020) shows there is an absence or very low fishing effort over those protected areas (Figure 58).⁵⁸² The amendment created six HAPCs off the eastern tip of Louisiana in 2020.⁵⁸² The trawl effort largely predates the creation of these coral HAPCs in 2020 and these sensitive areas are and have been avoided by the shrimp harvesters. It is important to note that per the Coral Amendment 9 Final Rule, Gulf Royal Red shrimp fleet are permitted to have their gear deployed in Viosca Knoll 862/906, so long as it is not in contact with the bottom (Figure 58).⁵⁸² The fishing overlap in this closure is not the fleet under assessment, nor is it contacting the bottom. The overlap in effort that can be observed on Alabama Alps Reef and Viosca Knoll 826 HAPCs predates the formation of those closures, however natural reefs never form perfect quadrilateral shapes (despite closures being defined as such) and the overlap in the corners is highly likely not coral habitat (Figure 58).

The low/absence of overlap between effort and closures supports the claim that harvesters are aware of hard bottom habitats where nets can hang up and actively avoid these areas. The use of “hang location” database for onboard ELBs and the collaborative effort to share this knowledge makes the probability that these reefs are encountered very low. There is evidence that the shrimp fleet avoids known coral locations prior to the implementation of HAPCs which would indicate that coral reef habitat that is not currently protected by a closure is not being fished by the fleet.

⁵⁸² GMFMC. 2023. Amendment 9 to the Fishery Management Plan for Coral and Coral Reef Resources in the GOM U.S. waters (Amendment 9). <https://portal.gulfcouncil.org/coral9/>

⁵⁸³ Leann Bosarge (former Gulf Council Chair), personal communication, 13 July 2023.

12.2.7. There shall be knowledge of the essential habitats for the *stock under consideration* and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.

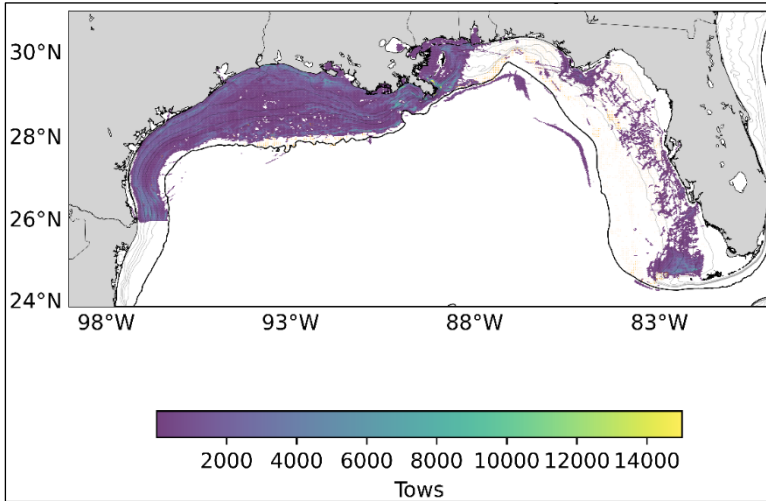


Figure 57. Geographic distribution and intensity of trawl effort in the Gulf of Mexico shrimp fishery given estimated number of tows in a given 0.04° latitude by 0.04° longitude grid cell. Orange points represent known natural reef habitat. Light orange represents grid cells with <1km² of reef area and dark orange represent cells with >1km² reef area. Dark black line demarcates the 200m depth contour which indicates the continental shelf margin, and the grey lines show 10, 20, 30, 40, 50 meters depth (Source: Produced by LGL Ecological Research Associates for the purpose of this assessment).

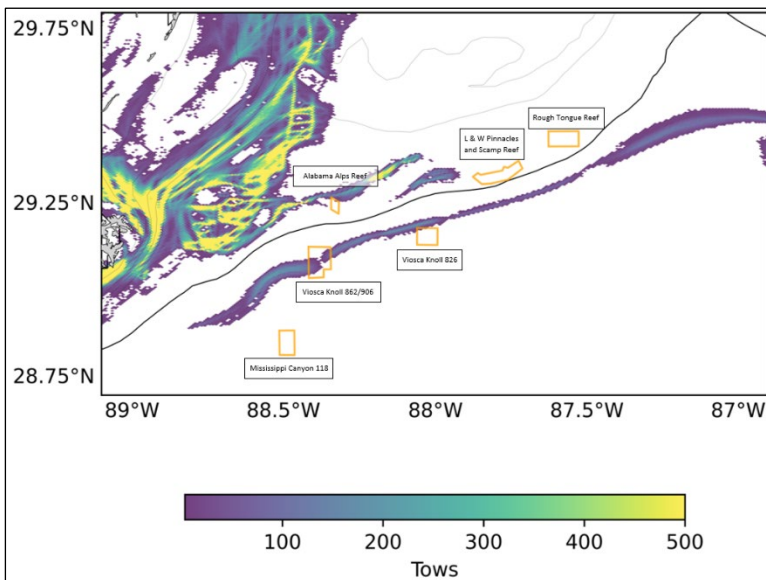


Figure 58. Trawl effort (from 2014-2021) off the eastern tip of Louisiana around six newly created HAPCs from Coral Amendment 9. Coral HAPCs are marked by orange lines and tow intensities are given by colors ranging from purple (low) to yellow (high). Cells without at least three points are excluded to comply with confidentiality requirements (Source: Produced by LGL Ecological Research Associates for the purpose of this assessment).

References:	Refer to embedded footnotes.				
Numerical score:	Starting score	-	Number of EPs <u>NOT</u> met	x 3	= Overall score

12.2.7.	There shall be knowledge of the essential habitats for the <i>stock under consideration</i> and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.		
	10	(0)	10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Full Conformance
Non-conformance Number (if applicable):			N/A

9.5.1.10 Supporting Clause 12.2.8.

12.2.8. There shall be outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating the impacts of the unit of certification on essential habitats for the stock under consideration and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.	
Relevance:	Relevant
Evaluation Parameters	Met?
Process: <i>There is a mechanism in place that allows the establishment of outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating impacts on essential habitats for the stock under consideration and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The Council and NMFS have mechanisms to establish outcome indicators for EFH and sensitive/vulnerable habitats including HAPCs. Outcome indicators are consistent with achieving management objectives for avoiding, minimizing, or mitigating habitat impacts of GOM shrimp fisheries to EFH and HAPCs.	
Current status/Appropriateness/Effectiveness: <i>Successful outcome indicators and management measures have been developed and are in place to achieve the objectives described in the process parameter.</i>	<input checked="" type="checkbox"/>
EVIDENCE: For the Butterfly net UoAs, there is no interaction with habitats, thus this supporting clause is fully met. For skimmer and otter trawl UoAs, amendments to the FMPs for various species in the GOM often have various conservation objectives that the Council is trying to achieve. Many of those focus on the conservation of Essential Fish Habitat (EFH) and habitats of particular concern (HAPCs). ⁵⁸⁴ Most recently, Coral Amendment 9 established 13 new HAPCs in the GOM. ⁵⁸⁵ Over the course of determining the locations to be protected, The Council determined which areas should be protected based on scientific research into known coral locations. These habitats are highly damaged by bottom contact gear, thus the council determined that regulations forbidding gear to be in contact with the water in these HAPCs where fishing is prohibited (with the exception of some HAPCs where vessels targeting Royal Reds may leave their gear in the water so long as it is not contacting the ground). There is an EFH amendment that applies to all seven FMP in the GOM. ⁵⁸⁶ The amendment described the EFH for each of the life history stages of the 26 most commonly landed species in the Gulf. The FH is described in terms of habitat types and distribution, threats to these habitats, predator-prey relationships, factors resulting in EFH losses, conservation and enhancement measures for EFH, and recommendations to minimize impacts from non-fishing threats. ⁵⁸⁶ The overlap of all of these identified EFH spans nearly the entire GOM, so it is impossible to protect all of these habitats. However, the areas with the highest overlap or most critical to threatened species are afforded areal protections via closures. Below is a map of all the various closures (including HAPCs and EFHs) that currently exist in the Gulf of Mexico (Figure 59).	

⁵⁸⁴ <https://gulfcouncil.org/fishery-management-2/implemented-plans/>

⁵⁸⁵ GMFMC. 2020. Coral Amendment 9- Final Rule. <https://portal.gulfcouncil.org/coral9/>

⁵⁸⁶ <https://gulfcouncil.org/fishery-management-2/implemented-plans/essential-fish-habitat/>

12.2.8. There shall be outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating the impacts of the unit of certification on essential habitats for the *stock under consideration* and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.

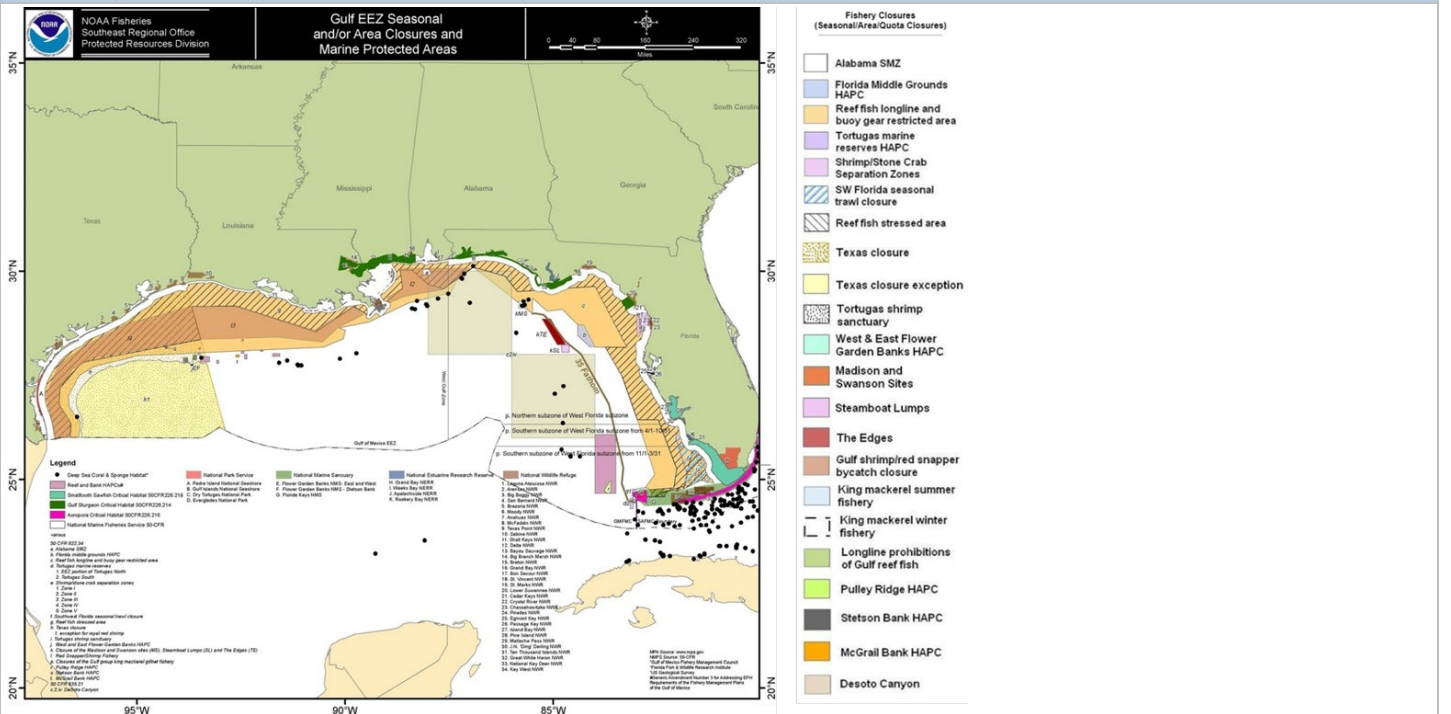


Figure 59. Existing seasonal, areal, and quota-based closures in the Gulf of Mexico: NOAA Southeast 2021.

Coral Amendment 9 and EFH amendment are just a couple examples of the type of work being conducted to protect habitats that are highly vulnerable to damage by the fishing gear.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating impacts on essential habitats for the stock under consideration and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification. Examples may include various regulations, data, and reports.



EVIDENCE:
 There is evidence that outcome indicators help to achieve management objectives of avoiding, minimizing, or mitigating impacts on EFH for GOM shrimp fishery and on habitats that are highly vulnerable to damage by the fishing gear. These sources can be found in the Evaluation Parameters above.

References:	Refer to embedded footnotes		
Numerical score:	Starting score	- (Number of EPs <u>NOT</u> met x 3) =	Overall score
	10	0	10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance		
Non-conformance Number (if applicable):	N/A		

9.5.1.11 Supporting Clause 12.2.9.

12.2.9. The fishery management organization shall consider the most probable adverse impacts of the fishery under assessment on the ecosystem (Appendix 1, Part 6), by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.	
Relevance:	Relevant
Evaluation Parameters	Met?
<p>Process: <i>There is a process that accounts for the most probable adverse impacts of the unit of certification on the ecosystem. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on the ecosystem impacts of fishing for the unit of certification, generic evidence based on similar fishery situations (proxies) can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations, then, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP species or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.</i></p>	<input checked="" type="checkbox"/>
<p>EVIDENCE: Brown, white, and pink shrimp are not considered to be key prey species (unlike many small pelagic species like herring) consumed for food by dependent predators. These shrimp species serves as prey for numerous, diverse predators, but it is not a preferred prey item for any single predator species, such that it is highly unlikely that reductions in shrimp abundance would lead directly to reductions of any specific predator species. Moreover, as long as the shrimp stock is maintained at sustainable levels, as determined through the stock assessment, there should be sufficient shrimp prey to satisfy the demands of its predators. Furthermore, the predators of these shrimp species are generalist predators that are not significantly affected by any single prey species.</p> <p>The role of the stock under consideration in the food web is considered. 2015 publication by Ainsworth <i>et al.</i> (2015) detailed the results for an Atlantis Ecosystem model for the Gulf of Mexico supporting integrated ecosystem assessment.⁵⁸⁷ Additionally, Masi <i>et al.</i> (2014) was able to construct a food web diagram to link 35 function groups in the GOM using normalized mode values obtained from the MLE distribution. Key aspects of food web research relevant to this fishery are shown in the next Evaluation Parameter.</p>	
<p>Current status/Appropriateness/Effectiveness: <i>The bait used to capture the stock under consideration shall not be formally classified as ETP species (by Alaska or other international designations), and the fishery under consideration does not hinder recovery or rebuilding of overfished species that are not formally classified as ETP species and used as bait.</i></p>	<input checked="" type="checkbox"/>
<p>EVIDENCE: To characterize the trophic interactions occurring between groups of species in our Atlantis-GOM model, Ainsworth <i>et al.</i> (2015)²⁵¹ first performed a laboratory analysis of stomach samples to better understand the trophic interactions of data-deficient fish species within the Gulf of Mexico study area, and then expounded on laboratory results through the assimilation of available diet data sets. Following the methodology of Ainsworth <i>et al.</i> (2010), the authors used a maximum likelihood estimate (MLE) to aggregate these data sets and provide a probabilistic representation of major predator-prey linkages for the Gulf of Mexico ecosystem.</p> <p>The results are presented in Masi <i>et al.</i> (2014)⁵⁸⁸ in Figure 60. The food web depicts the predator-prey interactions (modes >23.0%) for the consumer functional groups analyzed using the MLE method, where the size of the box represents the Atlantis model biomass estimates, on a logarithmic scale. However, the carnivorous macrobenthos (including the shrimp species under assessment), infaunal meiobenthos and bivalve groups are not to scale because their biomass is too large to show the actual log biomass. The solid lines</p>	

⁵⁸⁷ Ainsworth, C. H., Schirripa, M. J., and Morzaria-Luna, H. (eds.) 2015. An Atlantis Ecosystem Model for the Gulf of Mexico Supporting Integrated Ecosystem Assessment. NOAA Technical Memorandum NMFS-SEFSC-676, 149 p. <http://doi.org/10.7289/V5X63JVH>

⁵⁸⁸ Masi, M.D. & Ainsworth, C.H. & Chagaris, D., 2014. A probabilistic representation of fish diet compositions from multiple data sources: A Gulf of Mexico case study. Ecological Modelling, Elsevier, vol. 284(C), pages 60-74. <https://doi.org/10.1016/j.ecolmodel.2014.04.005>

12.2.9. The fishery management organization shall consider the most probable adverse impacts of the fishery under assessment on the ecosystem (Appendix 1, Part 6), by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.

represent interactions between groups with modes greater than 40.0%, whereas the dashed lines represent linkages of 23.0 to 40.0% between predators and their prey. The predator groups flatfish, jacks, large reef fish, other demersal fish, pinfish, red drum, seatrout, skates and rays, small demersal fish, small reef fish and snook only show dashed linkages, which probably indicates generalist feeding habits.

The stock under consideration does not represent a key prey species in the ecosystem.

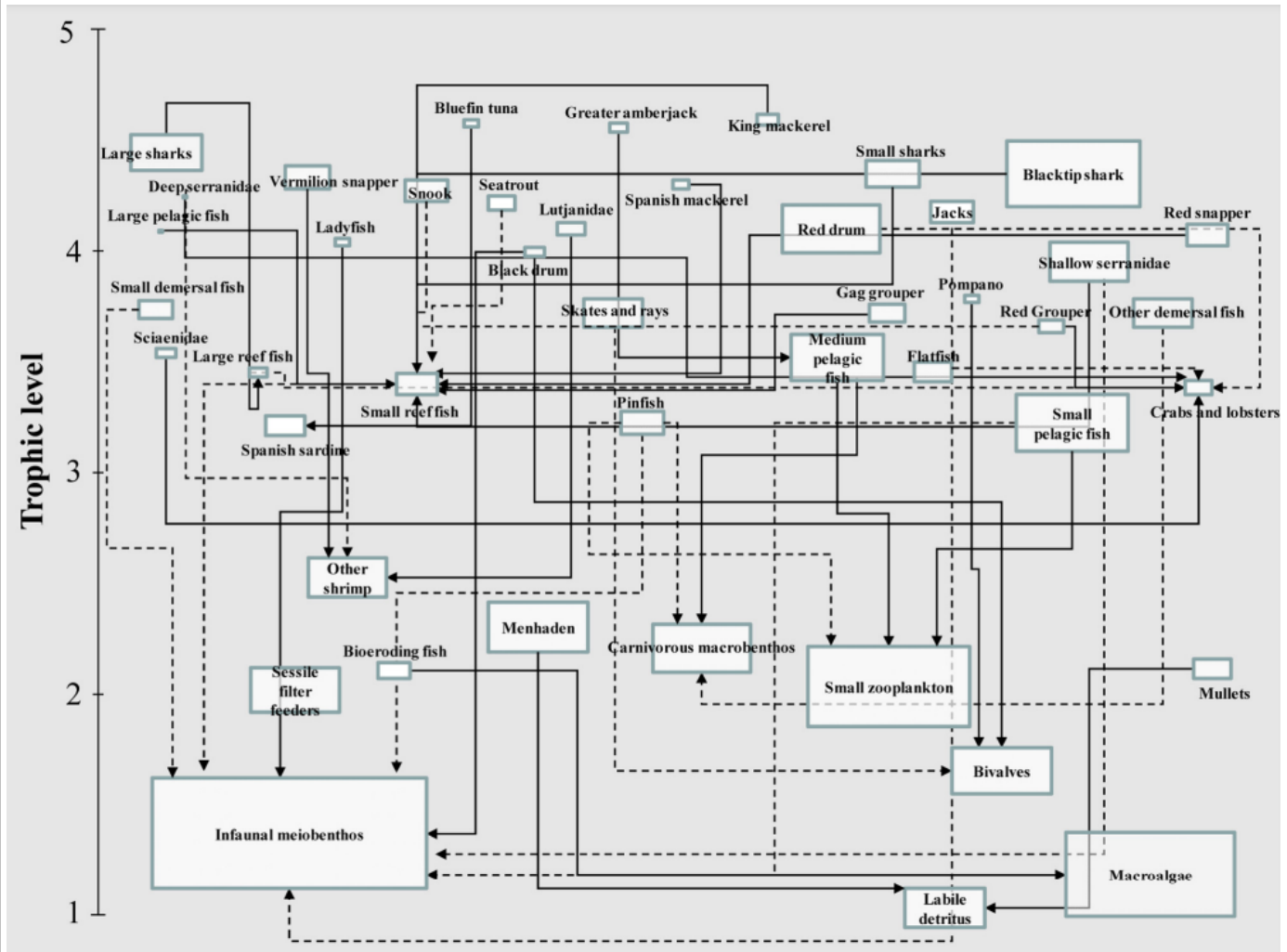


Figure 60. Food web diagram showing the predator-prey interactions. The area of each box is directly proportional to the log biomass concentration averaged over all areas in the Gulf of Mexico; solid lines show prey contributions > 40%; dashed lines show 23-40% connection; linkages <23% not shown. Carnivorous macrobenthos, infaunal meiobenthos, and bivalves are not to scale. From Masi *et al.* (2014).⁵⁸⁸

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on the ecosystem, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible;



12.2.9. The fishery management organization shall consider the most probable adverse impacts of the fishery under assessment on the ecosystem (Appendix 1, Part 6), by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.

if such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.

EVIDENCE:

Evidence can be found in the Evaluation Parameter sections above.

References: Refer to footnotes embedded in the text

Numerical score:	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score
	10			0					10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
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Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
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Non-conformance Number (if applicable):	N/A
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9.5.1.12 Supporting Clause 12.2.10.

12.2.10. There shall be outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhanced activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration must be reversible and not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function.	
Relevance:	Relevant
Evaluation Parameters	
Process: <i>There is a process to allow for drafting effective outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. There is also a process that states modifications to the habitat for enhancing the stock under consideration are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function.</i>	<input checked="" type="checkbox"/>
EVIDENCE: There is a process to allow for drafting effective outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. The Shrimp FMP is a collaboration between states and federal government collaborating at The Council level. ⁵⁸⁹ Amendment 4 to the GOM shrimp FMP outlines the management and research objectives. ⁵⁹⁰ Many of these objectives aim to minimize the effect of the shrimp fishery on the structure, processes, and function of the ecosystem.	
Current status/Appropriateness/Effectiveness: <i>There is evidence for outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Brown, white, and pink shrimp are not considered to be key prey species (unlike many small pelagic species like herring) consumed for food by dependent predators. These shrimp species serves as prey for numerous, diverse predators, but it is not a preferred prey item for any single predator species, such that it is highly unlikely that reductions in shrimp abundance would lead directly to reductions of any specific predator species. Moreover, as long as the shrimp stock is maintained at sustainable levels, as determined through the stock assessment, there should be sufficient shrimp prey to satisfy the demands of its predators. Furthermore, the predators of these shrimp species are generalist predators that are not significantly affected by any single prey species.	
Amendment 4 for the GOM Shrimp fishery FMP (1988) ⁵⁹⁰ incorporated the following fishery-specific management objectives: <ul style="list-style-type: none"> • Optimize the yield from shrimp recruited to the fishery. • Encourage habitat protection measures to prevent undue loss of shrimp habitat. • Coordinate the development of shrimp management measures by the Council with the shrimp management programs of the several states, where feasible. • Promote consistency with the Endangered Species Act and the Marine Mammal Protection Act. • Minimize the incidental capture of finfish by shrimpers, when appropriate. • Minimize conflicts between shrimpers and stone crab fishermen. • Minimize adverse effects of obstructions to shrimp trawling. • Provide for a statistical reporting system. 	

⁵⁸⁹ <https://gulfcouncil.org/fishery-management-2/implemented-plans/shrimp/>

⁵⁹⁰ GMFMC. 1988. Amendment Number 4 to the FMP for the shrimp fishery in the GOM United States Waters. <https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/SHRIMP/SHRIMP%20Amend-04%20Final%201988-08.pdf>

12.2.10. There shall be outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhanced activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration must be reversible and not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function.

These objectives aim to preserve the structure, processes, and function of the ecosystem. But, because these stocks are not considered to be a key prey or predator species in the GOM marine ecosystem, dedicated outcome indicator(s) are not considered to be strictly necessary.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function. Examples may include various regulations, data, and reports.



EVIDENCE:
 The GOM shrimp FMP and its 18 amendments provide sufficient evidence to substantiate that there are effective outcome indicators consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible.

References:	Refer to footnotes embedded in the text		
Numerical score:	Starting score	- (	Number of EPs <u>NOT</u> met
	10	- (	0 x 3) =
			Overall score
			10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance		
Non-conformance Number (if applicable):	N/A		

9.5.1.13 Supporting Clause 12.2.11.

12.2.11. The fishery management organization shall consider the most probable adverse human impacts on the stock/ecosystem under consideration, by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.	
Relevance:	Relevant
Evaluation Parameters	
Process: <i>There is a process that accounts for the most probable adverse impacts of the unit of certification on the ecosystem. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on the ecosystem impacts of fishing for the unit of certification, generic evidence based on similar fishery situations (proxies) can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures.</i>	<input checked="" type="checkbox"/>
EVIDENCE: <p>The GOM shrimp fishery is managed at the GMFMC level, and the management process considered the risks of the fishery on stocks, associated species, ETP species, habitats, and ecosystem.⁵⁹¹</p> <p>A 2015 publication by Ainsworth <i>et al.</i> 2015 detailed the results for an Atlantis Ecosystem model for the Gulf of Mexico supporting integrated ecosystem assessment.⁵⁹¹ NOAA published a notice in January 2023⁵⁹¹ to highlight that the model had undergone a rigorous Center for Independent Experts (CIE) review and that the public portion of the would be held on March 28th, 2023-March 30th, 2023, with an open session for public comment on March 30th, from 9:30-11:30 a.m. eastern. The next step in the process is to use the peer-reviewed GOM Atlantis model to run Gulf Penaeid shrimp simulations (e.g., habitat loss) and strategically evaluate the long-term biological, economic and ecosystem-level trade-offs.</p> <p>Information about the ecosystem food web in the Gulf of Mexico is taken from the Ainsworth <i>et al.</i> 2015 Atlantis Ecosystem model publication (NMFS-SEFSC-676).⁵⁹¹ This model is a comprehensive model that considers the human related effects of fishing on stocks, associated species, ETP species, and ecosystem. The human impact on habitats is detailed in Supporting Clauses 12.2.6 to 12.2.8.</p>	
Current status/Appropriateness/Effectiveness: <i>There is evidence that the fishery management organization considers the most probable adverse human impacts of the unit of certification on the ecosystem, by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge. Accordingly, these impacts are likely to be irreversible or very slowly reversible; if so, effective remedial action shall be taken. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.</i>	<input checked="" type="checkbox"/>
EVIDENCE: <p>Atlantis is an ‘end-to-end’ model which represents trophic dynamics from apex predators to primary producers, fisheries, nutrient dynamics, microbial cycles, habitat, and physical oceanography in a three-dimensional, spatially-explicit domain using a modular structure. The Atlantis GOM model represents present-day conditions (c. 2012). The model extent is divided into 66 three-dimensional polygons, each containing up to 7 depth strata. Ainsworth <i>et al.</i> 2015 linked the Atlantis GOM model to the Navy Coastal Ocean Model (NCOM) – American Seas model (AMSEAS) to force temperature and salinity fluxes. They simulated food web dynamics using 91 functional groups, including reef fish (11 groups), demersal fish (12), pelagic fish (15), forage fish (4), elasmobranchs (6), shrimp (4), seabirds (2), mammals (4), sea turtles (3), commercial benthos (3), structural species (4), macrobenthos (3), filter feeders (3), primary producers (8), pelagic invertebrates (4), and nutrient cyclers (4), and recreated biomass, catch, and effort trends in the Gulf of Mexico from 1980 to 2010 based on historical catch and biomass data. The model also includes fisheries fleet dynamics representing the main fishing fleets in the US, Mexico, and Cuba, and evaluated the ability of the model to represent historical fishing pressure from 1980 to 2010. The preliminary assessment shows that the Atlantis GOM can reasonably approximate historical catch time series and spatial distributions for most functional groups and fisheries in the Gulf of Mexico. The Atlantis GOM will allow addressing ecological hypotheses, test ecosystem indicators, assess the effects of climate change, and evaluate the trade-offs of alternate management scenarios.</p> <p>Anthropogenic effects on abiotic factors, such as habitats, are detailed in Supporting Clauses 12.2.6 to 12.2.8.</p>	

⁵⁹¹ <https://gulfcouncil.org/fishery-management-2/implemented-plans/shrimp/>

12.2.11. The fishery management organization shall consider the most probable adverse human impacts on the stock/ecosystem under consideration, by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on the ecosystem, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.



EVIDENCE:

The depth of knowledge and monitoring on biotic and abiotic aspects of the ecosystem is sufficient to substantiate that the fishery management organization considers the most probable adverse on the ecosystem. Sensitive areas and species are given closer examination and protect, such as corals⁵⁹² and essential fish habitat⁵⁹³. As there are FMP for those sensitive species, the requirement for monitoring is higher and thus the information is more substantial.

References: Refer to embedded footnotes as well as references from Supporting Clauses 12.2.6 to 12.2.8.

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
	10			0					10

Corresponding Confidence Rating:
 (10 = High; 4 or 7 = Medium; 1 = Low) High

Corresponding Conformance Level:
 (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC) Full Conformance

Non-conformance Number (if applicable): N/A

⁵⁹² <https://gulfcouncil.org/fishery-management-2/implemented-plans/coral/>

⁵⁹³ <https://gulfcouncil.org/fishery-management-2/implemented-plans/essential-fish-habitat/>

9.5.1.14 Supporting Clause 12.3.

12.3.	The role of the <i>stock under consideration</i> in the food web shall be considered, and if it is a key prey species⁵⁹⁴ in the ecosystem, management objectives and measures shall be in place to avoid severe adverse impacts on dependent predators.	
Relevance:	Relevant	
Evaluation Parameters		Met?
Process:	<p><i>There is a mechanism in place by which the role of the stock under consideration in the food web is assessed and monitored, and its relative importance as a prey species is determined. If the species is considered by the fisheries management organization to be an important prey species, there shall be specific management objectives relating to minimizing the impacts of the fishery on dependent predators. The FAO Guidelines require that all sources of fishing mortality on the stock under consideration are taken into account (whether or not it is a prey species) in assessing the state of the stock under consideration, including discards, unobserved mortality, incidental mortality, unreported catches, and catches in other fisheries.</i></p>	
EVIDENCE:	<p>Brown, white, and pink shrimp are not considered to be key prey species (unlike many small pelagic species like herring) consumed for food by dependent predators. These shrimp species serves as prey for numerous, diverse predators, but it is not a preferred prey item for any single predator species, such that it is highly unlikely that reductions in shrimp abundance would lead directly to reductions of any specific predator species. The role of brown, white, and pink shrimp stocks in the food web has been adequately considered and the appropriate precautions and management are taken to ensure that the health of these stocks are not adversely affected by the effort of the UoAs. A 2015 publication by Ainsworth <i>et al.</i> 2015 detailed the results for an Atlantis Ecosystem model for the Gulf of Mexico supporting integrated ecosystem assessment.⁵⁹⁵</p> <p>Atlantis is an ‘end-to-end’ model which represents trophic dynamics from apex predators to primary producers, fisheries, nutrient dynamics, microbial cycles, habitat, and physical oceanography in a three-dimensional, spatially-explicit domain using a modular structure.⁵⁹⁵ The Atlantis GOM model represents present-day conditions (c. 2012). The model extent is divided into 66 three-dimensional polygons, each containing up to 7 depth strata. Ainsworth <i>et al.</i> 2015 linked the Atlantis GOM model to the Navy Coastal Ocean Model (NCOM) – American Seas model (AMSEAS) to force temperature and salinity fluxes. They simulated food web dynamics using 91 functional groups, including reef fish (11 groups), demersal fish (12), pelagic fish (15), forage fish (4), elasmobranchs (6), shrimp (4), seabirds (2), mammals (4), sea turtles (3), commercial benthos (3), structural species (4), macrobenthos (3), filter feeders (3), primary producers (8), pelagic invertebrates (4), and nutrient cyclers (4), and recreated biomass, catch, and effort trends in the Gulf of Mexico from 1980 to 2010 based on historical catch and biomass data. The model also includes fisheries fleet dynamics representing the main fishing fleets in the US, Mexico, and Cuba, and evaluated the ability of the model to represent historical fishing pressure from 1980 to 2010. The preliminary assessment shows that the Atlantis GOM can reasonably approximate historical catch time series and spatial distributions for most functional groups and fisheries in the Gulf of Mexico. The Atlantis GOM will allow addressing ecological hypotheses, test ecosystem indicators, assess the effects of climate change, and evaluate the trade-offs of alternate management scenarios.</p> <p>The 2004 Gulf Council EFH EIS⁵⁹⁶ review highlighted that that larvae of shrimp feed on phytoplankton and zooplankton. Post larvae feed on epiphytes phytoplankton, and detritus. Juveniles and adults prey on polychaetes, amphipods and chironomid larvae but also detritus and algae. The habitat of these prey is essentially the same as required by shrimp. Prey and predators of shrimp have been reproduced below from the 2004 Gulf Council EFH EIS.</p>	

⁵⁹⁴ See Appendix 1 of Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in Alaska Version 2.0 May 2018.

⁵⁹⁵ Ainsworth, C. H., Schirripa, M. J., and Morzaria-Luna, H. (eds.) 2015. An Atlantis Ecosystem Model for the Gulf of Mexico Supporting Integrated Ecosystem Assessment. NOAA Technical Memorandum NMFS-SEFSC-676, 149 p.

<http://doi.org/10.7289/V5X63JVH>

⁵⁹⁶ GMFMC. 2004. Final EIS for EFH for the Gulf of Mexico FMPs. Gulf of Mexico Fishery Management Council <https://gulfcouncil.org/wp-content/uploads/March-2004-Final-EFH-EIS.pdf>

12.3. The role of the *stock under consideration* in the food web shall be considered, and if it is a key prey species⁵⁹⁴ in the ecosystem, management objectives and measures shall be in place to avoid severe adverse impacts on dependent predators.

The three shrimp species under consideration are short-lived (18-24 months but most seldom live longer than one year), grow fast, mature early, and are highly fecund (spawning 215,000 to 1 million eggs multiple times during the spawning season) and disperse offspring widely. These biological traits make them highly productive and inherently resilient to fishing pressure. These shrimps are essentially an “annual crop”. Abundance is driven primarily by environmental conditions and as long as these are favourable, populations can rebound from low abundance one year to high abundance the next. Salinity, water temperature, and dissolved oxygen can influence function, distribution, growth, survival, and movement of shrimp. In fact, the hydrological conditions in shrimp nursery areas, particularly in early spring, play a large role in dictating the next shrimping season’s potential harvest. Optimal conditions for growth and survival can vary between species and life-history stages.

Considering that GOM brown, white and pink shrimp species cannot be said to be key prey species in the ecosystem (i.e., they are preyed by medium pelagic fish, other demersal fish and finfish) nor they are key predators (as they feed on polychaetes, amphipods and chironomid larvae but also detritus), and while taking into account that they are essentially an “annual crop” with abundance driven primarily by environmental conditions (included in stock assessment efforts⁵⁹⁷), all the while considering the apparent conservative harvest by the fishery it is unlikely that the GOM shrimp fishery is likely to disrupt ecosystem structure and function.

Current status/Appropriateness/Effectiveness:

Management measures have been developed and are in place to achieve the management objectives described in the process parameter, and there is evidence to demonstrate that they are successful to this end. If the species under assessment is not considered to be a key prey species, then this parameter shall be considered fulfilled.



EVIDENCE:

GOM shrimp stocks are not considered key prey species

Evidence Basis:

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the role of the stock under consideration in the food web is considered, and if it is a key prey species in the ecosystem, objectives and management measures are in place to avoid severe adverse impacts on dependent predators. Examples may include various stock and ecosystem assessment reports.



EVIDENCE:

Annual monitoring by the states and federal governments are in place to ensure that each stock remains highly productive and large enough to support ecosystem functionality.

The primary source that demonstrates brown, white, and pink shrimp’s roles in the ecosystem is the Atlantis Model.⁵⁹⁵ However, there is The Gulf of Mexico (Gulf) EBFM Road Map Implementation Plan describes how EBFM guiding principles can be translated into actionable steps, using current capacity and ongoing activities as a foundation for development. Many EBFM efforts are already underway. The 2019 Gulf of Mexico Ecosystem Based Fisheries Management Implementation Plan⁵⁹⁸ serves to: 1) document the efforts that the Southeast Fisheries Science Center (SEFSC), Southeast Regional Office (SERO), and other regional partners have completed to date, 2) guide the organization of ecosystem science within the Southeast region, 3) clarify regional priorities in order to facilitate collaboration, and 4) assist the Gulf of Mexico Fishery Management Council (Gulf Council) with ecosystem-level planning. Successful completion of the activities described within is expected to advance basic research, increase efficiencies in operations, create better flow of information from science to management, and increase stakeholder participation and buy-in to the scientific and management process.

Much progress has been made in including ecosystem considerations in stock assessments; for example, through the inclusion of red tide mortality in grouper species, development of predictions of recruitment strength due to oceanographic influences for red snapper, and the development of individual-based brown shrimp production models (e.g., see the 2022 Empirical Dynamic Modeling

⁵⁹⁷ GMFMC. 2022. Empirical Dynamic Modeling for Short-Lived Penaeids. Presentation to the Gulf Council in March 2022 by Dr Michelle Masi. Work by Drs. Michelle Masi, Stephan B Munch, Adam Pollack & Cheng-Han Tsai. https://gulfcouncil.org/wp-content/uploads/X.-EDM_for-Brown-and-White-Shrimp.pdf

⁵⁹⁸ NOAA. 2019. 2019 Gulf of Mexico Ecosystem Based Fisheries Management Implementation Plan. NOAA Fisheries. https://media.fisheries.noaa.gov/dam-migration/gulf_of_mexico_ebfm_road_map_implementation_plan-5apr.pdf

12.3. The role of the *stock under consideration* in the food web shall be considered, and if it is a key prey species⁵⁹⁴ in the ecosystem, management objectives and measures shall be in place to avoid severe adverse impacts on dependent predators.

shrimp presentation to the Gulf Council⁵⁹⁹) to supplement the stock assessment process. Ecosystem information can also be qualitatively included in the stock assessment process; for example, through consideration of ecosystem indicators that are thought to be tied to critical aspects of population dynamics.

Monitoring is crucial for tracking not only individual stock and protected species dynamics, but also for understanding changes in the larger system in which these organisms reside. The occurrence of the Deepwater Horizon oil spill in 2010 brought to light a general paucity of data streams with which to track Gulf ecosystem change, and the occurrence of the event itself spurred massive data collection efforts which may serve as a useful baseline for the future. The [Deepwater Horizon Natural Resource Damage Assessment Trustee Council's Regionwide Trustee Implementation Group \(TIG\)](#) has developed strategic frameworks for birds, marine mammals, oysters, and sea turtles, which identify key regional monitoring needs and other information gaps relevant to implementing restoration for those four resources. Similarly, the Open Ocean TIG is in the process of developing a Monitoring and Adaptive Management Strategy that will identify priority data and science needs for the open ocean restoration area. Future restoration monitoring implemented through these two TIGs, and the TIGs for the five Gulf states, may contribute valuable data that can be used to help to fill some of the gaps in existing Gulf of Mexico monitoring. Another significant monitoring activity includes the recently added [Gulf of Mexico Marine Assessment Program for Protected Species](#) (GOMMAPPS; extended from a similar Atlantic survey effort), which is a multi-agency partnership to collect and disseminate broad-scale data on the abundance, distribution, habitat use, and behavior of marine mammals, sea turtles, and seabirds in the Gulf. These data form the basis for protected species stock assessments and can be used to improve mitigation and monitoring for impacts of human activities, including those related to the oil and gas industry, and are required to inform National Environmental Policy Act (NEPA) documents and consultations related to Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Migratory Bird Treaty Act (MBTA), and other statutes.

References:	Refer to footnotes included in each section.		
Numerical score:	Starting score	- (	Number of EPs <u>NOT</u> met
	10	- (	0 x 3) =
			Overall score
			10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance		
Non-conformance Number (if applicable):	N/A		

⁵⁹⁹ GMFMC. 2022. Empirical Dynamic Modeling for Short-Lived Penaeids. Presentation to the Gulf Council in March 2022 by Dr Michelle Masi. Work by Drs. Michelle Masi, Stephan B Munch, Adam Pollack & Cheng-Han Tsai. https://gulfcouncil.org/wp-content/uploads/X.-EDM_for-Brown-and-White-Shrimp.pdf

9.5.1.15 Supporting Clause 12.4.

12.4. There shall be outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a stock under consideration that is a key prey species⁶⁰⁰.																			
Relevance:	Not relevant. The stock is not considered a key prey species.																		
Evaluation Parameters	Met?																		
Process: <i>There is a mechanism in place that allows the establishment of outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a stock under consideration that is a key prey species⁶⁰¹. Mortality in Alaska is usually accounted for all removals of given species. The state and federal fish accounting systems operate in depth and make an explicit effort to document all removals to confirm with regulations in force. The assessors shall ensure that all removals are accounted for in the system (fish ticket, eLandings) for stock assessment and management purposes.</i>	<input checked="" type="checkbox"/>																		
Evidence:	Not relevant.																		
Current status/Appropriateness/Effectiveness: <i>There is evidence that outcome indicators and management measures have been developed, are in place, and have succeeded in achieving the objectives described in the process parameter.</i>	<input checked="" type="checkbox"/>																		
Evidence:	Not relevant.																		
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a stock under consideration that is a key prey species. Examples may include various stock and ecosystems assessment reports.</i>	<input type="checkbox"/>																		
Evidence:	Not relevant.																		
References:																			
Numerical score: <table border="1" style="display: inline-table; margin-left: 20px;"> <tr> <td style="text-align: center;">Starting score</td> <td style="text-align: center;">-</td> <td style="text-align: center;">(</td> <td style="text-align: center;">Number of EPs <u>NOT</u> met</td> <td style="text-align: center;">x</td> <td style="text-align: center;">3</td> <td style="text-align: center;">)</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Overall score</td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> <td style="text-align: center;">0</td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">10</td> </tr> </table>	Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score	10			0					10	
Starting score	-	(Number of EPs <u>NOT</u> met	x	3)	=	Overall score											
10			0					10											
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High																		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance																		
Non-conformance Number (if applicable):	N/A																		

⁶⁰⁰ See Appendix 1 of Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in Alaska Version 2.0 May 2018.

⁶⁰¹ General harvest guidelines based on Lenfest report: "in fisheries with an intermediate level of information (which will include most well managed forage fisheries), there must be at least 40% of virgin or unfished biomass (B₀) left in the water, and fishing mortality should be no higher than 50% of F_{MSY}. Low information fisheries should leave at least 80% of B₀ in the water. High information fisheries (which have a high information not just on the fished stock, but the full ecosystem), may exceed these reference points if justified by the science, but in no case should fishing mortality exceed 75% of F_{MSY} or biomass fall below 30% of B₀. Link: http://www.lenfestocean.org/~media/legacy/lenfest/pdfs/littlefishbigimpact_revised_12june12.pdf?la=en.

9.5.1.16 Supporting Clause 12.5.

12.5. States shall introduce and enforce laws and regulations based on the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).	
Relevance:	Relevant
Evaluation Parameters	
Process: <i>The appropriate regulations have been implemented.</i>	<input checked="" type="checkbox"/>
EVIDENCE: Laws and regulations based on the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) are in place and enforced. The US Senate ratified MARPOL and Congress implemented it by the Act to Prevent Pollution from Ships (APPS; 33 U.S.C §§1905-1915) on October 21, 1980. These apply to both the state and federal jurisdictions (all UoAs).	
Current status/Appropriateness/Effectiveness: <i>These regulations and their enforcement are effective and in line with the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).</i>	<input checked="" type="checkbox"/>
EVIDENCE: The US EPA and USCG have established protocols for managing enforcement of the Act to Prevent Pollution from Ships ⁶⁰² . To further facilitate enforcement, APPS contains a “whistle blower provision” - those who come forward with violations of APPS or MARPOL may be compensated with up to 50% of the monetary penalties that the US Government receives from the guilty parties ⁶⁰³ . These apply to both the state and federal jurisdictions (all UoAs).	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State has introduced and enforces laws and regulations based on the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). Examples may include various regulations, data, and reports.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The US has introduced and enforces laws and regulations based on MARPOL as evidenced by: - US federal law (Act to Prevent Pollution from Ships, APPS; 33 U.S.C §§1905-1915) - Established protocols between US EPA and USCG for managing enforcement of Annex VI of MARPOL - A public record of criminal prosecutions of vessel pollution cases by the US Department of Justice (penalties exceeded \$200 million over a recent 10-year period ⁶⁰⁴ . These apply to both the state and federal jurisdictions (all UoAs).	
References:	See footnotes embedded in text
Numerical score:	$\text{Starting score} - \left(\text{Number of EPs NOT met} \times 3 \right) = \text{Overall score}$
	$10 - (0 \times 3) = 10$
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	N/A

⁶⁰² <https://www.epa.gov/enforcement/marpol-annex-vi-and-act-prevent-pollution-ships-apps>

⁶⁰³ <https://www.whistleblowers.org/stop-shipping-pollution/>

⁶⁰⁴ <https://www.justice.gov/enrd/vessel-pollution-enforcement>

9.5.1.17 Supporting Clause 12.6.

12.6. Research shall be promoted on the environmental and social impacts of fishing gear especially on the impact of such gear on biodiversity and coastal fishing communities.	
Relevance:	Relevant
Evaluation Parameters	
Process: <i>Research is promoted on the environmental and social impacts of fishing gear and its impacts on biodiversity and coastal fishing communities, as applicable to the fishery.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The focus of the federal government (for which the five states also participated in) with regard to the US GOM shrimp fishery has been cleaning up the unwanted species in the catch. Turtle Excluder Devices (TEDs) are required on all otter trawl (since 1987 for offshore and 1993 for nearshore) and skimmer trawl vessels (since 2021) greater than 40 ft. TEDs are effective at excluding turtles as well as other larger animals such as sharks, skates, and marine mammals. Additionally, Bycatch Reductions Devices (BRDs) are required in federal, Texas, and Florida waters and research is ongoing as to their effectiveness as excluded unwanted finfish. Research on these two systems have been investigated for the last three to four decades with continual updates on the legislation and regulations to ensure that best practices are being observed.	
Current status/Appropriateness/Effectiveness: <i>There is evidence for this research, and is it considered appropriate for overall fisheries management purposes.</i>	<input checked="" type="checkbox"/>
EVIDENCE: <u>TEDs</u> There are numerous examples of research into the effectiveness of TEDs dating back to the 1980s. Watson and Seidel (1980) investigated turtle mortalities at the hands of the southeastern shrimp fishery to be a major problem. ⁶⁰⁵ They presented their work on analyzing the effectiveness of the “reverse” excluder barrier and the TED. They concluded that both were effective at excluding turtles but did reduce the total amount of shrimp catch. This research continued into the 90s where Renaud <i>et al.</i> (1990) analyzed how much shrimp were lost as a result of TED implementation when other factors are considered (season, tow times, net configuration, and others). ⁶⁰⁶ Now that it was clear that TEDs reduced shrimp catch, research into optimizing their configuration proceeded to minimize the amount of shrimp lost and maximize the effectiveness of turtle exclusion. Mitchell <i>et al.</i> (1995) analyzed the effectiveness of six different TED bar configurations, construction material, size, placement within the codend, top exiting vs. bottom exiting, TED installation angle, floatation size and position, acceleration funnel, and many other alterations. ⁶⁰⁷ Ultimately these results helped modify the TED regulations for which many are still in place today. In 2002, Epperly and Teas concluded that there were a significant number of stranded turtles that exceeded the minimum legal TED opening height, which would indicate that the opening was too small for some of the larger turtles including the leatherback and loggerheads. ⁶⁰⁸ In 2005, there was a study completed that found that flat bar TEDs had statistically significant increases in shrimp catch rates when compared to aluminum pipe. ⁶⁰⁹ Nowadays, the research is still focused on maximizing the efficiency of the TEDS, but research has also been expanded to allow for other large animals to escape such as sharks, skates, and marine mammals (e.g. Campbell <i>et al.</i> , 2020). ⁶¹⁰	

⁶⁰⁵ Watson, J.W. and Seidel, W.R., 1980. Evaluation of techniques to decrease sea turtle mortalities in the southeastern United States shrimp fishery. *ICES CM*, 31, pp.1-8. https://www.ices.dk/sites/pub/CM%20Documents/1980/B/1980_B31.pdf

⁶⁰⁶ Renaud, M.L., Gitschlag, G.R., Klima, E.F., Shah, A., Nance, J.M., Caillouet, C.W., Zein-Eldin, Z.P. and Patella, F.J., 1990. Evaluation of the impacts of turtle excluder devices (TEDs) on shrimp catch rates in the Gulf of Mexico and South Atlantic, March 1988 through July 1989. https://repository.library.noaa.gov/view/noaa/5936/noaa_5936_DS1.pdf

⁶⁰⁷ Mitchell, J.F., Watson, J.W., Foster, D.G. and Caylor, R.E., 1995. The turtle excluder device (TED): a guide to better performance. https://repository.library.noaa.gov/view/noaa/30895/noaa_30895_DS1.pdf

⁶⁰⁸ Epperly, S. P., and W. G. Teas. 2002. Turtle excluder devices—Are the escape opening large enough? *Fish. Bull.* 100:466–474. <https://aquadocs.org/bitstream/handle/1834/31078/07epperl.pdf?sequence=1&isAllowed=y>

⁶⁰⁹ Gulf and South Atlantic Fisheries Foundation, Incorporated. 2008. An assessment of turtle excluder devices within the Southeastern shrimp fisheries of the United States. NOAA/NMFS Cooperative Agreement No. NA04NMF4540112; #92.

⁶¹⁰ Campbell, M.J., Tonks, M.L., Miller, M., Brewer, D.T., Courtney, A.J. and Simpendorfer, C.A., 2020. Factors affecting elasmobranch escape from turtle excluder devices (TEDs) in a tropical penaeid-trawl fishery. *Fisheries Research*, 224, p.105456. https://www.bycatch.org/sites/default/files/Campbell%20et%20al%202020%20Factors%20affecting%20elasmobranch%20escape%20from%20turtle%20excluder%20devices%20in%20a%20tropical%20penaeid%20trawl%20fishery_0.pdf

12.6. Research shall be promoted on the environmental and social impacts of fishing gear especially on the impact of such gear on biodiversity and coastal fishing communities.

BRDs
 Bycatch reduction devices (BRDs) are a much newer technique used by the GOM shrimp industry. The aims of these BRDs is to exclude larger finfish from the catch to benefit the finfish harvesters in the area (both commercial and recreational) and to reduce on deck sorting time by the shrimping industry. Right now, BRDs are only required for vessels fishing in federal, Texas, or Florida waters (but many shrimpers voluntarily carry them in waters where not required or will carry more than the required number). While BRDs are not mandatory in state waters in LA, MS and AL, dockside surveys and interviews have indicated that a significant portion of state permitted vessels are also utilizing BRDs. For example, in Louisiana, recent research indicates that approximate 45% of skimmer trawls pull BRDs, and fishermen in Louisiana are allowed to retain bycatch species for sale or personal consumption (e.g. certain fish species or blue crab) within regulatory requirements for those species.

There are currently five certified BRDs recognized the state and federal governments: fisheye, Jones Davis, modified Jones Davis, cone fish deflector composite panel, and square mesh panel composite panel. In order to be certified, a BRD must reduce bycatch by at least 30%.

Research into these devices began in the early 90s and into the 2000s. Rogers *et al.* (1997) tested four variations of BRDs for their effectiveness at reducing finfish bycatch, including a variation of the fisheye BRD that is certified today.⁶¹¹ Louisiana and Texas Sea Grant programs currently has a funded project titled *Better Bycatch Reduction Device Project*.⁶¹² This project received federal funding (as well as industry and private) from NOAA to conduct research on new BRD designs and testing those designs for certification. The 2021/2022 Annual Report outlines the five key areas of research that this project aims to address: communication and outreach, research, and development, new BRD rollout, vessel support, and monitoring.⁶¹³

Research on both BRDs and TEDs are focused on maintaining high biodiversity in the GOM. All jurisdictions participate in this research; thus, this applies to all UoAs.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that research is promoted on the environmental and social impacts of fishing gear especially the impact of such gear on biodiversity and coastal fishing communities. Examples may include various regulations, data, and reports.



EVIDENCE:
 Refer to evidence and research described above.

References: See footnotes embedded in text

Numerical score:	Starting score	-	(	Number of EPs <u>NOT</u> met	x	3	)	=	Overall score
	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									N/A

⁶¹¹ Rogers, D.R., Rogers, B.D. and Wright, V.L., 1997. Effectiveness of four industry-developed bycatch reduction. *Fishery Bulletin*, 95, pp.552-565. https://www.researchgate.net/profile/Donna-Rogers-4/publication/237137650_Effectiveness_of_four_industry-developed_bycatch_reduction_devices_in_Louisianas_inshore_waters/links/5699496c08aeeea985946a16/Effectiveness-of-four-industry-developed-bycatch-reduction-devices-in-Louisianas-inshore-waters.pdf

⁶¹² <https://www.laseagrant.org/outreach/projects/better-brds/>

⁶¹³ Better Bycatch Reduction Devices Annual Report 2021 & 2022. <https://www.laseagrant.org/wp-content/uploads/BetterBRD-Public-Annual-Report-2021-22.pdf>

9.5.1.18 Supporting Clause 12.7.

12.7. The fishery management organization shall make use, where appropriate, of Marine Protected Areas (MPAs). The general objectives for establishing MPAs shall include ensuring sustainability of fish stocks and fisheries, and protecting marine biodiversity and critical habitats.	
Relevance:	Relevant
Evaluation Parameters	Met?
Process: <i>There is a process available for the consideration of MPAs as appropriate, as a tool for management.</i>	<input checked="" type="checkbox"/>
EVIDENCE: The process for consideration of MPAs as a management tool is established at State, Federal and Council levels. ⁶¹⁴	
Current status/Appropriateness/Effectiveness: <i>There shall be evidence for the use of MPAs, if appropriate (e.g., if they are employed MPAs as part of suite of management tools), as a tool for effective management with the general objectives of ensuring sustainability of fish stocks and fisheries, and protecting marine biodiversity and critical habitats.</i>	<input checked="" type="checkbox"/>
EVIDENCE: State, federal, and Gulf Council all collaborate on protecting resources in the GOM. There is a large network of MPAs (including seasonal and areal closures) in the GOM to protect everything from spawning activity of sensitive species, critical habitat for endangered species, biogenic habitat, or even spawning migrations of shrimp to inshore waters. Generally speaking, the Gulf Council and the NOAA aim to protect offshore areas (outside the state water demarcation line) and to protect areas specific to endangered species survival. Inshore waters are left to the states to decide their own protocols, but typically they are aimed to protect sensitive nearshore habitat, such as seagrass and oyster beds, and to protect ecosystem productivity. All states protect waters seasonally to allow shrimp to grow to marketable size and use sampling to determine when it is acceptable to open the season without affecting the ecosystem's productivity. These seasonal closures serve as MPAs for state waters in addition to permanent MPAs. Additionally, there is also a network of MPAs aimed to protect GOM reef fishes. ⁶¹⁵ In 2020, the gulf council passed Coral Amendment 9 to the GOM shrimp FMP. ⁶¹⁶ This amendment created 13 new habitat areas of particular concern (HAPCs). Some of these HAPCs establish fishing regulations for the shrimp industry and, and for all intents and purposes, serve as MPAs. Given the large number of MPAs, it is not surprising that specific conservation objectives vary from one MPA to another. However, most of GOM's MPAs have been established with an aim to ensure the sustainability of fish stocks and fisheries, and/or to protect marine biodiversity and critical or sensitive habitats.	
Evidence Basis: <i>The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization has made use, where appropriate, of MPAs. The objectives of establishing MPAs are ensuring sustainability of fish stocks and fisheries, and protecting marine biodiversity and critical habitats. Examples may include various regulations, data, and reports.</i>	<input checked="" type="checkbox"/>
EVIDENCE: As stated above, the goal of the vast majority of MPAs established in the GOM is to promote sustainability of fish stocks and fisheries and protect marine biodiversity and critical habitats. The network of MPA is a dynamic system where new areas for conservation are always being researched and lobbied for by various stakeholder to protect an economic or environmental resource. Evidence of this is the newly implemented protections for coral habitat that were protected in Coral Amendment 9. ⁶¹⁶	

⁶¹⁴ <https://www.fisheries.noaa.gov/resource/map/gulf-mexico-seasonal-and-or-area-closures-and-marine-protected-areas>

⁶¹⁵ 50 CFR § 622.34 - Seasonal and area closures designed to protect Gulf reef fish. <https://www.law.cornell.edu/cfr/text/50/622.34>

⁶¹⁶ Gulf of Mexico Fishery Management Council. 2020. Coral Amendment 9- Final Rule. <https://portal.gulfcouncil.org/coral9/>

12.7. The fishery management organization shall make use, where appropriate, of Marine Protected Areas (MPAs). The general objectives for establishing MPAs shall include ensuring sustainability of fish stocks and fisheries, and protecting marine biodiversity and critical habitats.

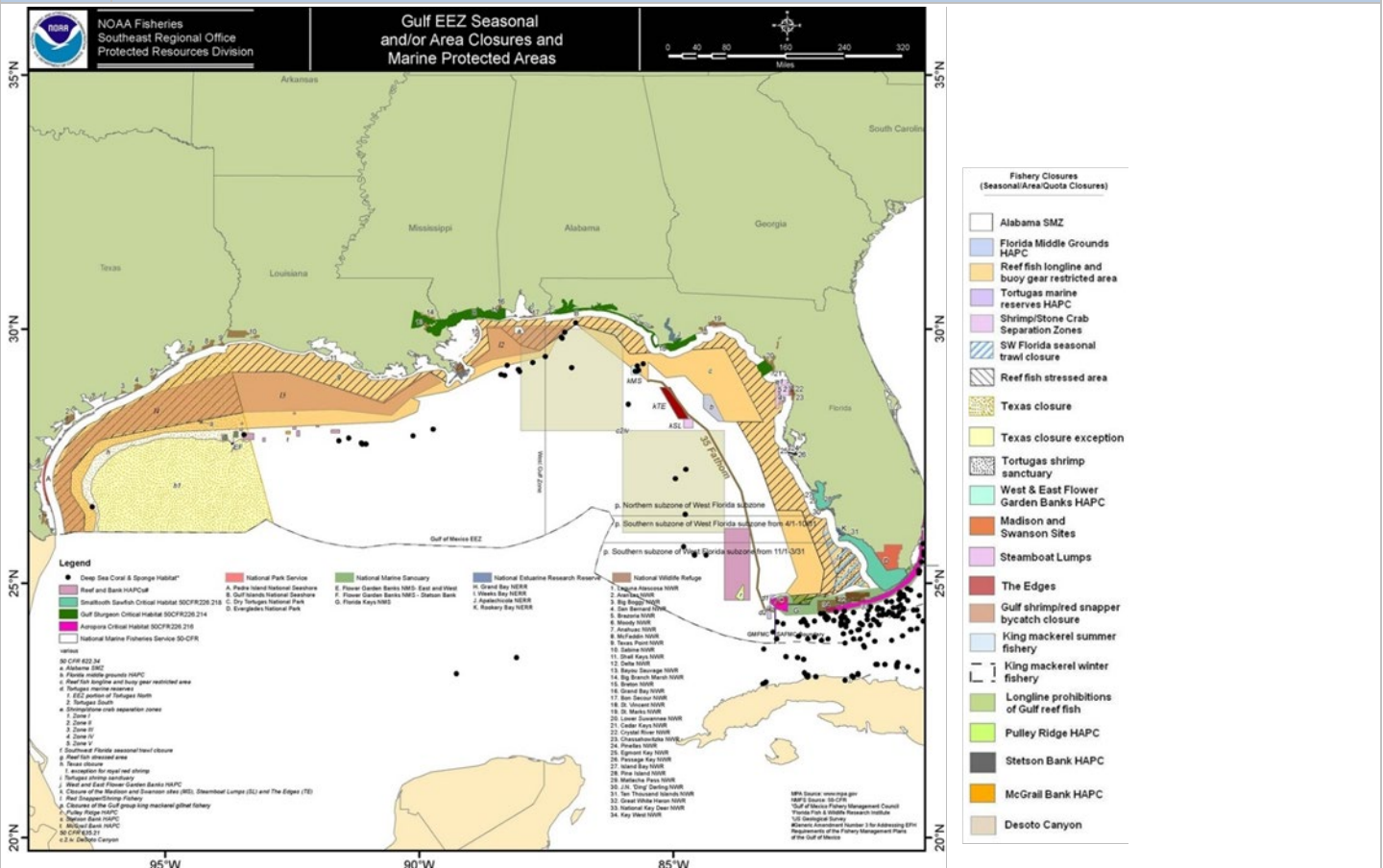


Figure 61. Existing seasonal, areal, and quota-based closures in the Gulf of Mexico: NOAA Southeast 2021⁶¹⁴.

References:	See footnotes embedded in text		
Numerical score:	Starting score	- (Number of EPs <u>NOT</u> met x 3) =	Overall score
	10	- (0 x 3) =	10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance		
Non-conformance Number (if applicable):	N/A		

10 Non-conformances and Corrective Actions

10.1 Non-conformances and associated Corrective Actions

The Assessment Team has identified 3 non-conformances - all MINOR.

In this assessment there were 2 minor non-conformances for the UoAs 25-30 from the state of Alabama. A minor NC was raised against the pink shrimp UoAs in Florida and Federal waters with regard to the smalltooth sawfish. And, a minor NC is raised against all otter trawl UoAs (all species and all jurisdictions) with regard to the giant manta ray.

In accordance with AK RFM requirements, the Client is required to submit a Corrective Action Plan (CAP) to address each non-conforming area. CAPs may consist of information that directly closes out the area of non-conformity with no further action required or a plan of activities to be implemented within a specific timeframe in order for the non-conformity to be closed out. Where CAPs require the cooperation and support of fishery management organisations, these must be identified with specific tasks and activities that are to be undertaken. Please note that, while the implementation of CAPs may be on-going for an extended period, in general non-conformances should be closed out within the lifetime of any resulting certificate.

Following receipt of a CAP, the Assessment Team are required to review the CAP and determine its likely adequacy at meeting the requirements of the particular clause and the appropriateness of the timeframe to achieve close out. Consideration of the CAP will also be part of the formal certification review by Global Trust’s Certification Committee prior to awarding certification/continued certification.

10.1.1 Non-conformance 1 (of 3)

Non-conformance 1 (of 3)	
Clause:	1.7 (Alabama)
Non-conformance level:	Minor
Non-conformance :	Within the fishery-specific management system for Alabama procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information.
Rationale:	Documentary evidence is lacking to demonstrate how the components of the State’s fishery management system for the commercial shrimp fishery, and their performance, is continuously reviewed. The required evidence is closely aligned to the existence of short and long-term objectives and associated performance metrics. The objectives are those that address the management system’s components related to the sustainable exploitation of the target stock; the mitigation of negative impacts on non-target species through bycatch, discarding, and indirect effects; the protection of Endangered, Threatened, Protected (ETP) species; and the physical environment. In other words, evidence that the agency’s current conservation and management measures are supported by long and short-term objectives that are also measurable.
Milestones	<p>At the first surveillance (2024), the client in collaboration with State officials shall initiate discussions aimed at developing proposed short and long-term objectives and associated metrics for the components of the commercial shrimp fishery’s management system in state waters. Evidence of such would typically consist of meeting minutes or exchanges of correspondence. Condition remains open.</p> <p>At the second surveillance (2025), the client in collaboration with State officials and interested stakeholders shall table for discussion with the appropriate state management body(ies) the proposed long and short-term objectives and associated metrics. Evidence of such would typically consist of meeting minutes or exchanges of correspondence. Condition remains open.</p>

Non-conformance 1 (of 3)

At the third surveillance (2026), the client in collaboration with State officials and interested stakeholders shall demonstrate acceptance of the short and long-term objectives and associated metrics by the appropriate state management body(ies), including the approach for undertaking a continuous review process of the components of the fishery management system. Evidence of such would typically consist of meeting minutes or exchanges of correspondence. **Condition remains open.**

At the fourth surveillance (2027), the client shall provide evidence that a (continuous) review of the components of the State’s commercial shrimp fishery has been concluded. The review will demonstrate how the approved short and long-term objectives and metrics were considered in the review. The client will also demonstrate that the objectives have been formally (explicitly) adopted as a component of the state’s fishery management system (either under a plan, statutes or other document). **Condition is closed.**

Corrective Action Plan (CAP):

Corrective Action Plan #1

Client, in collaboration with State officials, will develop short and long-term objectives and associated metrics for the components of the commercial shrimp fishery’s management system in state waters.

Milestone	Action	Roles & Responsibilities	Outputs
Year 1 (early 2025)	–Client will initiate discussion with ADCNR staff on developing short and long-term objectives for the shrimp fishery.	Client Group/ADCNR	–Client will share with the CAB any relevant notes and communications related to the action.
Year 2 (early 2026)	–Client will hold a meeting with ADCNR staff and relevant stakeholders to discuss short and long-term objectives for the shrimp industry.	Client Group/ADCNR	– Client will share with the CAB any relevant agendas, notes, and communications related to the action.
Year 3 (early 2027)	–Client and ADCNR will formalize short and long-term objectives.	Client Group/ADCNR	— Client will share with the CAB any relevant agendas, plans, and communications related to the action.
Year 4 (early 2028)	–Client will provide the CAB with a review of the State’s commercial shrimp fishery that includes the new short and long-term objectives.	Client Group/ADCNR	– Client will provide the CAB with a review of the State’s commercial shrimp fishery that includes the new short and long-term objectives.

Assessment team’s Note: The milestones associated with Corrective Action Plans 1 and 2 are similar; however, they serve different purposes. In the case of the former, objectives and metrics are required in order to inform the State of Alabama’s “continuous review” process for the components of its commercial shrimp fishery management system. In the case of the latter, the objectives and metrics are required as a means for adjoining them formally to the fishery management system

Letter of Support

Non-conformance 1 (of 3)



Kay Ivey
GOVERNOR

Christopher M. Blankenship
COMMISSIONER

Edward F. Poolos
DEPUTY COMMISSIONER

STATE OF ALABAMA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
MARINE RESOURCES DIVISION

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Our mission is to manage the State's marine fishery resources through research, enforcement, and education for the maximum benefit of the resources and the citizens of Alabama.



M. Scott Bannon
Director
MARINE RESOURCES DIVISION

March 22, 2024

Mr. Trey Pearson
American Shrimp Processors Association
P. O. Box 4867
Biloxi, MS 39535

Re: Support for the American Shrimp Processors Association Corrective Action Plan, as required for Certified Seafood Collaborative certification of the Gulf of Mexico shrimp fishery

Dear Mr. Pearson,

Congratulations on the progress the American Shrimp Processors Association (ASPA) has made towards achieving public recognition of the sustainability of the Gulf of Mexico shrimp fishery through certification against the Certified Seafood Collaborative's Responsible Fisheries Management Program standards. The Alabama Department of Conservation and Natural Resources, Marine Resources Division (ADCNR/MRD), recognizes that the Corrective Action Plan (Plan) you have developed to meet the standards represents your commitment, as the client, to accept responsibility for meeting the identified Non-Conformance items imposed on the Gulf of Mexico shrimp fishery.

The actions in this Plan related to Alabama's Non-Conformance items 1 and 2 involve ADCNR/MRD's management of the state's shrimp fishery and address development of measurable short and long-term management objectives for the fishery. We will work with ASPA to ensure appropriate evidence is provided to the assessment team for future surveillance audits and reports documenting progress towards meeting the desired outcome of the Plan. If you have any questions, please feel free to contact me.

Respectfully,



M. Scott Bannon, Director
Marine Resources Division

The Department of Conservation and Natural Resources does not discriminate on the basis of race, color, religion, age, sex, pregnancy, national origin, genetic information, veteran status or disability in its hiring or employment practices nor in admission to, access to, or operations of its programs, services, or activities.

Assessment Team

The Assessment team confirms that further evidence submitted by ASPA Client Group to address the non-conformance is sufficient to close non-conformance #1 with no further specific actions required by the Client.

Non-conformance 1 (of 3)	
evaluation of CAP	Annual surveillance audits will continue to review any up-dates, changes in circumstances and status as part of the normal audit procedure
Status:	Open – Corrective Actions in place to be reviewed annually at surveillance audits.

10.1.2 Non-conformance 2 (of 3)

Non-conformance 2 (of 3)	
Clause:	3.1 (Alabama)
Non-conformance level:	Minor
Non-conformance:	Long-term management objectives shall be translated into a plan or other management document (taking into account uncertainty and imprecision) and be subscribed to by all interested parties.
Rationale:	<p>The state’s long-term objectives for the management of the commercial fisheries in the state’s waters currently are annotated in statutes like the <i>Alabama Code 2022</i>, Title 9 (Conservation and Natural Resources), Chapter 12 (Seafoods), Divisions 2 and 3. The regulations include provisions in respect of the licensing requirements, landing and reporting requirements, and fishing restrictions. Management measures include spatial and temporal closures to protect juvenile shrimp and various ETP species as well as a state-wide coastal zone management program. However, in the Assessment team’s opinion, these measures are more commonly associated with an “outcome” as opposed to a “purpose”.</p> <p>In order to better meet the requirement of the clause, the state should (i) undertake to clearly define its long-term objectives, (ii) establish that they are based on the best available scientific evidence, (iii) are measurable, and (iv) are translated into a management plan, or regulations, or another document.</p>
Milestones	<p>At the first surveillance (2024), the client will, in collaboration with State officials, initiate discussions aimed at developing long-term objectives and associated metrics for the commercial shrimp fishery management system in state waters. Evidence of such would typically consist of meeting minutes or exchanges of correspondence. Condition remains open.</p> <p>At the second surveillance (2025), the client will, in collaboration with State officials and interested stakeholders, table for discussion and review the long-term objectives and associated metrics as developed. Evidence of such would typically consist of meeting minutes or exchanges of correspondence. Condition remains open.</p> <p>At the third surveillance (2026), the client will, in collaboration with State officials and interested stakeholders, present and recommend acceptance of the long-term objectives and associated metrics to the appropriate state management body(ies), including a recommendation on the most appropriate mechanism for adjoining the objectives and metrics to the fishery management system. Evidence of such would typically consist of meeting minutes or exchanges of correspondence. Condition remains open.</p> <p>At the fourth surveillance (2027), the client will provide evidence that the long-term objectives and metrics have been formally (explicitly) adopted as a component of the state’s fishery management system (either under a plan, statutes or other document). Condition is closed.</p>
Corrective Action Plan (CAP):	

Non-conformance 2 (of 3)

Corrective Action Plan #2			
Client, in collaboration with State officials, will develop long-term objectives and associated metrics for the components of the commercial shrimp fishery's management system in state waters.			
Milestone	Action	Roles & Responsibilities	Outputs
Year 1 (early 2025)	-Client will initiate discussion with ADCNR staff on developing long-term objectives for the shrimp fishery.	Client Group/ADCNR	-Client will share with the CAB any relevant notes and communications related to the action.
Year 2 (early 2026)	-Client will hold a meeting with ADCNR staff and relevant stakeholders to discuss long-term objectives for the shrimp industry.	Client Group/ADCNR	- Client will share with the CAB any relevant agendas, notes, and communications related to the action.
Year 3 (early 2027)	-Client and ADCNR will formalize long-term objectives and present to appropriate State rule making body(ies).	Client Group/ADCNR	- Client will share with the CAB any relevant agendas, plans, and communications related to the action.
Year 4 (early 2028)	-Client will provide the CAB with evidence that the long-term objectives have been formally adopted.	Client Group/ADCNR	- Client will provide the CAB with evidence that the long-term objectives have been formally adopted.
Letter of Support	Please see the ADCNR letter of support on #NC1		
Assessment Team evaluation of CAP	The Assessment team confirms that further evidence submitted by ASPA Client Group to address the non-conformance is sufficient to close non-conformance #2 with no further specific actions required by the Client. Annual surveillance audits will continue to review any up-dates, changes in circumstances and status as part of the normal audit procedure		
Status:	Open – Corrective Actions in place to be reviewed annually at surveillance audits.		

10.1.3 Non-conformance 3 (of 3)

Non-conformance 3 (of 3)	
Clause:	12.2.5
Non-conformance level:	Minor
Non-conformance:	Guidance for the evidence basis evaluation parameter states that “the availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicators seeking to ensure that the ETP species are protected from adverse impacts” from the UoAs. That means that the level of interaction/impact between the fishery with the smalltooth sawfish and the giant manta ray should be documented to a level in which being able to determine the level of detrimental impacts can be assessed. There is not sufficient evidence (available, quality, nor adequacy) to assess these impacts. Therefore, a minor NC is raised against the pink shrimp UoAs in Florida and Federal waters with regard to the smalltooth sawfish. And, a minor NC is raised against all otter trawl UoAs (all species and all jurisdictions) with regard to the giant manta ray.
Rationale:	The overall lack of information for both species is evident by the very few publications on that documents the interaction between the fishery and sawfish and mantas. There is sporadic information regarding the interactions with sawfish presented in Scott-Denton <i>et al.</i> (2012; 2020). These publications present the number of captures and the animal’s release condition, but does not provide information on location (Gulf or Atlantic), year or any other type of information to indicate the impact of the fishery one the smalltooth sawfish. Carlson (2020) provides a bit more information regarding the interaction of both species with the southeastern shrimp fishery. Yet, due to the high variability within the dataset (and low statistical power), the confidence intervals describing the estimated take and the hypothesized mortality rate are wide ranging (Note: the 2021 Biological Opinion uses the same data presented in Carlson 2020). Additionally, the data presented in Carlson

Non-conformance 3 (of 3)	
	<p>(2020) for giant mantas are from only one year of data in 2019 and those data have low confidence due to the likelihood of recaptures on the same vessel trip (Note: the 2021 Biological Opinion uses the same data presented in Carlson 2020). Data from 2019, coupled with low documented interactions between the fishery and giant mantas in 1992-1994 from Beyea <i>et al.</i> (2022), provide little insight to the overall impact of the fishery on the species.</p> <p>Corrective action may constitute a place of activities that the applicant confirms will be implemented within a specified timeframe in order for the non-conformities to be closed out. The non-conformances must be closed within the lifetime of the certificate. The corrective action should address the following milestones for the smalltooth sawfish and giant manta ray.</p>
Milestones	<p>At the first surveillance audit (Year 2024) the client shall provide evidence of discussions with management authorities (advisory committees, task forces, councils, etc at the appropriate level (state or federal)) on how to improve the available information that the federal observer program collects for ETP species including the smalltooth sawfish and the giant manta ray. The client shall also provide evidence of an agreed plan with defined timelines and outcomes for the implementation of better information practices for the observer program. Condition remains open.</p> <p>At the second surveillance audit (Year 2025) the client shall provide evidence that the plan is being implemented and provide a written update on the outcome of the key steps that have been undertaken in the plan and progress to the agreed upon timeline. Condition remains open.</p> <p>At the third surveillance audit (Year 2026) the client shall provide evidence that data collection to improve the clarity on the impacts of the UoA on the smalltooth sawfish and the giant manta has been initiated. Evidence can be of the form of their inclusion in the federal observer database. Condition remains open.</p> <p>At the fourth surveillance audit (Year 2026) the client shall provide evidence that data collection to improve the clarity on the impacts of the UoA on the smalltooth sawfish and the giant manta has been initiated. Evidence can be of the form of their inclusion in the federal observer database over a multiyear scale. The client shall also provide evidence that these data is not confidential and can be shared with the assessment team and published in subsequent assessments. The client shall also provide these data available to the assessment team. Providing these pieces of evidence shall close the non-conformance for supporting clause 12.2.5, provide that these policies continue in perpetuity. Condition is closed.</p>
Corrective Action Plan (CAP):	

Non-conformance 3 (of 3)
Corrective Action Plan #3

Client will initiate dialogue with NOAA's shrimp observer program coordinator to determine what protected species data from the observer program are available and ensure all data are provided to the assessment team such that it may be published in assessment related reports.

Milestone	Action	Roles & Responsibilities	Outputs
Year 1 (early 2025)	-Client will initiate dialogue with NOAA on protected species data availability and create a plan with defined timelines for obtaining the appropriate protected species observer data on an ongoing basis.	Client Group/NOAA	-Client will share with the CAB any notes/reports from meetings/communications with NOAA on protected species data availability, and a copy of the aforementioned plan.
Year 2 (early 2026)	-Client will verify that protected species data are being collected and are publicly available.	Client Group/NOAA	-Client will share with the CAB evidence that the protected species data are being collected and are publicly available.
Year 3 (early 2027)	- Client will verify that protected species data are being collected and are publicly available.	Client Group/NOAA	-Client will share with the CAB evidence that the protected species data are being collected and are publicly available.
Year 4 (early 2028)	-Client will provide CAB with publicly-available, multi-year observer data on shrimp fishery interactions with smalltooth sawfish and giant manta ray.	Client Group/NOAA	-Client will provide CAB with publicly-available, multi-year observer data on shrimp fishery interactions with smalltooth sawfish and giant manta ray.

Letter of Support

Non-conformance 3 (of 3)



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric
Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149 U.S.A.
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April 17, 2024


Mr. Trey Pearson
Board President
American Shrimp Processors Association
P. O. Box 4867
Biloxi, MS 39535

Dear Mr. Pearson:

We understand that American Shrimp Processors Association (ASPA) is pursuing Responsible Fisheries Management Certification of the Gulf of Mexico shrimp fishery. Having heard substantial concerns from the harvesting sector regarding economic conditions, we see this as a positive step and look forward to working with all sectors of the industry to address challenges affecting the fishery. You may have heard of our "Shrimp Futures" project that we are embarking upon with Gulf States Marine Fisheries Commission (GSMFC) which is a regional program of the NMFS National Seafood Strategy. The goal of Shrimp Futures is to support the development of and realization of a long-term vision for sustainability of the shrimp fishery, and we see the processing sector as a critical component in this. There is an upcoming meeting hosted by GSMFC in Baton Rouge on April 30-May 1, where we will discuss this and we welcome your participation.

In response to your request for information to meet the conditions of the findings of deficiency, particularly Non-conformance #3, we can commit to providing species specific bycatch estimates from the shrimp observer program on smalltooth sawfish and giant manta ray to ASPA in the format of annual reports. We are still finalizing the timing and the format of these reports. In addition, summary data will be available in the Biological Opinion resulting from the ongoing ESA Section 7 consultation.

However, availability, quality and precision of these bycatch estimates and their efficacy as indicators to protect from adverse impacts depend upon adoption of the Gulf of Mexico Fisheries Management Council's (GMFMC) Framework Action to implement a modern, electronic effort data collection or vessel monitoring program. While the process of developing the Biological Opinion is ongoing, representative, fine-scale spatial and temporal effort data will be essential for evaluating, minimizing, and monitoring interactions and for developing mitigation measures. The GMFMC has recently reinitiated work on this action and has committed to an approximate

Non-conformance 3 (of 3)	
	<p>timeline for final action on January 2025, which will then allow NMFS to proceed with rulemaking. We would also recommend that ASPA emphasize the importance of and support for the rapid implementation of a modern electronic effort data collection program to meet the terms, conditions and timeline of the Corrective Action Plan.</p> <p>Thank you for your inquiry and we look forward to working together to address the many challenges that the shrimp fishery faces now and in the future. Please do not hesitate to contact us, directing inquiries to Science Center Director, Clay Porph (clay.porch@noaa.gov), Deputy Director for Science and Council Services, John Walter (john.f.walter@noaa.gov), and SEFSC Liaison Larry Massey (larry.massey@noaa.gov).</p> <p>Sincerely,</p>  <p>John F. Walter, III, Ph.D. SEFSC Deputy Director for Science and Council Services</p> <p>cc: Clay Porph, Andrew Strelcheck, David Gloeckner, Larry Massey, Carrie Simmons, Gulf Council members, Council staff</p>
Assessment Team evaluation of CAP	The Assessment team confirms that further evidence submitted by ASPA Client Group to address the non-conformance is sufficient to close non-conformance #3 with no further specific actions required by the Client. Annual surveillance audits will continue to review any up-dates, changes in circumstances and status as part of the normal audit procedure
Status:	Open – Corrective Actions in place to be reviewed annually at surveillance audits.

10.2 Recommendations

Assessment Teams may also make Recommendations in areas where conformity to the RFM Standard could be improved. While Recommendations do not require Corrective Action Plans, the issues highlighted in these recommendations will be reviewed at subsequent assessment audits.

10.2.1 Recommendation

There were no recommendations from the assessment team.

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NOAA Fisheries – Gulf of Mexico Shrimp Commercial Fishing Permit (Limited Access): <https://www.fisheries.noaa.gov/permit/gulf-mexico-shrimp-commercial-fishing-permit-limited-access>

NOAA Fisheries Seeks Comments on an Application for an Exempted Fishing Permit to Test an Experimental Shrimp Trawl Bycatch Reduction Device in Gulf of Mexico Federal Waters (June 3, 2019):

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Request for Comments: Proposed Designation of Habitat Areas of Particular Concern and Associated Fishing Regulations in Gulf of Mexico Federal Waters (November 15, 2019) <https://www.fisheries.noaa.gov/bulletin/request-comments-proposed-designation-habitat-areas-particular-concern-and-associated-0>

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- Title 22 – Mississippi Department of Marine Resources: Part 2 Rules and Regulations for Shrimping in the State of Mississippi.
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Links

[Federal Fishing Regulations – Gulf of Mexico Fishery Management Council \(gulfcouncil.org\)](https://www.gulfcouncil.org/),

50 CFR 622 [eCFR :: 50 CFR Part 622 Subpart C -- Shrimp Fishery of the Gulf of Mexico](https://www.ecfr.gov/current/title-50/chapter-622/subchapter-C)

All Gulf States utilize Trip Ticket programs to collect harvest information. These are coordinated through the Gulf States Marine Fisheries Commission (GSMFC) FIN program to provide consistency across the Gulf and details can be found at <https://www.gsmfc.org/fin.php>

<https://gulfcouncil.org/fishery-management/implemented-plans/shrimp/>

<https://www.federalregister.gov/d/E9-636/p-221>

https://gulfcouncil.org/Shrimp-Amendment-15-FINAL_508Compliant.pdf

NOAA provides information on species biology and fishery management.

www.fisheries.noaa.gov/species/pink-shrimp

www.fisheries.noaa.gov/species/brown-shrimp

www.fisheries.noaa.gov/species/white-shrimp

FIP audits were conducted in 2019/2020 by a third-party CAB with updates on status against the MSC standard.

<https://fisheryprogress.org/fip-profile/us-texas-shrimp-otter-trawl>

<https://fisheryprogress.org/fip-profile/louisiana-shrimp-otterskimmer-trawl>

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Additional links are provided as footnotes throughout the background and supporting clause sections.

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12 Appendices

12.1 Appendix 1 – External Peer Review

The RFM program requires that reports be subjected to review by reviewers external to the Certification Body. Based on the technical expertise required, a team of Peer Reviewers was selected. Peer Reviewers were asked to focus on specific parts of the assessment depending on their particular areas of expertise but were also asked to provide comments elsewhere where they saw fit to do so. The team of Peer Reviewers for this assessment was made up of:

- Dr. Robert Leaf
- Dr. Wesley Toller

Note. Peer reviewer information has been removed and peer reviews are unattributed in this report.

12.2 Peer reviewer 1

12.2.1 Peer Reviewer 1 General Comments

Peer Reviewer Comments	Assessment Team Response
<p>General Comments</p> <p>Overall, I found the RFM assessment report for the Gulf of Mexico brown, white and pink shrimp fishery to be well-written, comprehensive, and thoroughly referenced. This work is even more commendable for the scope of its assessment – covering 36 individual UOCs spread across five U.S. States. For the most part, I think the team provides a solid evaluation of the Gulf shrimp fishery against the RFM standard. With one major exception (discussed below) and a few minor exceptions (presented in section 2.2.3.1 of my review), I think the team’s conclusions are defensible and well-supported by detailed and logical scoring rationales.</p> <p>I do feel there is one major problem with this fishery assessment: there are no recent stock assessments (SAs) for the target stocks⁶¹⁷. Consequently, information on B_{MSY}, biomass estimates, F_{MSY} and fishing mortality estimates is currently “not available” for these three stocks (also see Stock SMART) and apparently it hasn’t been available for over five years. Here I should highlight that the assessment team properly identifies “the absence of stock assessments in recent years” as a problem in their assessment report (pp. 15, 34). The team notes in their rationale for SC 6.3 that in 2019, an assessment model review found several technical concerns among these three penaeid shrimp SS models (e.g., conflicting indices, convergence issues, and residual patterns), prompting the GMFMC to initiate a Southeast Data, Assessment, and Review (SEDAR) research track process for all three stocks. The team also notes that as of September 2023, there is no indication of when new stock determination criteria will be in place. However, the team does not explain how authorities have managed shrimp stocks in the period since 2019 when stock assessments stopped being available to them. More than five years have passed. How are the stocks being managed today?</p> <p>II. Ramifications</p>	<p>Assessment Team Response:</p> <p>As is pointed out in several SC rationales, the assessment team has concluded that since abundance is driven primarily by environmental conditions, fishing is unlikely to have a significant impact on these shrimp stocks in terms of long-term recruitment dynamics. The primary focus of the harvest strategy is aimed at eliminating small shrimp in the catch to the extent possible. The management measures in place within all 6 jurisdictions act collectively to avoid catching small shrimp and to control fishing mortality overall to ensure sufficient escapement of adults to offshore spawning areas. These measures ensure that the US GoM shrimp fishery does not impair recruitment by reducing reproductive potential and, also allow for efficient harvesting of whatever recruitment that becomes available for each species.</p> <p>All considerations with respect to whether this fishery should be considered data deficient aside, the lack of formal stock assessments for recent years is what triggered use of the DDF in this RFM assessment. Vulnerability scores calculated in the DDF indicate a low potential risk or vulnerability to overfishing, which is consistent with the foregoing conclusion that fishing is unlikely to have a significant impact on these shrimp stocks.</p> <p>Over recent years, all components of the management system and harvest strategy have continued to conduct</p>

⁶¹⁷ This fact is easily confirmed by visiting NOAA Fisheries’ website Stock SMART which shows 2018 was the last year of data for stock assessments of Gulf of Mexico [brown shrimp](#), [white shrimp](#), and [pink shrimp](#).

In my opinion, the absence of recent SAs has negatively impacted the RFM assessment of the Gulf shrimp fisheries in three important ways: 1) time series are now outdated; 2) ambiguity/inconsistency has arisen because of multiple scoring scenarios; and 3) the team used a protocol (PSA) that is designed for data-limited fisheries to score the stock status (SC 6.3) of a data-rich fishery.

1. Outdated time series

Fishery assessment reports are usually supplemented with graphics showing trends in fisheries over a recent span of time (e.g., landings over the last 10 or 20 years). Time series graphs in the Gulf shrimp report stop at a point over five years ago. For example, trends in spawning stock biomass (SSB) over time (Figure 9, 11, 13), fishing mortality rate (F) over time (Figure 10,12, 14), landings over time (Figure 15, 17, 19), and CPUE over time (Figure 16, 18, 20) are all truncated at 2018. This gap makes it difficult or impossible for reviewers/stakeholders to interpret how these fisheries are currently performing relative to established reference points (e.g., SSB_{MSY} , F_{MSY}) or how stocks in 2024 are doing relative to their past levels. As the team notes, targeted stocks of shrimp are short lived and their population abundance is driven primarily by environmental conditions. Yet these same factors could also drive greater year-to-year volatility in stock abundance. I would ask the assessment team to provide more up-to-date information on stock status.

2. Scoring ambiguity/inconsistency

I assume the lack of recent SAs has forced the team to try to accommodate in their scoring two very different fishery management scenarios: Scenario #1 - prior to 2019 when stock assessments were done annually and fishery performance was evaluated relative to well-defined limit and target reference points; Scenario #2 - after 2019 where presumably management has been using a different suite of indices to track fishery performance. It is possible this “two scenarios” problem contributed to the ambiguity/inconsistencies that I observed in scoring rationales for clauses SC 5.1 (stock assessment); SC 6.1 (target reference points); SC 6.2 (limit reference points); and Stock Status (SC 6.3). This should be cleared up. In particular, the report should unambiguously identify relevant limit reference points and the target reference points.

3. PSA and Data Limited Fisheries

The team opted to use a Productivity and Susceptibility Analysis (PSA). To be clear, I do think it was reasonable and appropriate for the team to use PSA to assess the vulnerability of main and minor associated species (e.g., Atlantic croaker, sand/silver seatrout, hardhead and gafftopsail catfishes, etc) for SC 12.2.1 and 12.2.2. I also think it was reasonable and appropriate to include brown, white and pink shrimp as bycatch components in the same directed shrimp fisheries (as per the team’s explanation on p.338) for the purposes of scoring 12.2.1. In both these cases, the usage is, I think, consistent with the intent of the standard setter.

business as usual. The only part that has been missing from the mix is the formal analytical determination of stock status with respect to Blim and FMSY. The assessment team is confident that ongoing management of the fishery has not been compromised by this shortcoming. The management system is clearly sufficiently sophisticated to detect a potential overfished or overfishing situation and respond accordingly even in the absence of an analytical determination.

It is unfortunate that the absence of stock assessment reports over recent years meant that the assessment team did not have access to graphics illustrating updated data time series that these normally provide. However, those available in the last such reports were included in our report to provide relevant historical context. Recent data that were available, such as landings, are included in the relevant text.

We would like to point out that a new US GOM Shrimp stock assessment is carrying out under SEDAR 87⁶¹⁸. A data workshop was held in Tampa, Florida September 18-22, 2023. The assessment process will be conducted via webinars from April – October 2024, and the Review Workshop is slated for June 2025. It is expected that the report will be completed on August 2025.

⁶¹⁸ <https://sedarweb.org/assessments/sedar-87-gulf-of-mexico-white-pink-and-brown-shrimp/>

My concern is with the use of PSA for the purpose of scoring SC 6.3 (stock status). Should PSA be used for a high value stock with a long history of management, a robust system of data collection, and a legacy of properly executed, quantitative stock assessments? My understanding is that the standard setter intends for PSA to be applied to data-limited fisheries (DLFs). Here is one definition of DLF: *“fisheries for which independent status assessments are not practical for some impacted populations, due to a mismatch between the scale of the fishery and the level of data required.” In practice, data-limited fisheries are often small in both volume and value and often conducted with small vessels and crews. As such, they are often unable to support formal, quantitative stock assessments, large, directed research programs, or observer programs. Instead, they are often managed with alternative data sources and rules that are more practical yet may be sufficient for the fishery size and scale.”*

Can it be credibly argued that the Gulf shrimp fishery is a DLF? Perhaps, but not in terms of fishery size, value, or research capacity. NOAA Fisheries identifies Gulf brown, white and pink shrimp as among the most valuable fisheries in the southeastern United States. The assessment report identifies the fishery as having lengthy time series of annual catch and effort data as well as comprehensive research activities that provide the basis for assessment. The SEDAR 87 research track has assembled working papers which underscore the robustness of datasets available for stock assessment purposes. If Gulf shrimp is not data-limited, then it is unclear to me how PSA is justified for assessing Gulf shrimp stock status. I would encourage the team to explain this in the report.

Other Comments:

Table 1 – should identify the PSA methodology that was used.

Introductory section: would be helpful to have an overview of the size of the GOM shrimp fishery in terms of total number of licensed vessels/captains and broken down by state (TX, LA, MS, AL, FL) and fleet segment (inshore vs. offshore).

Table 1 was modified by including an extra row indicating that the RFM Data Deficiency Framework version 2.0 was used

The team included tables and information from Griffith, D. 2023. Social Dimensions of the Gulf of Mexico Shrimp Fishery: Overview. SEDAR87-DW-02. SEDAR, North Charleston, SC.8 pp where it describes the number of shrimping licenses by state throughout 1984-2021 and year 2021
The team could not find information by fleet segment (inshore vs. offshore).

12.2.2 Non-conformances raised (if applicable) – Peer Reviewer 1

Peer Reviewer Comments	Assessment Team Response
Background Section	
Please provide a short commentary on any non-conformances raised and the appropriateness or otherwise of proposed corrective actions. Please refer to both positive and critical aspects discovered during the review (circa. 0.5 page).	No response needed.
See comments in 2.2.4 below.	

12.2.3 Scoring element review – Peer Reviewer 1

Please provide comment as required on each clause or leave blank as appropriate—again here, please refer to both positives and negatives.

12.2.3.1 Section A: The Fisheries Management System

Clause	Peer Reviewer comment	Assessment team response
1. Structured and legally mandated management system		
1.1.	-	No response required
1.2.	EP1, first paragraph: Are mangrove estuaries relevant to the 3 shrimp stocks under assessment?	Mangrove estuaries were mentioned in reference material that inform the description of the coastal (inland) shrimp fishery and were therefore included.
1.2.1.	-	
1.3.	Agree with the team’s determination that this SC is not relevant	No response required.
1.3.1.	Agree with the team’s determination that this SC is not relevant	No response required.
1.4.	Agree with the team’s determination that this SC is not relevant	No response required.
1.4.1	Agree with the team’s determination that this SC is not relevant	No response required.
1.5.	Good	No response required.
1.6.	Viewed narrowly, EP2 does not appear to be met since GOM shrimp fisheries are not currently financed using a cost recovery system. But viewed more broadly, SC1.6 speaks to financing arrangements that are appropriate to the nature of the fishery, possibly aiming for cost recovery. Perhaps the team can explain why the existing financing model – exclusive of cost recovery - is more appropriate for GOM shrimp?	The Standard refers to cost recovery or other system. As described, each of the Gulf states and the Federal government have in place some form of financial management in respect to how their expenditures and revenues are derived and, in some cases, fees charged for services provided. The financial models are typically set out in various regulations, and no two models are necessarily alike.
1.6.1.	Agree with the team’s determination that this SC is not relevant	No response required.
1.7.	I concur with the team’s view that Alabama UOCs #25-30 do not meet EP1 but disagree with their rationale which implies that AL does not meet EP3. It seems to me there is good evidence that AL fishery managers actively update CMMs as needed through e.g. their participation in the GOM Council process.	The State’s active participation in the Council’s shrimp fora normally would lead one to conclude that some level of state continuous review of its shrimp management measures was therefore also routinely undertaken. However, that was not established during the Assessment team’s discussions with State officials.
1.8.	Good	No response required.
1.9.	Agree with the team’s determination that this SC is not relevant.	No response required.
2. Coastal area management frameworks		

Clause	Peer Reviewer comment	Assessment team response
2.1.	-	No response required
2.1.1.	-	No response required
2.1.2.	-	No response required
2.2.	EP1, stakeholder consultation. Does the Council represent the fishing industry in NEPA consultations on proposed coastal activities (e.g., permitting of proposed windfarms, oil and gas development, etc)?	We do not believe the GMFMC represents industry in NEPA consultations. The intension of the eight U.S. regional FMCs are to manage fishery resources in federal waters. This primarily pertains to the creation of Fishery Management Plans in the GoM. However, these FMPs also include Corals and Essential Fish Habitats. As these FMPs are related to habitats, there is potential overlap between the MSA and the NEPA. In these cases, the GMFMC had to ensure that they complied with both the MSA and the NEPA.
2.3.	Rationale adequately addresses conflicts that may arise within the fisheries sector. But it does not address the potential for conflicts between the fishing industry and other coastal resource users. Is there a role here for the Council or NMFS in avoiding/settling such conflicts? What about the NEPA process?	<p>The process for settling conflicts is described in EP1 “The US judicial system at the state and federal levels includes a longstanding court-based mechanism that informs the management regimes for resolving legal disputes that may arise within the system (e.g., judicial challenges, administrative reviews.” This is the forum for which conflicts are resolved both within and outside industry conflicts. An example of that continues with the NEPA example from the previous PR comment comes the Council’s role within their management of EFHs. Taken from “5-Year Review of EFH Requirements” published in 2016: “In 2000, a lawsuit was brought forth by a coalition of environmental groups challenging the identification and description of EFH, the court decided that EFH amendments by several Councils (including the Gulf Council) were found in accordance with the MSA, but in violation of the National Environmental Policy Act (NEPA). NMFS was ordered to complete new and more thorough NEPA analyses for each EFH amendment in question. This resulted in the 2004 EFH Final Environmental Impact Statement (FEIS) (GMFMC 2004).”</p> <p>This demonstrates the use of the U.S. judicial system to resolve disputes between the fishing industry and other coastal resource users. The same structure exists on the state level and would be applied in a similar way.</p>
2.4.	EP2. The rationale describes how fishery regulations are formulated but not how they are effectively disseminated.	Thank you for your comment. Any fishery related information is publicly available on the state and/or Council websites. The links via footnotes provided in the Evidence Basis EP provide an archive list of meeting minutes. Anyone may access this at any time, thus it is considered that the fishery-related information is effective disseminated.
2.5.	-	No response required
2.6.	-	No response required
2.7.	-	No response required.

Clause	Peer Reviewer comment	Assessment team response
3. Management objectives and plan		
3.1.	-	No response required.
3.1.1.	Good. Note: giant manta ray missing from Table 32.	Agreed. Table 32 is amended to include giant manta ray.
3.1.2.	Good summary review of habitats that are highly vulnerable to damage by the UOC's fishing gears.	No response required.
3.1.3.	-	No response required.
3.2.	Agree with the team's determination that this SC is not relevant	No response required.
3.2.1.	-	No response required
3.2.2.	EP2. I concur with the team's view that having "specific" fishing capacity objectives is not needed in the Gulf shrimp fishery given the suite of other measures already in place to monitor fishery performance.	No response required.
3.2.3.	-	No response required.
3.2.4.	Good description of management actions and processes relating to protection of ETP species	No response required.

12.2.3.2 Section B: Science & Stock Assessment Activities, and the Precautionary Approach

Clause	Peer Reviewer comment	Assessment team response
4. Fishery data		
4.1.	-	No response required
4.1.1.	Rationale refers to "annual" stock assessments for GOM brown, pink and white shrimp. But elsewhere the assessment report indicates that the most recent stock assessments were done in 2018 – over 5 years ago. References provided in SC 4.1.1 are also from 2018. Please reconcile the stated "annual" frequency of stock assessments with the observed 5+ year absence of a stock assessment for Gulf brown, white and pink shrimp.	The concern raised here is addressed in the assessment team response to General Comments.
4.1.2.	Agree with the team's determination that this SC is not relevant	No response required.
4.2.	Please expand on why the stated target of 2% observer coverage is judged to be sufficient to meet EP2 requirement for "accurate and useful" data. Note concerns about estimating mortality of smalltooth sawfish from limited numbers of observer records as identified in SC 12.2.4-5 (and also potentially a factor in NOAA's reinitiated ESA Section 7 consultation). Also, might be helpful to cross-reference this SC to the more comprehensive description of the gulf shrimp observer program given in SC 10.1.	The assessment team notes that the at-sea observer coverage referenced here is carried out by NOAA staff who are trained for the purpose to ensure accuracy of the data collected. We are not aware of any formal evaluation of the data's "sufficiency" (not part of the SC wording) per se, the 2% level of coverage clearly provides highly useful data, in particular with regard to bycatch in the shrimp fishery. Furthermore, The team would like to add the following to address Peer Reviewer 1 concerns: NOAA (as issued in their 2003 National Bycatch Strategy) uses coefficient of variation (CV) to justify observer coverage in United States fisheries. Because 100% is not logistically nor economically sustainable (estimated over \$1,000,00 USD to meet sawfish CV

Clause	Peer Reviewer comment	Assessment team response
		<p>goals), there will always inherently be variation in sample collection. In traditional statistics, that variation decreases as a larger proportion of the population is sampled. However, in less variable ecosystems, the sample size (percent observer coverage) required before asymptotic variation is achieved is much lower than in highly variable ecosystems. Instead of reaching target percent-based observer coverage, NOAA strives to achieve coefficient of variation (CV) standards to justify realized percent-based observer coverage. Achieving precision, or lower CV values, indicates that the sampled data (observed harvesting) are more representative of the entirety of the data (all harvesting effort, observed or not). For protected species, including the ETP species considered in this report, the recommended precision goal is a 20-30% CV for estimates of bycatch for each species taken by a fishery. For fishery resources caught as bycatch in a fishery, or the non-protected species, the recommended precision goal is 20-30% CV for estimates of total discards (aggregated over all species) for a fishery; or if total catch cannot be divided into discards and retained catch, then the goal is 20-30% CV for estimates of total catch.</p> <p>The bycatch data presented by Scott-Denton et al. (2012 and 2020) presents CV for the top non-protected bycaught species in the GoM shrimp fishery. All species that exceed an extrapolated weight (i.e., over 100% fishing effort) of 1000 kgs (0.025% of the total catch) had CV values under 0.2 from 2000 to 2016. These values have been used as the justification for not increasing observer coverage in the U.S. GoM shrimp fishery. However, these papers do not present the CV values for protected species and due to the nature of more infrequent occurrence, these values are expected to be higher.</p> <p>NOAA uses a Tier Classification System (TCS) to evaluate bycatch observer programs. This system is used to determine the quality of data obtained within a specific fishery. Each fishery is scored on a scale from 0 to 72 and placed into tiers from zero to four where the description of tiers can be found on the table below. The GoM shrimp fishery is classified as Tier 3 as of 2015 (and was classified as Tier 2 in 2005). The reasoning for this tier was described as “A complete sampling frame with representative spatial and temporal coverage, as well as implementation of a random or probability-based sampling scheme yielded an improved score for this fishery. Data quality control and database/IT</p>

Clause	Peer Reviewer comment	Assessment team response												
		<p>considerations also improved during the 10-year period.”</p> <p>The GoM shrimp fishery does not have the most data-rich observer program, however the data collected is both robust and reliable enough to serve the needs of the fishery.</p> <p>Tier descriptions for the Tier Classification System (TCS) as described by Benaka <i>et al.</i> (2021).</p> <table border="1"> <thead> <tr> <th>Tier number</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>Bycatch estimates are based on reliable observer program data collected on an annual basis for at least the past five years, with partial or complete sampling frames and negligible or non-existent program design deficiencies</td> </tr> <tr> <td>3</td> <td>Observer program data were collected over the past five years, although not necessarily on an annual basis, and sampling frames were either partial or incomplete</td> </tr> <tr> <td>2</td> <td>Bycatch estimates typically were based on inconsistent or unreliable information (e.g., self-reported logbooks), but current or recent observer data may have been available for some of these fisheries</td> </tr> <tr> <td>1</td> <td>Observer data were not available or have not been collected during the past 10 years, or serious deficiencies or limitations in the design of the observer program were identified</td> </tr> <tr> <td>0</td> <td>Bycatch data collection programs have not been implemented</td> </tr> </tbody> </table>	Tier number	Description	4	Bycatch estimates are based on reliable observer program data collected on an annual basis for at least the past five years, with partial or complete sampling frames and negligible or non-existent program design deficiencies	3	Observer program data were collected over the past five years, although not necessarily on an annual basis, and sampling frames were either partial or incomplete	2	Bycatch estimates typically were based on inconsistent or unreliable information (e.g., self-reported logbooks), but current or recent observer data may have been available for some of these fisheries	1	Observer data were not available or have not been collected during the past 10 years, or serious deficiencies or limitations in the design of the observer program were identified	0	Bycatch data collection programs have not been implemented
Tier number	Description													
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0	Bycatch data collection programs have not been implemented													
4.2.1.	See comment on SC 4.2	See response on SC 4.2												
4.3.	-	No response required												
4.4.	Not relevant? If GOM shrimp are harvested for direct human consumption, then SC 4.4 should be scored as “relevant” to the assessment. For example, current research might support policies relating to handling and product quality, optimizing value, utilizing byproducts, etc.	Given that all of the GoM shrimp harvest goes to human consumption, there is no need to “stimulate the research required to support policies related to fish as food”, per the supporting clause wording, which we consider to be about promotion of fish as food rather than some non-food use. The examples suggested are simply refinements to the use of shrimp as food.												
4.5.	-	No response required												
4.6.	-	No response required												
4.7.	Agree with the team’s determination that this SC is not relevant	No response required.												
4.8.	Agree with the team’s determination that this SC is not relevant	Ditto.												
4.9.	Agree with the team’s determination that this SC is not relevant	Ditto.												
4.10.	Agree with the team’s determination that this SC is not relevant	Ditto.												
4.11.	Agree with the team’s determination that this SC is not relevant	Ditto.												
5. Stock assessment														
5.1.	EP1. Confirm statement about the “importance of mangrove estuaries as nursery habitats for shrimp” as this seems at odds with descriptions of inshore habitat utilization given elsewhere in the report.	The importance of mangrove estuaries as nursery habitat for shrimp has been a given for a very long time. It is unclear how this statement may seem at odds with any description of inshore habitat utilization elsewhere in the report. There is ample description in the report of the progression from nursery to inshore to near shore to offshore habitat utilization over the course of the life cycles of the shrimps under consideration. Further, the point is irrelevant to the “institutional framework for research” being evaluated in this SC.												

Clause	Peer Reviewer comment	Assessment team response
5.1.1.	Agree with the team’s determination that this SC is not relevant	No response required.
5.1.2.	-	No response required
5.2.	-	No response required
5.3.	Agree with the team’s determination that this SC is not relevant	Ditto.
5.4.	Agree with the team’s determination that this SC is not relevant	Ditto.
5.5.	-	No response required
6. Biological reference points and harvest control rule		
6.1.	<p>EP2. Para 2. “(F in excess of Maximum Fishing Mortality Threshold, i.e., F_{MSY}.)” Should this be “rate of fishing mortality at maximum sustainable yield”? Or is “maximum fishing mortality threshold” an equivalent term?</p> <p>EP2, para 5 “Although no target reference point as such (per supporting clause wording) has been established for these shrimp stocks, the approach to managing them is consistent with achieving MSY.” If F_{MSY} is not a target reference point, then why present it in the rationale for SC 6.1?</p> <p>EP2, para. 5 “The primary focus of the harvest strategy is aimed at eliminating small shrimp in the catch to the extent possible.” An escapement goal? Is escapement a proxy for a target reference point?</p> <p>“As of September 2023, there is no indication of when new stock determination criteria will be in place.” What criteria have been used since 2018?</p>	<p>Yes, Maximum Fishing Mortality Threshold is equivalent to the rate of fishing mortality at MSY.</p> <p>Maximum Fishing Mortality Threshold (F_{MSY}) is part of the FMP described in the 6.1 rationale.</p> <p>No small shrimp escapement goal per se is identified in the shrimp FMP. Collectively, management measures are intended to eliminate catching small shrimp so that catches are considered to be consistent with achieving MSY.</p> <p>See response to General Comments.</p>
6.2.	<p>EP1 does not identify a “scientifically based limit reference point” for each stock, or?</p> <p>EP2, identifies F_{MSY} as a “trigger” if exceeded for 2 years. Was F_{MSY} scored as the LRP? EP2 paragraph 1 equates MSST to B_{lim}. Is MSST (and/or B_{lim}) currently the limit reference point? Please provide more detail on how shrimp stocks have performed relative to LRP(s) in recent years.</p>	<p>It is unclear what the “or?” re EP1 is referring to.</p> <p>F_{MSY} is the “overfishing” trigger, whereas B_{lim} is the “overfished” trigger. Either one is intended to trigger a management response.</p> <p>In the absence of formal assessments, it is unknown how shrimp stocks have performed relative to B_{lim} in recent years.</p>
6.3.	<p>EP1, paragraph 1, “...[US GOM penaeid shrimp stocks] are assessed to determine F in relation to F_{MSY} and SSB in relation to B_{lim}.” This is consistent with descriptions in the Introductory section of the report (Sections 6.4-6.5) But it seems at odds with the rationale for SC 6.1 which does not identify F_{MSY} as the TRP and the rationale for SC 6.2 which does not identify B_{lim} as the LRP. Please clarify whether they are currently used as reference points for GOM shrimp or not.</p>	<p>The response to 6.2 comment should clarify that F_{MSY} and B_{lim} are in place as reference points in the FMP for GoM shrimp stocks. However, in the absence of formal assessments, they have not been applied as such in recent years.</p> <p>See response to General Comments.</p>

Clause	Peer Reviewer comment	Assessment team response
	EP2 “As of September 2023, there is no indication of when new stock determination criteria will be in place.” What criteria are being used in the interim?	
6.4.	EP2, paragraph 1, “Specifics of a management response to one of these shrimp stocks being in overfished/overfishing status have not been defined.” This statement seems to be at odds with team’s overall conclusion that management actions are agreed in advance about the appropriate management response if reference points are approached/exceeded.	What has been agreed in advance, per the FMP, is that management action is required if overfished or overfishing status is determined.
6.5.	-	No response required
7. Precautionary approach		
7.1.	-	No response required
7.1.1.	-	No response required
7.1.2.	Disagree with the team’s determination that SC 7.1.2 is not relevant. Surely some aspects of Gulf shrimp fishery management could be improved with better information. I think the question is: would research be triggered if/when such needs are identified? Perhaps check the list of research priorities compiled by NMFS and the Council every 5 years. Also note ongoing work by the NOAA Gear Monitoring Group on BRDs and TEDs as cited in SC 8.12. And SEDAR 87 as cited in SC 6.1.	In the context of the wording of this SC, the assessment team considers that there clearly is “adequate” scientific information on which to base management of the GoM shrimp fishery. We do not consider that “adequate” is meant to apply to ongoing research aimed at refinements to specific management measures but rather to fisheries for which there is too little information to properly support management.
7.2.	Agree with the team’s determination that this SC is not relevant	No response required.

12.2.3.3 Section C: Management Measures, Implementation, Monitoring, and Control

Clause	Peer Reviewer comment	Assessment team response
8. Management measures		
8.1.	-	No response required
8.1.1.	-	No response required
8.1.2.	-	No response required
8.2.	-	No response required
8.3.	-	No response required
8.4.	-	No response required
8.4.1.	-	No response required
8.5.	-	No response required
8.5.1.	-	No response required
8.6.	Uncertain about the team’s determination that SC 8.5.1 is not relevant. Perhaps better to score 8.5.1 and provide a rationale explaining that there are no applicable regulatory requirements for marking the UOCs’ shrimp otter trawls/skimmer/butterfly nets because these are mobile gears with high value and they are lost only very infrequently.	Note that the comment refers to SC 8.5.1 but 8.6 was intended. The assessment team considers that gear loss is a non-issue in the fishery, hence the absence of gear marking requirements, and this is justification for this supporting clause being irrelevant.
8.7.	-	
8.8.	Disagree with the team’s determination that SC 8.8 is not relevant. The clause should be scored and evidence provided at EP3 to support the team’s conclusion that	Based on consistent feedback at site visit meetings across the 6 jurisdictions involved, the assessment team is satisfied that gear loss is a non-issue in the

Clause	Peer Reviewer comment	Assessment team response
	“Gear loss is so infrequent it is a non-issue in this fishery.”	GoM shrimp fishery, which justifies this supporting clause being irrelevant.
8.9.	-	No response required
8.10.	Agree with the team’s determination that this SC is not relevant	No response required.
8.11.	-	No response required
8.12.	-	No response required
8.13.	Agree with the team’s determination that this SC is not relevant	Ditto.
9. Appropriate standards of fishers’ competence		
9.1.	-	No response required.
9.2.	-	No response required.
9.3.	-	No response required.
10. Effective legal and administrative framework		
10.1.	Good	No response required.
10.2.	-	No response required.
10.3.	Agree with the team’s determination that this SC is not relevant	No response required.
10.3.1.	Agree with the team’s determination that this SC is not relevant	No response required.
10.4.	Agree with the team’s determination that this SC is not relevant	No response required.
10.4.1.	Agree with the team’s determination that this SC is not relevant	No response required.
11. Framework for sanctions		
11.1.	A good descriptive and quantitative summary of recent enforcement activities relating to the Gulf shrimp fishery.	No response required.
11.2.	Good. But the first sentence in EP1 should refer to SC 11.1, not 11.2.	Agreed. Correction made.
11.3.	Uncertain about the team’s determination that SC 11.3 is not relevant. Perhaps better to score 11.3 and cite the absence of IUU fishing within the US EEZ as further evidence for the effectiveness of existing sanctions and enforcement?	The Assessment team’s conclusion that SC 11.3 is not relevant is consistent with the team’s evaluation of another U.S. fishery assessment using the RFM Standard. Our approach does not materially impact the scoring of the SC and is, therefore, best left as is.
11.4.	Agree with the team’s determination that this SC is not relevant	No response required.

12.2.3.4 Section D: Serious Impacts of the Fishery on the Ecosystem

Clause	Peer Reviewer comment	Assessment team response
12. Impacts of the fishery on the ecosystem		
12.1.	The rationale for SC 12.1 explains that robust environmental data sets are available, but it doesn’t say how such data sets are used to assess environmental impacts on the target stocks. This is a bit surprising given that Gulf shrimp “abundance is driven primarily by environmental conditions [and] fishing is unlikely to have a significant impact on these shrimp stocks in terms of long-term recruitment dynamics” (SC 6.1).	Thank you for pointing that out. The assessment team has added a section that shows the specific use of environmental data to determine the impacts on the shrimp species in the GoM.

Clause	Peer Reviewer comment	Assessment team response
12.2.	I note that there is no requirement to score SC 12.2 because it has no associated EPs. Nonetheless, the team has used this section to give a detailed account of how main and minor species were identified for the purposes of scoring SC 12.2.1 and 12.2.2. To me, this seems to be a logical way to use SC 12.2. I found your inclusion of this section to be very helpful.	Thank you for your detailed comment on this Supporting Clause. Despite not being a non-scoring clause, the support of the approach used provide reassurance to the assessment team that the information provided is appropriate.
12.2.1.	Good analysis	Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.
12.2.2.	Good analysis	Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.
12.2.3.	EP2, re BRD development: Historically there were concerns about levels of bycatch of juvenile red snapper in the shrimp fishery (e.g. Shrimp FMP Amendment 9). Although your analysis of bycatch in recent observer datasets indicates that <i>L. campechanus</i> is not taken in large enough quantities to warrant designation as a minor associated species (per RFM guidance), it still seems relevant to discuss red snapper bycatch at least as an historic factor in the development of BRDs.	Thank you for addressing this issue of Red Snapper in the GoM shrimp fishery. While the assessment team recognizes the historical interaction and significant impact that the fishery has had on the red snapper, but due to the evolution of gear practices in this fishery, the red snapper is no longer impacted to the same extent. The assessment team feels that because the data used in this assessment goes back 10+ years and red snapper only appears in the otter trawl data with a maximum occurrence of 0.3% (in a given dataset), the effects on this species do not warrant consideration. The assessment team feels it is most useful and efficient to highlight the effects on the main and minor associated species which are currently being impacted by the fishery.
12.2.4.	Good analysis. EP1, Bottlenose Dolphin, para.3: “As the removal from the collective GOM shrimp fishery are estimated to be around 10% of the PBR for each stock, <u>it is unlikely that the UoAs are within PBR limits.</u> ” Please clarify: are UoAs <u>outside</u> PBR limits? Does any one shrimp UoA exceed the PBR limit for a GOM bottlenose dolphin stock? If so, which UoA?	Thank you for addressing this contradiction. The mistake has been fixed to ensure clarity. The statement now reads, “As the removal from the collective GOM shrimp fishery are estimated to be around 10% of the PBR for each stock, it is highly likely that the UoAs are within PBR limits.” To answer your question, none of the PBRs are exceeded for any stock of bottlenose dolphins. Here, we do not assess each individual UoA as there are multiple UoAs that impact a single dolphin stock and some UoAs impact multiple dolphin stocks. Instead we assess the collective effort of the UoAs as they impact each individual dolphin stock. The collective impacts of the UoAs do not exceed any singular dolphin stock PBR and only two dolphin stocks exceed the threshold for insignificant mortality (10% PBR). In those cases, the impact on the Northern Continental Shelf (NSC) stock is 11.5% PBR and the Western Coastal (WC) stock is 19% PBR. While insignificant mortality is surpassed in both these cases, the impact from the entirety of the GoM shrimp fishery is still well within the PBR limits.

Clause	Peer Reviewer comment	Assessment team response
12.2.5.	Good to identify NOAA's reinitiation of ESA Section 7 consultation of Gulf shrimp fishery impacts on giant manta ray and smalltooth sawfish. Agree that the RFM assessment should proceed rather than wait for conclusion of the consultation. But there is potential for consultation outcomes to impact on the fisheries' continued compliance with RFM scheme requirements for ETP species management. I would encourage the assessment team to formulate a recommendation (e.g., using report Section 10.2) to ensure that relevant outcomes of ESA consultation are reviewed during the first surveillance audit.	<p>The assessment team agrees with your statement on the reinitiation of the ESA Section 7 consultation. However, the assessment team does not feel the need to formulate a recommendation because this report is assessing the fishery as it stands currently. As it stands currently, there are no deficiencies as it related to the RFM standard, therefore the need for a recommendation is not needed. The assessment team is very much aware of the need to review the revised ESA Section 7 consultation at the first surveillance audit and only included this in the current report to ensure the reader and the client were aware of potential changes that can arise during the surveillance process.</p> <p>The assessment team feels that there is currently a lack of evidence available, which is why the assessment team opened an NC against the Evidence Basis EP for this SC. The ESA Section 7 consultation will provide more evidence to reevaluate the Process and Current Status EPs at the next surveillance audit.</p>
12.2.6.	-	No response required.
12.2.7.	Good analysis.	Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.
12.2.8.	-	No response required.
12.2.9.	-	No response required.
12.2.10	EP2: "dedicated outcome indicator(s) are not considered to be strictly necessary." Considered by whom - the Council or the assessment team?	Thank you for your question. The assessment team feels that the outcome indicators are not strictly necessary because the three shrimp species are not considered to be key prey species. Scientific literature and respective management do not consider these species to be key prey species, thus the assessment team concluded that, for this reason, the outcome indicators are not strictly necessary.
12.2.11	-	No response required
12.3.	SC 12.3, EP1: "The role of brown, white, and pink shrimp stocks in the food web has been adequately considered. These three stocks are [not?] considered to be key prey species in the GOM food web." Compare to conclusions in SC 12.3 EP2, SC 12.2.10 and SC 12.3 that shrimp are <u>not</u> key prey species. Are shrimp key prey species or not? Please be clear and consistent.	Thank you for noting this mistake. It was a typo to omit 'not', as you have identified. The sentence has been restructured to ensure clarity and create uniformity across other SCs.
12.4.	Key prey species - see above comment on SC 12.3	The document has been checked for similar typos. These shrimp species are not key prey in the GoM.
12.5.	-	No response required
12.6.	BRDs: Perhaps mention the early work on reduction of red snapper bycatch (e.g. Amendment 9 of Shrimp FMP)? Also see my comment on SC 12.2.3	Assessment team has the same response to the comment made on SC 12.2.3.
12.7.	-	No response required

12.2.4 Conclusion – Peer Reviewer 1

Peer Reviewer Comments	Assessment Team Response
<p>General Comments</p> <p>I find it difficult to support the overall conclusion of the assessment team (which is to recommend the certification of 36 UOAs from the Gulf of Mexico shrimp fisheries) until the team has responded to my concerns as detailed in Section 2.2.1 and deriving from the absence of recent stock assessments for GOM brown, white and pink shrimp.</p> <p>With respect to non-conformities raised, I believe the three findings are appropriate, and I believe the associated corrective action plans are likely to address the identified issues within the timeframe specified.</p> <p>In addition, I would encourage the assessment team to raise a “recommendation” with respect to ETP species management (SC 12.2.5) in order to ensure there is a detailed review at the first surveillance audit of relevant outcomes from NOAA’s reinitiation ESA Section 7 consultation for giant manta ray and smalltooth sawfish.</p> <ul style="list-style-type: none"> ▪ 	<p>Assessment team response:</p> <p>With respect to the first point raised here, the concerns detailed in Section 2.2.1 (General Comments) have been addressed in that section.</p> <p>Assessment team response from SC 12.25: <i>The assessment team agrees with your statement on the reinitiation of the ESA Section 7 consultation. However, the assessment team does not feel the need to formulate a recommendation because this report is assessing the fishery as it stands currently. As it stands currently, there are no deficiencies as it related to the RFM standard, therefore the need for a recommendation is not needed. The assessment team is very much aware of the need to review the revised ESA Section 7 consultation at the first surveillance audit and only included this in the current report to ensure the reader and the client were aware of potential changes that can arise during the surveillance process.</i></p>

12.3 Peer Reviewer 2

12.3.1 General comments – Peer Reviewer 2

Peer Reviewer Comments	Assessment Team Response
<p>General Comments</p> <p>The assessment team for the U.S. Gulf of Mexico shrimp fishery deserves high commendation for their exemplary work. The report was not only clear and easy to read but also thoroughly documented all the critical aspects of the fishery in alignment with the four major components of responsible management derived from the FAO Code of Conduct for Responsible Fisheries (1995) and the Guidelines for the Eco-labelling of products from marine capture fisheries (2009). These components include the Fisheries Management System, Science and Stock Assessment Activities utilizing the Precautionary Approach, Management Measures with Implementation, Monitoring, and Control, as well as the Serious Impacts of the Fishery on the Ecosystem. The comprehensiveness of the assessment was evident, encompassing a desktop review of a wide array of relevant documentary information such as the latest fishery assessment and stock evaluation reports, Council publications, scientific research, ecosystem status reports, fishery management plans and amendments, regulatory changes, enforcement statistics, environmental impact statements, marine mammal stock assessments, and strategic plans. The thorough process also involved substantive meetings with key representatives from Texas Parks and Wildlife, Louisiana Department of Wildlife and Fisheries, Mississippi Department of Marine Resources, Alabama Department of Conservation and Natural Resources Fisheries, Florida Fish and Wildlife Conservation, and the Gulf of Mexico Fishery Management Council (GMFMC). This collaborative effort ensured a robust and well-rounded evaluation, reflecting the team's dedication and expertise in fisheries management.</p> <p>I am in agreement with the conclusions reached in the assessment document.</p>	<p>No response needed.</p>

12.3.2 Non-conformances raised (if applicable) – Peer Reviewer 2

Peer Reviewer Comments	Assessment Team Response
<p>Background Section</p> <p>I agree with the assessment team's identification of three minor non-conformances in the U.S. Gulf of Mexico shrimp fishery. The first non-conformance pertains to Alabama's fishery-specific management system, where procedures must be in place to continuously review and revise current conservation and management measures based on new information. This issue, which has been present since the first surveillance, highlights the need for Alabama to establish objectives and metrics to inform its continuous review process for the commercial shrimp fishery management system. The second non-conformance, also related to Alabama, requires long-term management objectives to be translated into a formal plan subscribed to by all interested parties.</p>	<p>No response needed</p>

The assessment team confirmed that the evidence submitted by the ASPA Client Group is sufficient to close this non-conformance, with ongoing annual surveillance audits to monitor updates and changes. The third non-conformance addresses the need for adequate evidence to assess the impact of the fishery on ETP species, specifically the smalltooth sawfish and the giant manta ray. There is currently insufficient evidence to determine the level of detrimental impacts on these species. Consequently, a minor non-conformance is raised against the pink shrimp UoAs in Florida and Federal waters for the smalltooth sawfish, and against all otter trawl UoAs for the giant manta ray. All non-conformances are considered minor, and I fully agree with the assessment team's findings.

12.3.3 Scoring element review – Peer Reviewer 2

Please provide comment as required on each clause or leave blank as appropriate—again here, please refer to both positives and negatives.

12.3.3.1 Section A: The Fisheries Management System

Clause	Peer Reviewer comment	Assessment team response
1. Structured and legally mandated management system		
1.1.	The clause 1.1, which mandates an effective legal and administrative framework at international, state, and local levels for fishery resource conservation and management, is well-supported, and the evaluation terms are met. The federal agencies, including NOAA, GSMFC, and the Gulf of Mexico Fisheries Management Council, oversee and maintain various legislations that ensure compliance with international, state, and local laws and regulations. These legislations include the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA), Marine Mammal Protection Act of 1972 (MMPA), Shore Protection Act of 1988 (SPA), Sustainable Fisheries Act of 1996 (SFA), Coastal Zone Management Act of 1972 (CZMA), Endangered Species Act of 1973 (ESA), National Environmental Policy Act (NEPA) of 1970, Fish and Wildlife Coordination Act (FWCA) of 1934, Lacey Act (LA) of 1900, and National Marine Sanctuaries Act (NMSA) of 1972. These regulations collectively ensure that the fisheries management system operates within the legal frameworks designed to protect fishery resources and the environment. The ESA, for instance, provides stringent measures for protecting threatened and endangered species, while NEPA ensures environmental considerations are factored into decision-making processes. Furthermore, federal-state interjurisdictional cooperation, as laid out in the	No response required.

Clause	Peer Reviewer comment	Assessment team response
	<p>Interjurisdictional Fisheries Act (IJFA) and Sec. 306 of the Magnuson-Stevens Act, underscores the collaborative management of fisheries in federal waters, reinforcing the robust governance structure for the U.S. Gulf of Mexico shrimp fishery.</p>	
1.2.	<p>Clause 1.2, which requires management measures to consider stock status, genetic diversity, and other biological characteristics of fish stocks, is well evidenced and meets the requirements. The assessment team comprehensively documented the extensive shrimp research conducted by NOAA's Southeast Fisheries Science Center (SEFSC). The SEFSC has been conducting shrimp research for decades, thoroughly understanding the life cycle, movements, growth, survival, and ecology of all life-history stages of the three shrimp species. Historical studies from the 1960s highlighted the crucial role of mangrove estuaries as nursery habitats, while research from the late 1990s improved the understanding of how salinity and temperature affect shrimp growth and survival. Recent studies have provided insights into the behavior and migration of larvae and juvenile shrimp. NOAA's annual Shrimp/Groundfish Surveys in summer and fall further bolster the understanding of shrimp stock status. These surveys monitor the size and distribution of penaeid shrimp, evaluate the "Texas Closure" management measure of the GMFMC's Shrimp FMP, and provide comprehensive data on shrimp and groundfish stocks from inshore waters to depths of 60 fathoms. The SEAMAP Information System includes biological and environmental data from all Gulf surveys. State agencies also conduct robust monitoring and research. For instance, Texas Parks and Wildlife Department's Coastal Fisheries Division uses a variety of assessment tools to characterize the commercial shrimp resource in state waters, supplemented by special studies for informed management decisions. Louisiana Department of Wildlife and Fisheries biologists conduct monthly surveys using standardized trawling procedures to monitor shrimp growth, distribution, and abundance. Mississippi's Department of Marine Resources Marine Fisheries Program manages living marine resources through research and data collection. Alabama's Fisheries Assessment and Monitoring Program (FAMP) conducts fishery-independent sampling, while Florida's Fish and Wildlife Conservation Commission collects both fishery-dependent and fishery-independent data to review stock trends and status annually. These comprehensive research efforts and monitoring programs ensure that managers have a thorough understanding of stock</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
	<p>structure and composition, contributing to stock resilience and stability. The preservation of genetic diversity and avoidance of localized depletions are critical objectives, achieved through demographic independence considerations and scientifically informed management recommendations. This holistic approach underscores the effectiveness of the management measures in place.</p>	
1.2.1.	<p>Supporting Clause 1.2.1, which requires previously agreed management measures established and applied in the same region to be taken into account, is well supported. I agree with the assessment team's process and conclusions. There is a robust process or system that ensures the continuity and updating of previously agreed and implemented management measures. This includes a specific review process or management plan where these measures are clearly identified, allowing for continued implementation and updates. Federal and state management measures for the Gulf of Mexico's commercial shrimp fisheries are updated as necessary based on statutory requirements, new information, recommendations from various entities, and decisions by legislative bodies. The management systems for the commercial shrimp fisheries managed by the Gulf-based agencies are defined by various sources, including statutes, formal management plans, policies and standards, fishery-specific objectives, and mandatory monitoring and review obligations. All Gulf management agencies operationalize their fishery management systems through amendments to measures, regulations, policies, and administrative provisions. Some management measures apply Gulf-wide across all Units of Assessment (UoAs) such as data collection and reporting, stock assessment, and mandatory Turtle Excluder Devices (TEDs), while others are state-specific, such as the Texas closure, Alabama seasonal openings, and harvester and dealer licensing. The evidence is compelling that the availability and adequacy of the evidence is sufficient to substantiate that previously agreed management measures established and applied in the same region are indeed taken into account by management. This high level of confidence and comprehensive evidence supports a high overall score for this clause. The ongoing review and update processes ensure that management measures remain effective and relevant, reflecting the dynamic nature of the fishery and its management environment.</p>	No response required.
1.3.	Not Relevant and not addressed in the report.	No response required
1.3.1.	Not Relevant and not addressed in the report.	No response required
1.4.	Not Relevant and not addressed in the report.	No response required

Clause	Peer Reviewer comment	Assessment team response
1.4.1	Not Relevant and not addressed in the report.	No response required
1.5.	<p>Supporting Clause 1.5, which requires that the fishery management system actively foster cooperation between states regarding information gathering and exchange, fisheries research, fisheries management, and fisheries development, is well met and supported by sufficient evidence. The five Gulf of Mexico (GOM) states are legally empowered through administrative codes, statutes, or specific legal instruments to introduce and enforce resource management, resource policy, and enforcement measures for the GOM commercial shrimp fishery in their respective jurisdictions. The measures enacted result from processes that incorporate scientific and technical studies, legal oversight, stakeholder and public engagement, and legislative authorization. State representation at the Gulf of Mexico Fishery Management Council (GMFMC) level ensures state participation in federal fishery management decision-making and promotes the development of compatible approaches and regulations in both state and federal waters. All key federal and state management agencies engage in planning activities that produce multi-year strategic plans, reflecting their priorities for fisheries research (including fish stocks, habitat protection, ecological, and climate change), development, and enforcement while also identifying new initiatives to strengthen their respective governance and operational frameworks. The evidence provided, including that for Supporting Clauses 1.1 and 1.2, is sufficient to substantiate that both the federal and state fishery management systems foster active inter-jurisdictional and inter-agency cooperation on fishery matters regarding information gathering and exchange, fisheries research, fisheries management, and fisheries development. This comprehensive cooperation ensures effective management and sustainability of the GOM commercial shrimp fishery. There is high confidence and high correspondence to this.</p>	No response required
1.6.	<p>Supporting Clause 1.6, which stipulates that fishery management organizations and regional arrangements should agree on the means of financing their activities, is effectively met. Federal and Gulf of Mexico states responsible for managing the region's fisheries have the financial resources to operationalize their management activities, as documented by the assessment team and client or agency representatives. Each state's financial means are well-documented. Currently, fishery management organizations and arrangements are financed using a cost recovery or other system. Both federal and state fishery</p>	No response required

Clause	Peer Reviewer comment	Assessment team response
	<p>management agencies in the Gulf of Mexico are funded by Congress and/or State Legislatures, with additional funding sources including trust funds, revenue sharing arrangements, and fees for services and goods. Moreover, NOAA in Alaska has a formal cost recovery system in place for the Pacific Halibut and Sablefish commercial fisheries. The evidence supports the conclusion that there is agreement on the means by which the activities of these organizations are financed, with efforts aimed at recovering the costs of fisheries conservation, management, and research. This is corroborated by data showing expenditure and cost recovery derived from fisheries management activities. Overall, the evidence provided substantiates that there is agreement on the means of financing for the principal federal and state agencies involved in fishery management in the Gulf of Mexico.</p>	
1.6.1.	Not Relevant and not addressed in the report.	
1.7.	<p>Supporting Clause 1.7, which mandates procedures to continuously review and revise conservation and management measures within the fishery management system, is effectively met. Both federal and state fishery management agencies in the Gulf of Mexico have established procedures to review their management measures, as evidenced by detailed information provided for each Gulf state and the federal government. These procedures cover all aspects of management measures, including sustainable exploitation of target stocks, mitigation of negative impacts on non-target species, and protection of Endangered, Threatened, Protected (ETP) species and the physical environment. The management processes of the North Pacific Fishery Management Council (NPFMC) for federal waters and the Alaska Board of Fisheries (BOF) for state waters also allow for continuous review of conservation and management measures, clearly documented as relevant to key management measures for the fishery under assessment. All federal and state agencies involved in the Gulf of Mexico Shrimp Fishery Assessment regularly review their fishery management systems, engaging in discussions and analysis of program performance through regional committees, sub-committees, and other groups of the Gulf of Mexico Fishery Management Council (GMFMC) and the Gulf States Marine Fisheries Commission (GSMFC). The evidence substantiates that procedures are in place to continuously review the efficacy of current conservation and management measures, with mechanisms for revision or abolition in light of new information. This comprehensive approach ensures</p>	<p>The Assessment team did not find documentary evidence that Alabama’s shrimp fishery conservation and management measures were continuously reviewed and updated as required by SC 1.7. A non-conformance was raised as a result</p>

Clause	Peer Reviewer comment	Assessment team response
	adaptive management practices, enhancing the sustainability of the Gulf of Mexico shrimp fishery.	
1.8.	Supporting Clause 1.8, which mandates that the management arrangements and decision-making processes for the fishery be organized transparently, is effectively met. Both federal and Gulf states' management agencies have well-defined and progressive internal and external communications strategies that inform their decision-making processes, ensuring transparency. NOAA Fisheries collaborates with federal agencies and federally-recognized tribes to advise and collaborate on activities impacting endangered and threatened species, marine mammals, and important marine habitats, demonstrating a commitment to transparency in decision-making. The Gulf of Mexico Fishery Management Council (GMFMC) outlines its consultation process with stakeholders and the public in its Statement of Organization, Practices, and Procedures, allowing interested parties to present oral or written statements regarding agenda matters and respond to new information used in decision-making. State agencies similarly hold open meetings mandated by state laws, allowing stakeholder groups and the public to engage transparently in decision-making processes. The decision-making processes of both federal and Gulf states' management agencies are statutory-based, ensuring transparency in all facets of rule-making undertakings, including public and stakeholder engagement, recordkeeping, oversight, voting and accountability, publication, and enactment. The evidence provided substantiates that the management arrangements and decision-making processes for the fishery are organized transparently, enhancing accountability and stakeholder trust in the management of the fishery.	No response required
1.9.	Not Relevant and not addressed in the report.	No response needed
2. Coastal area management frameworks		
2.1.	The detailed report thoroughly addresses Supporting Clause 2.1, demonstrating that an appropriate policy, legal, and institutional framework exists within the fisheries management organization's jurisdiction to achieve sustainable and integrated use of living marine resources. This framework considers the fragility of coastal ecosystems, the finite nature of natural resources, and recognizes the rights, needs, and customary practices of coastal communities, while ensuring compatibility with sustainable development. The integrated management mechanism assesses possible uses of coastal resources, governs access, and sets policies for coastal area management, accounting for environmental, socio-economic aspects, and	Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.

Clause	Peer Reviewer comment	Assessment team response
	<p>stakeholder interests. The existing framework includes federal consistency, coastal zone enhancement, nonpoint pollution control, and coastal and estuarine land conservation, which together ensure a comprehensive approach to managing coastal resources. Thus, the evidence indicates that the current status is appropriate, warranting a high overall score.</p>	
2.1.1.	<p>The detailed report effectively addresses Supporting Clause 2.1.1, demonstrating that mechanisms for cooperation and coordination in the planning, development, conservation, and management of coastal areas are well-established. The Gulf of Mexico Fishery Management Council (GMFMC) exemplifies such a mechanism, bringing together state, federal, industry, and at-large entities to prepare fishery management plans based on scientific advice and public input. This council facilitates cooperation between neighboring states and federal jurisdictions, ensuring coordinated coastal resource management. Evidence includes records of agreements and collaborations from international forums and the National Coastal Zone Management Program (CZMP), which promotes federal consistency, coastal zone enhancement, nonpoint pollution control, and coastal and estuarine land conservation. The adequacy and quality of this evidence substantiate the effectiveness of these cooperative mechanisms, resulting in an appropriately high overall score for full performance.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>
2.1.2.	<p>The detailed report thoroughly addresses Supporting Clause 2.1.2, demonstrating that the fisheries management organization ensures that the authorities representing the fisheries sector and fishing communities have the necessary technical capacities and financial resources for effective coastal management. The federal government and all five states have received adequate funding to implement the required technical capacities, as evidenced by documentation provided to the assessment team from each jurisdiction. The availability, quality, and adequacy of the evidence, including reports, data, staff operations, and financial budgets, confirm that these capacities and resources are in place and sufficient. Consequently, the current status is deemed appropriate and effective, justifying a high overall score for full performance.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>
2.2.	<p>The detailed report effectively addresses Supporting Clause 2.2, showing that representatives of the fisheries sector and fishing communities are actively consulted in decision-making processes related to coastal area management planning and development. Federal and state management agencies in the Gulf of</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>Mexico (GOM) demonstrate a commitment to accountability and transparency, supported by statutes, agency mandates, operations guidelines, and strategic plans. The Gulf of Mexico Fishery Management Council (GMFMC) involves a broad range of stakeholders in its committees and advisory bodies, ensuring access to first-hand information. Additionally, the public and other affected parties are kept informed and participate in the management process, as evidenced by public records of consultations and documentation available online or through public meetings. This comprehensive involvement and consultation process justify the high overall score for full performance.</p>	
2.3.	<p>The detailed report thoroughly addresses Supporting Clause 2.3, confirming that fisheries practices are in place to avoid conflicts among fishers and other coastal area users, such as those involved in fisheries enhancement, tourism, and energy. The US judicial system at both state and federal levels provides a robust court-based mechanism for resolving disputes transparently and effectively, ensuring legal disputes are settled publicly. The assessment team found no evidence of federal-state legal disputes regarding the management system for Gulf of Mexico shrimp fisheries since at least 2010, highlighting the effectiveness of cooperative and consensus-driven decision-making processes. Additionally, established procedures and mechanisms efficiently resolve conflicts within the fisheries sector and between fisheries resource users and other coastal users, as evidenced by laws and regulations such as the Magnuson-Stevens Fishery Conservation and Management Act and various state codes. This comprehensive approach justifies the high overall score for full performance.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>
2.4.	<p>The detailed report effectively addresses Supporting Clause 2.4, demonstrating that fisheries management organizations at the state, sub-regional, and regional levels in the Gulf of Mexico give due publicity to conservation and management measures. These organizations ensure that laws, regulations, and other legal rules governing their implementation are effectively disseminated. Public consultation is integral to the decision-making process, with all relevant documents, presentations, and meeting minutes made publicly accessible. Federal and state statutes, such as the Magnuson-Stevens Fishery Conservation and Management Act, along with state codes from Texas, Louisiana, Mississippi, Alabama, and Florida, provide a comprehensive framework for management objectives. This framework includes conservation, resource management, environmental management, ecosystem</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>management, species protection, enforcement, and strategic planning. The availability and quality of the evidence, including strategic plans, annual reports, and internal audits, substantiate that the purposes and bases of management measures are well explained to resource users, facilitating their application and garnering support for implementation. Consequently, the overall score is appropriately high, justifying full performance.</p>	
2.5.	<p>The detailed report effectively addresses Supporting Clause 2.5, demonstrating that the economic, social, and cultural value of coastal resources is comprehensively assessed by the appropriate fisheries management organizations to inform decision-making on their allocation and use. US marine fisheries are managed under the guidelines of the Magnuson-Stevens Fishery Conservation and Management Act, which mandates adherence to ten National Standards that ensure sustainable and responsible fishery management. These standards encompass optimum yield, scientific information, management units, fair allocations, efficiency, variations and contingencies, cost-benefit analysis, community impact, bycatch reduction, and safety at sea. This framework ensures that socio-economic and cultural values are integrated into fishery management plans, plan amendments, and regulations, facilitating informed decision-making. The assessment team confirms the presence of socio-economic and cultural value assessments, which effectively assist in resource allocation decisions, supported by sufficient and high-quality evidence, thus justifying a high overall score for full performance.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>
2.6.	<p>The detailed report effectively addresses Supporting Clause 2.6, demonstrating that states cooperate to support and improve coastal area management by establishing and promoting systems for research and monitoring of the coastal environment and multidisciplinary research. State resource management agencies prioritize coastal management, and there is ample evidence of formal reporting to stakeholders and the public about the fishery’s performance and management actions at both federal and state levels. NOAA’s Office for Coastal Management facilitates participation from all coastal states and territories, each with its own Coastal Management Program, including those in Texas, Louisiana, Mississippi, Alabama, and Florida. These programs ensure that research and monitoring systems consider physical, chemical, biological, economic, social, legal, and institutional factors to support effective coastal area management. The evidence confirms that these</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>systems are comprehensive and effectively implemented, justifying a high overall score for full performance.</p>	
2.7.	<p>The detailed report effectively addresses Supporting Clause 2.7, demonstrating that states provide timely information and, if possible, prior notification to potentially affected states regarding activities that may have adverse environmental effects on coastal areas. The federal Coastal Zone Management Act (CZMA) of 1972 fosters a partnership between the federal government and coastal states, promoting cooperation, including coordination with NOAA. All Gulf states have Coastal Management Programs that facilitate cooperation when necessary. NOAA’s Gulf of Mexico Regional Collaboration Team further strengthens communication, coordination, and collaboration among NOAA and its partners at regional and sub-regional levels. A notable example of this cooperation is the response to the Deepwater Horizon Oil Spill, where the Gulf Coast Ecosystem Restoration Council (GCERC) was established under the RESTORE Act to manage civil settlements and oversee ecosystem restoration across affected states. The GCERC's comprehensive plans and annual reports illustrate continued collaboration and the effective sharing of information and resources. The quality and adequacy of the evidence provided substantiate that states engage in timely information sharing and consultation in cases of potential adverse environmental impacts, thereby warranting a high score for full performance.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>
3. Management objectives and plan		
3.1.	<p>The review effectively addresses Supporting Clause 3.1, demonstrating that long-term management objectives have been translated into management plans and documents subscribed to by all relevant parties. The Gulf of Mexico (GOM) Shrimp fishery's initial Fishery Management Plan (FMP) from 1981 includes long-term objectives such as optimizing yield, protecting habitats, coordinating with state management programs, promoting consistency with environmental acts, minimizing bycatch, and resolving conflicts among fishers. U.S. marine fisheries, governed by the Magnuson-Stevens Fishery Conservation and Management Act, adhere to ten national standards ensuring sustainable and responsible management. Additionally, state-specific plans and regulations, such as Texas's Administrative Code, Louisiana's Fishery Management Plan, and similar frameworks in Mississippi, Alabama, and Florida, align with these objectives. This comprehensive approach ensures that the objectives are consistent with sustainable resource</p>	<p>No response required</p>

Clause	Peer Reviewer comment	Assessment team response
	use and are supported by all fishery stakeholders, thereby warranting a high score for full performance.	
3.1.1.	The assessment confirms that Supporting Clause 3.1.1 is effectively addressed, ensuring the protection of ETP (Endangered, Threatened, and Protected) species from adverse impacts resulting from interactions with fisheries and enhancement activities. Both federal and state fishery management agencies in the Gulf region have established programs and processes to identify, assess, regulate, and enforce the protection of ETP species. These efforts are guided by statutory mandates such as the Endangered Species Acts and other relevant legislation. Each state, including Texas, Louisiana, Mississippi, Alabama, and Florida, has specific provisions and mechanisms in place to protect ETP species, aligning with overarching objectives to conserve biodiversity and prevent irreversible impacts. Clear management objectives outlined in legislation, regulations, and management plans seek to mitigate adverse impacts on ETP species, ensuring their long-term conservation. This comprehensive approach, supported by legal frameworks and specific management measures, warrants a high score for full performance.	No response required
3.1.2.	The assessment confirms that Supporting Clause 3.1.2 is effectively addressed, ensuring the protection of essential habitats and vulnerable marine ecosystems (VMEs) from the impacts of fishing activities, particularly those employing bottom-contact gear. Both federal and state fishery management agencies in the Gulf region have established mechanisms to identify essential habitats and VMEs, assessing their vulnerability to fishing activities. These efforts are guided by detailed descriptions of benthic habitats, fishing effort distributions, and the characteristics of vulnerable ecosystems like seagrass beds and coral reefs. Management objectives, outlined in regulations and management plans, seek to avoid, minimize, or mitigate negative impacts on these habitats, reflecting a comprehensive approach to habitat conservation. Additionally, recent management actions, such as the establishment of Habitat Areas of Particular Concern (HAPC) to protect deep-sea corals, demonstrate ongoing efforts to address emerging conservation priorities. The robust evidence provided supports a high score for full performance across all federal and state agencies involved.	No response required
3.1.3.	The assessment confirms that Supporting Clause 3.1.3 is effectively addressed, ensuring the minimization of adverse impacts of the certified fishery, including fishery enhancement activities, on the structure,	No response required

Clause	Peer Reviewer comment	Assessment team response
	<p>processes, and function of aquatic ecosystems within the Gulf of Mexico. By employing comprehensive ecosystem models like Atlantis and considering the complex biophysical characteristics of the Gulf, management objectives are established to minimize irreversible or very slowly reversible impacts. These objectives are embedded within overarching fisheries legislation, regulations, and management plans, reflecting a commitment to ecosystem-based management. Additionally, the practice of shrimp harvesters to share "hang locations" data underscores proactive efforts to avoid detrimental impacts on important and vulnerable marine habitats. The evidence provided supports a high score for full performance across all federal and state agencies involved, ensuring the preservation of the Gulf's ecological integrity.</p>	
3.2.		
3.2.1.	<p>The assessment confirms that Supporting Clause 3.2.1 is effectively met, ensuring that excess fishing capacity is avoided and the exploitation of shrimp stocks in the Gulf of Mexico remains economically viable. While specific fishing capacity objectives are not in place, the absence of excessive fishing capacity is supported by robust management measures implemented across federal and state jurisdictions. Licensing programs regulate fishery access, and there is a commitment to monitor and manage fish populations to maintain sustainability. The latest fishery assessment indicates that the shrimp resource is not overfished, and compliance with regulations is relatively high, contributing to the fishery's economic viability. Stakeholder input underscores the challenges faced by harvesters but affirms that fishing efforts remain sustainable, aligning with the objectives of the certification process.</p>	No response required
3.2.2.	<p>The assessment confirms that Supporting Clause 3.2.2 is effectively met, ensuring that the economic conditions under which fishing industries operate in the Gulf of Mexico promote responsible fisheries. While specific fishing capacity objectives are not in place, robust management measures are implemented across federal and state jurisdictions to maintain the fishery's economic viability. Stakeholder input indicates that despite challenges such as declining ex-vessel prices and increased operating costs, there is no evidence of excessive fishing efforts aimed at maximizing catches and revenues. Furthermore, recent fishery assessments have concluded that shrimp stocks are not overfished, and compliance with regulations remains relatively</p>	No response required

Clause	Peer Reviewer comment	Assessment team response
	high, supporting the sustainability of the fishery and its economic conditions.	
3.2.3.	The assessment affirms that Supporting Clause 3.2.3 is effectively met, ensuring that the interests of fishers engaged in subsistence, small-scale, and artisanal fisheries are duly considered in the Gulf of Mexico fisheries management framework. Across federal and state jurisdictions, comprehensive stakeholder engagement processes are established, facilitating the inclusion of diverse perspectives in the development of management measures. Key organizations such as the Gulf of Mexico Fishery Management Council (GMFMC) and state-level agencies like the Texas Department of Parks and Wildlife (TPWD) ensure representation and participation from small-scale fishers. Importantly, there is no evidence indicating adverse impacts on small-scale fisheries resulting from current management measures, underscoring the appropriateness and effectiveness of the inclusive approach to fisheries management in the region.	No response required
3.2.4.	The assessment confirms that Supporting Clause 3.2.4 is effectively fulfilled, ensuring the conservation of biodiversity in aquatic ecosystems and the protection of Ecologically or Technologically Significant (ETP) species in the Gulf of Mexico (GOM). Robust management measures, underpinned by federal statutes like the Endangered Species Act and the Marine Mammal Protection Act, are instrumental in safeguarding ETP species throughout their habitat range. The presence of legislation and regulations at both federal and state levels, coupled with proactive measures such as the mandatory installation of Bycatch Reduction Devices (BRDs) and Turtle Excluder Devices (TEDs), reflects a comprehensive approach to mitigate the fishery's impact on ETP species. Moreover, the implementation of marine sanctuaries and rigorous monitoring through catch reporting and at-sea observer coverage further underscores the commitment to conservation efforts. As a result, there is no evidence indicating significant adverse impacts on aquatic ecosystems or risks of extinction for ETP species, affirming the appropriateness and effectiveness of the current management strategies across all agencies in the GOM.	No response required

12.3.3.2 Section B: Science & Stock Assessment Activities, and the Precautionary Approach

Clause	Peer Reviewer comment	Assessment team response
4. Fishery data		
4.1.	<p>The evaluation of Supporting Clause 4.1 demonstrates a robust and comprehensive approach to managing the fishery removals and mortality of target species in the US Gulf of Mexico (GOM) fishery. Each jurisdiction, including federal waters and the five states involved, employs thorough annual monitoring programs to collect reliable and accurate data on retained catch, bycatch, and discards across directed shrimp fisheries. This includes extensive fishery-dependent and fishery-independent data collection efforts, such as NOAA's Shrimp/Groundfish Surveys, trawl surveys conducted by state agencies like TPWD, LDWF, MDMR, ADCNR, and the Florida Fish and Wildlife Commission, and mandatory reporting programs like the Trip Ticket Program. These initiatives are complemented by environmental monitoring efforts that provide valuable insights into ecosystem dynamics and their interactions with the fishery. The availability of such comprehensive data allows for the effective assessment of stock status, trends, and impacts on ecosystems, enabling informed management decisions. Moreover, the dissemination of this information to relevant fishery management authorities ensures transparency and collaboration in managing the fishery resources. Overall, the data collection system exhibits a high level of appropriateness and effectiveness, meeting the requirements outlined in Supporting Clause 4.1 and contributing to the sustainable management of the GOM fishery.</p>	No response required.
4.1.1.	<p>The assessment of Supporting Clause 4.1.1 indicates a robust system for the production, maintenance, update, and verification of statistical data on catch and fishing effort in the US Gulf of Mexico fishery, aligning with international standards and practices. NOAA's Southeast Fisheries Science Center (SFSC) plays a pivotal role in conducting shrimp research, utilizing mandatory reporting programs such as the Trip Ticket Program and electronic logbooks to gather comprehensive data on catch, effort, and fishing locations. This information is meticulously compiled and subjected to rigorous statistical analysis in each annual stock assessment, contributing to informed fisheries management decisions. Moreover, research results serve as a basis for setting management objectives, reference points, and performance criteria, ensuring the adoption of scientific advice in the fisheries management process. The integration of scientific research into management practices reflects a</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
	<p>commitment to sustainable fisheries conservation and development. Overall, the evidence supports the timely, complete, and reliable compilation of statistics, promoting sound statistical analysis for stock assessment and facilitating effective fisheries management in accordance with international standards.</p>	
4.1.2.	<p>Not Relevant for this fishery.</p>	<p>Not relevant.</p>
4.2.	<p>The evaluation of Supporting Clause 4.2 confirms the establishment of an observer scheme designed to collect accurate data for research purposes and to support compliance with applicable fishery management measures in the US Gulf of Mexico fishery. While there are alternative methods for data collection, including electronic logbooks and mandatory trip reports, the at-sea observer program plays a crucial role in providing detailed information on catch, effort, and fishing location. The program ensures comprehensive coverage through periodic surveys aiming for a 2% level of coverage, contributing to a robust understanding of the fishery's dynamics. The collected data are considered accurate and useful, facilitating informed decision-making in fisheries management. Overall, the evidence supports the effectiveness and appropriateness of the observer scheme in fulfilling its objectives, aligning with international standards for data collection and compliance enforcement.</p>	<p>No response required.</p>
4.2.1.	<p>The assessment team's finding aligns with the acknowledgment of high support for Supporting Clause 4.2.1, emphasizing the importance of achieving a level and scope of observer programs sufficient to provide quantitative estimates of total catch, discards, and incidental takes of living aquatic resources. The evidence underscores the effectiveness of existing monitoring programs conducted by NOAA and the five State jurisdictions in the US Gulf of Mexico shrimp fisheries, as outlined in Supporting Clauses 4.1, 4.1.1, and 4.2. These programs provide a robust basis for quantitative estimates through data collected by observer programs, which are regularly updated and utilized alongside other fishery-related information in the annual stock assessments. The data obtained from observer programs are considered accurate and valuable, facilitating informed decision-making in fisheries management. The evidence demonstrates that the observer program is well-established and capable of providing quantitative estimates essential for assessing the status of living aquatic resources in the Gulf of Mexico. Overall, the assessment affirms full</p>	<p>No response required.</p>

Clause	Peer Reviewer comment	Assessment team response
	conformance with the clause, indicating a high level of confidence in the effectiveness and appropriateness of the observer program in fulfilling its objectives and supporting fisheries management efforts.	
4.3.	The assessment team's determination of high support for Supporting Clause 4.3 underscores the robust system in place within fisheries management organizations and regional bodies for compiling and distributing data while adhering to confidentiality requirements. Policies and procedures at both federal and state levels are outlined to safeguard the confidentiality of submitted and collected data, ensuring that only authorized users have access to confidential information for official duties. NOAA administrative order 216-100 delineates comprehensive protocols for protecting identifiable data, mandating aggregation to shield individual identities before public release. Additionally, Fisheries Management Councils are tasked with establishing procedures to ensure data confidentiality, with states applying their own confidentiality laws and regulations where applicable. Notably, cooperation agreements among states and federal agencies affirm their commitment to maintaining data confidentiality in alignment with legislative mandates such as the Magnuson-Stevens Fishery Conservation and Management Act of 1996. This evidence substantiates the effectiveness and appropriateness of the mechanisms in place to uphold confidentiality while facilitating timely data distribution to stakeholders. Overall, the assessment indicates full conformance with the clause, reflecting a high level of confidence in the adherence to confidentiality requirements within the fisheries management framework.	No team response required.
4.4.	Not relevant - this is a fishery that targets shrimp for human consumption.	Not relevant.
4.5.	The assessment team's recognition of high support for Supporting Clause 4.5 underscores the comprehensive understanding of the economic, social, marketing, and institutional dynamics within the fisheries domain. Mandates such as the MSA's National Standard 8 emphasize the significance of considering fishery resources in the context of fishing communities, aiming to sustain their participation while mitigating adverse economic impacts. Notably, federal and state agencies, along with industry organizations, actively promote research into seafood utilization, guided by regulatory bodies like the FDA, USDA, and NIH. Moreover, forums like the GSMFC facilitate stakeholder engagement, enabling diverse voices to contribute to fishery resource management discussions. The evidence	No response required.

Clause	Peer Reviewer comment	Assessment team response
	<p>presented highlights extensive knowledge acquisition through dedicated research efforts, with annual data collection and analysis serving as pillars for ongoing monitoring, analysis, and policy formulation. This robust system ensures that sufficient data on economic, social, marketing, and institutional aspects are generated and utilized to inform strategic decision-making processes. Overall, the assessment indicates full conformance with the clause, reflecting a high level of confidence in the effectiveness and appropriateness of the mechanisms in place to understand and address multifaceted dimensions within fisheries management.</p>	
4.6.	<p>The assessment team's determination of full conformance with Supporting Clause 4.6 is strongly supported by the evidence provided, indicating a thorough investigation and documentation of traditional fisheries knowledge and technologies, especially concerning small-scale fisheries. The US Gulf of Mexico shrimp fishery, despite being a well-developed and large-scale operation, has successfully integrated traditional fisher knowledge into its management practices over many decades. Additionally, records demonstrate the documentation of small-scale fisher practices, aligning with mandates such as Executive Order 12898, which emphasizes the inclusion and consideration of populations relying on fishery resources, including indigenous communities. NOAA's economic and socio-cultural research, as outlined in Supporting Clause 4.5, underscores its commitment to engaging with diverse stakeholders, including federally-recognized tribes, in co-management agreements and consultations. This collaborative approach ensures that traditional knowledge and technologies are thoroughly examined and leveraged for sustainable fisheries conservation, management, and development. The evidence presented confirms the effectiveness and appropriateness of the fisheries management organization's efforts in this regard, resulting in a high level of confidence in the conformance of the clause.</p>	No response required.
4.7.	<p>Supporting Clause 4.7 is deemed not relevant in the context of the U.S. Gulf of Mexico shrimp fishery. This determination arises from the fact that the fishery is fully managed by the Gulf of Mexico Fisheries Management Council (GMFMC) and the Gulf States Marine Fisheries Commission (GSMFC), with no requirement for shared stock research between multiple states.</p>	Not relevant.
4.8.	<p>Supporting Clause 4.8 is considered not relevant to the U.S. Gulf of Mexico shrimp fishery. This determination stems from several factors. Firstly, the fishery is fully</p>	Ditto.

Clause	Peer Reviewer comment	Assessment team response
	<p>managed by the Gulf of Mexico Fisheries Management Council (GMFMC) and the Gulf States Marine Fisheries Commission (GSMFC), eliminating the necessity for shared stock research between multiple states. Additionally, the U.S. Gulf of Mexico shrimp fishery does not operate in the high seas.</p>	
4.9.	<p>Supporting Clause 4.9 is deemed not relevant to the U.S. Gulf of Mexico shrimp fishery certification. This determination arises from the fact that this clause is applicable only when the certified unit involves a transboundary, shared, straddling, highly migratory, or high seas stock, which is exploited by one or more developing states.</p>	Ditto.
4.10.	<p>Supporting Clause 4.10 is considered not relevant to the certification of the U.S. Gulf of Mexico shrimp fishery. This determination is based on the fact that this clause does not apply to fully developed fisheries, as defined by the Food and Agriculture Organization (FAO).</p>	Ditto.
4.11.	<p>Supporting Clause 4.11 is deemed not relevant to the certification assessment of the U.S. Gulf of Mexico shrimp fishery. This determination arises from the fact that this clause applies in situations where the fishery operates within a developing region or small island region and where the management of the resource is conducted through an international organization. Given that developing countries do not participate in the U.S. Gulf of Mexico shrimp fisheries, this clause does not apply in this context. Therefore, it is considered not relevant to the certification assessment.</p>	Ditto.
5. Stock assessment		
5.1.	<p>The assessment team's finding of high support for Supporting Clause 5.1 is well-founded, as evidenced by the comprehensive institutional framework established for fishery management purposes in the U.S. Gulf of Mexico shrimp fishery. This framework, overseen primarily by NOAA's Southeast Fisheries Science Center (SEFSC), conducts extensive research covering various aspects of shrimp biology, ecology, and population dynamics. NOAA's Shrimp/Groundfish Surveys, conducted annually, provide critical data on the abundance and distribution of demersal organisms, including shrimp, contributing to the assessment of stock status. Additionally, each of the five Gulf States conducts surveys to monitor shrimp growth, distribution, and abundance within their respective waters, complementing federal efforts. The assessment process involves the utilization of stock synthesis-based models and empirical dynamic models, with ongoing</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
	<p>peer review and consideration of new assessment methodologies to ensure technical appropriateness. Furthermore, fishery-dependent and fishery-independent monitoring programs are continually updated and reviewed to support stock assessments. The evidence provided demonstrates a robust institutional framework for applied research, contributing to effective fishery management practices in the U.S. Gulf of Mexico shrimp fishery.</p>	
5.1.1.	<p>The assessment indicates that less elaborate stock assessment methods are commonly utilized for small-scale or low-value capture fisheries, leading to increased uncertainty about stock status. However, there is evidence to support the application of precautionary approaches, such as lower exploitation rates, in managing these fisheries, aligning with the requirements outlined in Supporting Clause 5.1.1.</p>	No response required.
5.1.2.	<p>The assessment indicates strong support for the establishment of an appropriate institutional framework for conducting comprehensive research into all aspects of the US Gulf of Mexico shrimp fisheries. This includes biology, ecology, technology, environmental science, economics, and aquaculture, with findings being disseminated effectively to contribute to fisheries conservation, management, and development.</p>	No response required.
5.2.	<p>The assessment team's findings indicate strong support for the establishment of research capacity necessary to assess and monitor various aspects crucial to the management of the US Gulf of Mexico shrimp stocks. This includes evaluating the effects of climate or other environmental change on stocks and aquatic ecosystems, monitoring the status of the stock under State jurisdiction, and assessing the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration. The Gulf of Mexico Fisheries Management Council (GMFMC) and the Gulf States Marine Fisheries Commission (GSMFC), in collaboration with NOAA, play significant roles in establishing and maintaining this research capacity. Their efforts, along with the comprehensive research activities conducted by NOAA's Southeast Fisheries Science Center, demonstrate a robust system in place to address these critical aspects of fisheries management effectively.</p>	No response required.
5.3.	<p>The assessment team found that there is a lack of relevance regarding the requirement for management organizations to cooperate with relevant international organizations to encourage research for optimum</p>	<p>Consistent with the first sentence, the assessment team determined that SC 5.3 is not relevant because the US GOM shrimp fishery is managed entirely by US Federal and State agencies who conduct all the</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>utilization of fishery resources, as the U.S. Gulf of Mexico shrimp fishery is managed solely by U.S. Federal and State agencies conducting all necessary research internally. Consequently, the evaluation parameter assessing cooperation or interaction between international organizations to ensure optimal resource utilization was not met. While evidence of such cooperation or interaction may exist, it does not apply to the management of the U.S. GOM shrimp fishery. Therefore, this clause does not align with the current management context, resulting in a critical non-conformance.</p>	<p>necessary research to ensure optimum utilization of these resources. Therefore, the concluding sentence re a critical non-conformance is incorrect.</p>
5.4.	<p>Clause 5.4 mandates fishery management organizations to develop collaborative research programs for transboundary, shared, straddling, highly migratory, and high seas stocks. However, this clause is not applicable to the U.S. Gulf of Mexico shrimp fishery due to its independent management within respective Exclusive Economic Zones (EEZs). Therefore, its relevance is deemed not applicable, and evaluation parameters are not met.</p>	<p>The assessment team determined that SC 5.4 it is not relevant. Therefore, the suggestion in the concluding sentence that evaluation parameters are not met is unnecessary and incorrect.</p>
5.5.	<p>I agree with the assessment team's score of high and their conformance level as "Full". Clause 5.5 requires that data generated by research be analyzed and published while respecting confidentiality when appropriate. The evaluation found that there is a process in place to ensure the analysis of research data and respect for confidentiality.</p>	<p>No response required.</p>
6. Biological reference points and harvest control rule		
6.1.	<p>The evaluation of Supporting Clause 6.1 found it to be relevant. The Magnuson-Stevens Act, which governs marine fisheries sustainability, ensures the prevention of overfishing and the rebuilding of overfished stocks. While annual catch limits (ACLs) and accountability measures (AMs) are not mandated for Penaeid shrimp due to their annual lifecycles, other biological reference points such as SDC, MSY, OY, ABC, and an ABC control rule are estimated. SDCs have been established for US GOM penaeid shrimp, triggering responses if overfishing or overfished status persists for two consecutive years. Although no specific target reference point has been set, the management approach aligns with achieving MSY. Measures are in place to ensure sustainable harvesting without impairing recruitment, and efforts are ongoing to enhance assessment models, including considering empirical dynamic models (EDMs) for future assessments. The evidence supports that target reference points have been established and are consistent with sustainable management objectives.</p>	<p>No response required.</p>

Clause	Peer Reviewer comment	Assessment team response
6.2.	<p>The assessment of Supporting Clause 6.2 found it to be relevant. The Magnuson-Stevens Act mandates the prevention of overfishing and the rebuilding of overfished stocks, requiring fisheries managers to quantitatively define "overfishing" and "overfished" for managed species. While annual catch limits (ACLs) and accountability measures (AMs) are not mandated for Penaeid shrimp due to their annual lifecycles, other biological reference points such as SDC, MSY, OY, ABC, and an ABC control rule are estimated. SDCs are in place for US GOM penaeid shrimp, triggering responses if overfishing or overfished status persists. Fishing pressure is managed to avoid impairing recruitment, focusing on eliminating small shrimp from the catch and ensuring sufficient escapement of adults for spawning. The evidence supports that safe limit reference points for exploitation have been established, consistent with avoiding recruitment overfishing or other impacts, and measures are in place to ensure these limits are not exceeded. The narrative provided by the assessment team was clear and well-articulated.</p>	No response required.
6.3.	<p>The assessment of Supporting Clause 6.3 indicates that robust data and assessment procedures are in place for the fishery, ensuring that the position of the fishery in relation to the reference points is accurately measured. Comprehensive fishery-dependent and fishery-independent data collection programs are operational across all six jurisdictions involved in managing the US Gulf of Mexico penaeid shrimp stocks. These programs facilitate the assessment of fishing mortality (F) in relation to the Maximum Fishing Mortality Threshold (FMSY) and spawning stock biomass (SSB) in relation to the Minimum Spawning Stock Threshold (Blim).</p> <p>The evidence suggests that the current stock status, in relation to the established reference points, determines the level of fishing permitted. The fishery management process ensures that the fishing level is appropriate, maintaining the future availability of fishery resources while considering potential long-term changes in productivity due to natural variability or other impacts besides fishing. While the stocks are not required to have annual catch limits (ACLs) or accountability measures (AMs) due to their unique life history, other biological reference points such as Status Determination Criteria (SDC), Maximum Sustainable Yield (MSY), Optimum Yield (OY), Acceptable Biological Catch (ABC), and an ABC control rule are estimated.</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
	<p>Despite the absence of a specific target reference point, the management approach is aligned with achieving MSY, considering the dynamic nature of the shrimp resource and the ecosystem shifts affecting recruitment. The primary focus of the harvest strategy is to avoid catching small shrimp and control overall fishing mortality to ensure sufficient escapement of adults for spawning. Moreover, ongoing efforts, such as the consideration of new assessment models like Empirical Dynamic Models (EDMs) and the initiation of a Southeast Data, Assessment, and Review (SEDAR) research track process, demonstrate a commitment to enhancing assessment procedures for better management outcomes.</p> <p>Overall, the available evidence supports the conclusion that the data and assessment procedures for the fishery are robust, allowing for an accurate evaluation of the fishery's position in relation to reference points and ensuring sustainable management practices.</p>	
6.4.	<p>The assessment of Supporting Clause 6.4 indicates that appropriate management actions are in place to address the eventuality of exceeding reference points, ensuring a well-formulated response approach. In the event that data sources and analyses indicate that target or limit reference points have been exceeded, agreed-upon management actions, as directed by the harvest control rule or framework, are immediately implemented. This includes reducing or halting fishing activities as necessary to maintain or restore the stock to acceptable and safe biological levels, thereby avoiding overfishing or overfished status. The harvest control rule proves effective in guiding these actions, particularly in response to triggers such as overfishing persisting for two consecutive years or spawning stock biomass falling below the Minimum Spawning Stock Threshold. While specifics of the management response to overfished or overfishing status have not been fully defined, the existing measures in place, described in supporting clause 8.1, collectively aim to control fishing mortality and ensure sufficient escapement of adults for spawning, thereby safeguarding recruitment and the long-term sustainability of the US Gulf of Mexico shrimp fishery. Overall, the evidence indicates that the management actions are appropriate and well-formulated, with contingency plans agreed upon in advance based on the best available scientific evidence, ensuring a proactive approach to addressing serious threats to the fishery resource.</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
6.5.	<p>The assessment of Supporting Clause 6.5 underscores the appropriateness of the management actions and the well-formulated response approach in identifying and protecting depleted stocks, resources, and habitats, while facilitating their sustained recovery or restoration. Efforts are directed towards identifying depleted or adversely impacted stocks, resources, and habitats, with particular attention to stocks that have been overfished or have their status below the limit reference point, impairing their ability to recover. The evidence indicates that where such stocks, resources, and habitats have been identified, concerted efforts have been made to ensure their restoration or recovery, ideally within a two-generations timeframe. This proactive approach is exemplified by the implementation of measures such as the State of Alaska's management within the stock of concern framework for underperforming salmon stocks. Moreover, conservation activities conducted by NOAA fisheries, including the protection of essential fish habitats and the mitigation of damage, further contribute to the wellbeing of these stocks and their associated ecosystems. Overall, the evidence substantiates that appropriate measures are introduced to safeguard depleted stocks and facilitate their recovery, alongside efforts to restore impacted resources and habitats critical to the wellbeing of the fishery resource.</p>	No response required.
7. Precautionary approach		
7.1.	<p>The assessment team's recognition of high support and full conformance for Fundamental Clause 7 and its supporting clause 7.1 reflects the appropriateness of the management actions and the well-formulated response approach in applying the precautionary approach (PA) to the conservation, management, and exploitation of ecosystems within the US Gulf of Mexico shrimp fishery. The application of the PA principle is deeply ingrained within US law and management frameworks, emphasizing the use of the best available information for science-based stock assessments and the recommendation of new or amended management measures, including those aimed at mitigating the impacts of fisheries on habitats and ecosystems. This commitment is evident in decisions made by both the Council and the Commission, showcasing a robust collaboration and cooperation among member agencies across all jurisdictions. Furthermore, the practical application of the PA aligns with FAO guidelines, advocating for a comprehensive management process that includes data collection, monitoring, research, enforcement,</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
	<p>and review. The emphasis on the identification of desirable and undesirable reference points, the implementation of measures to avoid undesirable outcomes, and the consideration of relevant uncertainties through risk management methods exemplifies a proactive and forward-thinking approach to resource management. Additionally, the flexibility and adaptability of management measures across different states within the Gulf region, tailored to specific ecological nuances and local fishing practices, further underscore the effectiveness of the response approach in ensuring the sustainable exploitation and preservation of the ecosystem. Overall, the evidence provided substantiates the appropriateness of the management actions and the efficacy of the response approach in upholding the precautionary principle within the US Gulf of Mexico shrimp fishery.</p>	
7.1.1.	<p>The assessment team's recognition of high support and full conformance for Supporting Clause 7.1.1 underscores the appropriateness of the management actions and the well-formulated response approach within the US Gulf of Mexico shrimp fishery. The evidence provided demonstrates a comprehensive system in place to address uncertainties related to stock status determination, levels of fishing mortality, impacts of fishing, and environmental and socioeconomic conditions, aligning with the principles of the precautionary approach (PA). This approach is deeply integrated into the management framework, with a clear emphasis on utilizing the best available scientific data to understand and manage the region's living marine resources. Stock assessments consider uncertainties associated with the size and productivity of the stocks, reference points, stock condition, and the impact of fishing activities on non-target species, supported by ongoing monitoring programs and research initiatives conducted by entities like the NMFS Southeast Fisheries Science Centre (SEFSC). These efforts not only inform management decision-making but also contribute to the development of effective management measures that account for within-season variability and ecosystem dynamics. Additionally, socio-economic evaluations provide valuable insights into the potential impacts of management actions on fishing communities and industry stakeholders, further enhancing the adaptive capacity of the management approach. Overall, the evidence substantiates the appropriateness of the management actions and the efficacy of the response approach in addressing uncertainties and promoting the sustainable management of the US Gulf of Mexico shrimp fishery.</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
7.1.2.		No response required.
7.2.	Supporting Clause 7.2 is not relevant to the assessment of the Gulf of Mexico shrimp fishery because it pertains to new or exploratory fisheries, which do not apply to the context of this assessment. Therefore, there is no evaluation of this clause, as indicated by the "Not relevant" assessment for its relevance. The evidence provided acknowledges that the Gulf of Mexico shrimp fishery is neither new nor exploratory, hence the parameters for this clause are not applicable to the current evaluation. Consequently, there is no score, confidence rating, or conformance level assigned to this clause, as it does not pertain to the fishery under assessment.	Not relevant.

12.3.3.3 Section C: Management Measures, Implementation, Monitoring, and Control

Clause	Peer Reviewer comment	Assessment team response
8. Management measures		
8.1.	The assessment team's finding of high support and full conformance regarding the Gulf of Mexico shrimp fishery's management actions is well-founded and aptly justified by the extensive evidence provided. The comprehensive framework of management measures, outlined in detail across various jurisdictions, reflects a robust approach designed to ensure the long-term sustainability of fishery resources while promoting optimum utilization. By involving Federal agencies, state authorities, industry groups, and other stakeholders, the management process incorporates diverse perspectives and expertise, enhancing its effectiveness and legitimacy. The utilization of scientific evidence, traditional knowledge, and stakeholder input underscores a balanced and inclusive decision-making process, aligning with international standards and best practices for fisheries management. Furthermore, the adaptive nature of the management strategy, as evidenced by ongoing amendments to the Gulf of Mexico Shrimp Fishery Management Plan and state-specific regulations, reflects a commitment to flexibility and responsiveness in addressing emerging challenges and opportunities. Overall, the management actions demonstrate a thoughtful and well-formulated response to ensure the sustainability of shrimp stocks while optimizing economic, social, and environmental outcomes for present and future generations.	No response required.
8.1.1.	The assessment team's determination of high support and full conformance regarding the Gulf of Mexico shrimp fishery's consideration of uncertainties related to stock status determination, fishing mortality levels, and socioeconomic conditions, as outlined in	No response required.

Clause	Peer Reviewer comment	Assessment team response
	<p>Supporting Clause 8.1.1, is well-founded and substantiated by abundant evidence. The demonstrated commitment to evaluating alternative conservation and management measures based on their cost-effectiveness and social impact reflects a comprehensive approach to decision-making that prioritizes both ecological sustainability and societal well-being. The involvement of various NOAA agencies in conducting economic and socio-cultural research ensures that the diverse needs and interests of communities reliant on fishery resources are taken into account, encompassing fishermen, indigenous groups, and other coastal stakeholders. Through extensive commercial fisheries economic analyses and the creation of regional fishing community profiles, NOAA facilitates a nuanced understanding of the impacts of management decisions on different sectors of society. Moreover, initiatives such as the Fisheries Economics of the United States report provide valuable insights into the economic trends and contributions of commercial and recreational fishing activities, informing evidence-based policymaking aimed at maximizing societal benefits while safeguarding marine resources. Overall, the robust evidence presented underscores the effectiveness and appropriateness of the management organization's approach in considering the multifaceted dimensions of conservation and management measures within the Gulf of Mexico shrimp fishery context.</p>	
8.1.2.	<p>The assessment team's conclusion of high support and full conformance regarding the management organization's adoption and implementation of measures to manage bycatch and reduce discards within the Gulf of Mexico shrimp fishery, as outlined in Supporting Clause 8.1.2, is well-supported by compelling evidence. The longstanding history of active management since the early 1980s underscores the fishery's commitment to evolving practices that prioritize sustainability. Through continuous gear modifications focused on reducing bycatch and incorporating turtle exclusion devices (BRDs and TEDs), the fishery has demonstrated a proactive approach to mitigating environmental impacts. The effectiveness of these measures is evident across the six jurisdictions involved in fishery management, where discards are minimized through conservative bycatch limits and mitigation strategies, particularly for vulnerable species such as sharks, seabirds, turtles, and marine mammals. The dynamic nature of the shrimp resource,</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
	<p>characterized by rapid growth and seasonal variability, necessitates adaptive management strategies, including delaying season openings until shrimp reach marketable size and widespread use of BRDs and TEDs to minimize bycatch. Notably, discussions with state representatives and industry stakeholders during site visits corroborate the successful implementation of these measures, with no evidence of discarding observed in the fishery. Overall, the robust evidence presented confirms the effectiveness of the management organization's efforts to address bycatch and discard reduction, aligning with international standards and reflecting a commitment to responsible fisheries management.</p>	
8.2.	<p>The Gulf of Mexico shrimp fishery, as outlined in Supporting Clause 8.2, aligns with the evidence presented. The fishery management organization has enacted regulations and laws explicitly prohibiting practices such as dynamiting, poisoning, and similar destructive methods.</p>	No response required.
8.3.	<p>The assessment team's evaluation of the fishery management organization's efforts regarding the identification and consultation with domestic parties, particularly indigenous people and local fishing communities, aligns with the evidence provided in Supporting Clause 8.3. There is a clear process in place that allows for the recognition and consultation with these parties, in accordance with national laws and regulations. Executive Order 12898 mandates federal agencies to conduct their programs without discrimination based on race, color, or national origin, and specifically requires the collection and analysis of information regarding the subsistence consumption patterns of populations reliant on fish and wildlife. Moreover, constitutional rights ensure that all citizens have the right to fish, and current licensing requirements apply universally.</p> <p>The US Gulf of Mexico shrimp fishery management involves collaborative arrangements among federal agencies, the Gulf of Mexico Fisheries Management Council (GMFMC), and the Gulf States Marine Fisheries Commission (GSMFC). These bodies work together to prepare fishery management plans consistent with national standards, with extensive input from industry groups, stakeholders, and the public. Additionally, industry-led organizations advocate for the interests of the shrimping industry, engaging with federal and local officials to address concerns and ensure the industry's</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
	<p>vitality. This collaborative approach demonstrates a commitment to engaging all interested parties in the fisheries management process.</p> <p>Overall, the evidence substantiates that the fishery management organization seeks to identify and collaborate with domestic parties, giving due recognition to the traditional practices, needs, and interests of indigenous people and local fishing communities. This commitment to consultation and collaboration is essential for achieving responsible fisheries management. The provided evidence supports a high confidence rating and confirms full conformance with established standards.</p>	
8.4.	<p>The assessment team has effectively documented compliance with evidence regarding the management organization's handling of fleet capacity in Supporting Clause 8.4. There's a robust system in place for measuring fleet capacity and maintaining updated data on fishing operations within the US Gulf of Mexico shrimp fishery. Each of the six jurisdictions involved requires annual licensing for participants, and trip ticket programs provide essential data on fishing effort. Mechanisms exist to reduce capacity to levels compatible with sustainable resource use, and fleet capacity is regularly monitored and updated.</p> <p>The evidence further demonstrates that the management mechanisms, such as quotas and permits, effectively restrict fishing capacity to maintain sustainability. While annual catch limits and accountability measures are not mandatory for penaeid shrimp due to their lifecycle characteristics exempting them from such requirements, other control measures are in place. For instance, the Gulf of Mexico Shrimp Fishery Management Plan (FMP) imposes regulations on commercial fishing permits, including a moratorium on new permits to maintain limited access. Additionally, various states, including Texas, have implemented their own measures to manage shrimp licenses effectively, such as buyback programs and limited-entry systems.</p> <p>These comprehensive measures ensure that fishing efforts do not exceed sustainable levels and contribute to the protection of Gulf shrimp stocks. Overall, the evidence provided supports a high confidence rating and confirms full conformance with established standards.</p>	No response required.
8.4.1.	The assessment team has documented compliance with evidence regarding the promotion of studies aimed at	No response required.

Clause	Peer Reviewer comment	Assessment team response
	<p>understanding the costs, benefits, and effects of alternative management options for rationalizing fishing in Supporting Clause 8.4.1. There's a clear acknowledgment of the need for such studies, and a process exists to facilitate them as appropriate.</p>	
8.5.	<p>The assessment team's findings regarding Supporting Clause 8.5 demonstrate high support for the management system's consideration of technical measures relevant to the fishery and stock under assessment. These technical measures include aspects such as fish size, mesh size, gear, closed seasons, closed areas, areas reserved for particular fisheries (e.g., artisanal), and the protection of juveniles or spawners.</p> <p>The evidence provided highlights the dynamic nature of the shrimp resource in the Gulf of Mexico, emphasizing the importance of measures aimed at avoiding the catch of small shrimp and minimizing waste associated with catching and discarding them. Management measures, including designated nursery areas, seasonal openings and closings, and the use of bycatch reduction and turtle exclusion devices, collectively contribute to achieving sustainability objectives and minimizing negative impacts on non-target species, ETP species, and the environment.</p> <p>The evidence basis, comprising fishery management plans, regulations, and various reports, supports the conclusion that technical measures are appropriately considered and implemented to ensure the sustainable exploitation of the target species. Overall, the assessment team's findings align with a high level of confidence in the management system's conformance to recognized standards, warranting a full conformance rating.</p>	No response required.
8.5.1.	<p>The shrimp fishery aimed at reducing bycatch and discards through the widespread use of bycatch reduction and turtle exclusion devices (BRDs and TEDs). These measures have been effective in achieving specific management objectives related to minimizing catch, waste, and discards of non-target species, as well as reducing the impact of the fishery on associated, dependent, or endangered species.</p> <p>The effectiveness of these measures is supported by various stock and ecosystem assessment reports, which substantiate the application of appropriate measures to achieve management objectives. Overall, the evidence demonstrates a high level of compliance with the requirements outlined in Supporting Clause 8.5.1,</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
	warranting a full conformance rating with a high level of confidence.	
8.6.	The requirement for fishing gear marking, as specified in the clause, is deemed not relevant to the context of the US Gulf of Mexico (GOM) shrimp fishery.	Not relevant.
8.7.	<p>The management system and relevant groups from the fishing industry have actively encouraged the development, implementation, and use of technologies and operational methods aimed at reducing waste and discards of the target species. These efforts involve various stakeholders such as fishers, processors, distributors, and marketers.</p> <p>Over the long history of the US Gulf of Mexico (GOM) shrimp fishery, fishing gears have been modified to minimize the catch of small shrimp, demonstrating ongoing efforts to improve selectivity and reduce discards. The implementation of technologies and operational methods to achieve these objectives is evident, with measures effectively reducing waste and discards of non-target species.</p> <p>The appropriateness and effectiveness of these methods are supported by evidence indicating that the gears used in the fishery are suitable in terms of selectivity, environmental impact, and cost-effectiveness, as assessed by the responsible scientific authority. Measures such as mesh size restrictions and the use of turtle exclusion devices (BRDs and TEDs) have contributed to significant reductions in bycatch in the shrimp fishery.</p> <p>Furthermore, discussions with industry representatives confirm the absence of discarding of shrimp in the fishery, with all sizes being retained and packaged according to market demand. The economic benefits of larger mesh sizes, including reduced catch of small shrimp and improved fuel efficiency, underscore the success of gear modifications in aligning economic incentives with sustainability goals.</p> <p>Overall, the evidence supports the conclusion that the fishery management organization and relevant industry groups have effectively measured performance and encouraged the development and use of selective, environmentally safe, and cost-effective gear, technologies, and techniques. These efforts have contributed to minimizing catch, waste, and discards of non-target species and reducing impacts on associated or dependent species, thereby achieving full</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
	conformance with the requirements of Supporting Clause 8.7.	
8.8.	<p>The assessment of Supporting Clause 8.8 indicates that it is not relevant to the US Gulf of Mexico (GOM) shrimp fishery. This determination is based on the nature of the fishing effort, which primarily occurs over soft, muddy, flat bottoms where the targeted species reside. Additionally, trawlers actively avoid locations with reefs and rocky outcrops, using GPS and sonar technology to prevent damage to gear. Consequently, gear loss is infrequent and considered a non-issue in this fishery.</p>	Not relevant.
8.9.	<p>The assessment of Supporting Clause 8.9 indicates its relevance to the US Gulf of Mexico (GOM) shrimp fishery. The clause focuses on ensuring that fishing selectivity and related regulations are not circumvented by technical devices, and it emphasizes the importance of providing information on new developments and requirements to all fishers.</p> <p>The evaluation confirms that there is a system in place to disseminate information on new developments and regulatory requirements to all participants in the fishery. Additionally, it highlights that the fishing regulations are effectively enforced, with significant violations being identified through enforcement data.</p> <p>In the GOM shrimp fishery, measures have been implemented to prevent the circumvention of fishing regulations by technical devices. These measures include gear mesh size restrictions, which help reduce the retention of small shrimp. The industry has voluntarily adopted larger mesh sizes in recent years, driven by economic considerations and the benefits of reducing catch of small shrimp and improving fuel efficiency.</p> <p>Moreover, discussions with industry representatives have demonstrated their support for measures aimed at eliminating unwanted catch, indicating no attempt to circumvent regulations through the use of technical devices.</p> <p>Overall, the evidence supports the conclusion that the intent of fishing selectivity and related regulations is not being circumvented in the GOM shrimp fishery. Information on new developments and requirements is effectively communicated to all fishers, ensuring compliance with regulatory measures and contributing to the full conformance of the fishery.</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
8.10.	<p>The assessment of Supporting Clause 8.10 indicates that it's not relevant to the US Gulf of Mexico (GOM) shrimp fishery at this time. This clause focuses on conducting assessments and scientific evaluations of the impacts of habitat disturbance on fisheries and ecosystems prior to the commercial-scale introduction of new fishing gear, methods, and operations, and monitoring these impacts accordingly.</p>	Not relevant.
8.11.	<p>The assessment of Supporting Clause 8.11 affirms its relevance to the US Gulf of Mexico (GOM) shrimp fishery. This clause emphasizes the encouragement of international cooperation for research programs involving fishing gear selectivity, fishing methods and strategies, dissemination of research results, and the transfer of technology.</p> <p>The evaluation parameters indicate that the process requirement is met. There exists a system of international information exchange facilitating the sharing of knowledge. Extensive international collaboration has occurred concerning research on various aspects of penaeid shrimp stocks management, including fishing gear selectivity, fishing methods, and harvest strategies. This collaboration has involved numerous countries due to the widespread distribution of these species and the existence of several fisheries targeting penaeid shrimps worldwide. Additionally, workshops and programs have been established, such as the MEXUS-Gulf program between the United States and Mexico, focusing on Gulf of Mexico fishery research, including shrimp, sea turtles, demersal fisheries, and fishing gear technology.</p> <p>The current status, appropriateness, and effectiveness are supported by evidence indicating extensive international information exchange, as demonstrated through meeting records and other documentation. Early workshops and ongoing collaborative efforts between countries ensure the widespread dissemination of research findings and the transfer of technology.</p> <p>Given the ample evidence provided, including references to workshops and collaborative programs, the evaluation concludes that international cooperation is effectively encouraged for research programs involving various aspects of fishing gear and methods related to the GOM shrimp fishery. Therefore, the clause is deemed relevant, with full conformance achieved.</p>	No response required.

Clause	Peer Reviewer comment	Assessment team response
8.12.	<p>The assessment of Supporting Clause 8.12 indicates its relevance to the US Gulf of Mexico (GOM) shrimp fishery, with collaborative research into fishing gear selectivity, fishing methods, and strategies being a strong component of the fishery.</p> <p>The process evaluation confirms that collaborative research into these aspects is indeed taking place. Over the long history of the GOM shrimp fishery, there has been ongoing modification of fishing gears to reduce the catch of small shrimp. Additionally, the management system and relevant industry groups have actively encouraged the development of technologies and methods to minimize waste and discard of target species. Notably, research efforts have primarily focused on bycatch reduction and the development of turtle exclusion devices (BRDs and TEDs), with significant attention given to the effectiveness of these measures.</p> <p>The current status, appropriateness, and effectiveness of such research are supported by evidence indicating its application in fisheries management. The ongoing research efforts have contributed to the development and implementation of management measures aimed at minimizing waste and discards, particularly concerning non-target species. Bycatch reduction and the use of BRDs and TEDs have been identified as effective strategies, with continuous efforts to improve their performance through research projects focused on enhancing TEDs and BRDs.</p> <p>The evidence provided, including references to various clauses and reports, substantiates the collaboration between fishery management organizations and relevant institutions in developing standard methodologies for research into fishing gear selectivity, fishing methods, and strategies. Consequently, the clause is deemed relevant, with full conformance achieved.</p>	No response required.
8.13.	<p>The evaluation of Supporting Clause 8.13 indicates its lack of relevance to the management of the US Gulf of Mexico (GOM) shrimp stocks. No form of enhancement, such as the use of artificial structures, is practiced by any of the jurisdictions involved in managing the stocks. Therefore, this clause is deemed not relevant to the fishery.</p>	Not relevant.
9. Appropriate standards of fishers' competence		
9.1.	<p>The assessment of Supporting Clause 9.1 confirms its relevance to the fishery, focusing on advancing the education and skills of fishers and their professional</p>	No response required

Clause	Peer Reviewer comment	Assessment team response
	<p>qualifications through education and training programs. The evaluation parameters demonstrate full conformance, with evidence of implemented education programs for fishers covering various aspects such as health and safety, fisheries management framework, rules, and regulations.</p> <p>Several programs and resources, facilitated by management resource agencies, Gulf Sea Grant Programs, and others, offer training and educational materials for fishermen. These programs are effectively training fishers in accordance with international standards and guidelines.</p> <p>In Texas, the Texas Parks and Wildlife Department (TPWD) provides comprehensive materials on commercial fishing rules and regulations through various platforms such as the TPWD website, mobile apps, and published guides. The Texas Sea Grant program engages in dockside activities, offering informal training to the Gulf shrimp fleet, focusing on compliance with regulations, improving gear efficiency, and safety measures. Similar efforts are observed in Louisiana, where the Louisiana Department of Wildlife and Fisheries (LDWF) provides clear materials on regulations and partners with Louisiana Sea Grant on education and training initiatives.</p> <p>NOAA's Gear Monitoring Team conducts dockside outreach throughout the Gulf states, ensuring proper installation and use of Turtle Excluder Devices (TEDs) and Bycatch Reduction Devices (BRDs). The Gulf of Mexico Fisheries Management Council and the US Coast Guard (USCG) also contribute to education and training efforts, providing federal regulations and safety materials to shrimpers.</p> <p>Moreover, Sea Grant programs in Mississippi, Alabama, and Florida, although not as targeted towards shrimpers as those in Texas and Louisiana, offer resources and outreach materials to fishermen. Additionally, the Marine Resource Education Program (MREP) provides training opportunities for commercial fishermen through its Southern Fisheries division.</p> <p>Overall, the evidence provided demonstrates a robust system of education and training programs in place for fishers, effectively advancing their skills and professional qualifications in line with international standards and guidelines, thus achieving full conformance.</p>	

Clause	Peer Reviewer comment	Assessment team response
9.2.	<p>The assessment of Supporting Clause 9.2 confirms its relevance to the fishery, emphasizing the importance of providing information on the FAO Code of Conduct for Responsible Fisheries (CCRF) and other relevant international conventions and standards to those engaged in fishing operations through education and training. The evaluation parameters demonstrate full conformance, with evidence of relevant measures of the FAO CCRF and other applicable standards being exposed to fishers for their training.</p> <p>Education and training programs for Gulf shrimp fishermen include US state and federal commercial fisheries regulations, which are largely based on the FAO CCRF principles. These programs are effective in training fishers in line with international standards, guidelines, and key CCRF principles.</p> <p>All rules and regulations governing Gulf Shrimp fisheries, including those dealing with responsible fishing methods, are readily available on various websites maintained by agencies such as the National Marine Fisheries Service (NMFS) and the Gulf of Mexico Fisheries Management Council (GMFMC). Federal and state enforcement agencies, along with the US Coast Guard (USCG), maintain close communication with the fishing industry through written materials, online notices, and in-person contacts. The collaborative and positive characterization of industry-enforcement relations in the Gulf shrimp fishery further demonstrates compliance with regulations.</p> <p>Overall, the evidence presented confirms that states, with the assistance of relevant international organizations, endeavor to ensure that all individuals engaged in fishing operations are given information on the most important provisions of the FAO CCRF and other relevant international conventions and standards essential to ensure responsible fishing operations. This demonstrates full conformance with the clause.</p>	No response required
9.3.	<p>The assessment of Supporting Clause 9.3 indicates its relevance to the fishery, emphasizing the importance of maintaining records of fishers, including information on their service and qualifications, in accordance with their state's laws. The evaluation parameters demonstrate full conformance, with evidence of a comprehensive system in place to collect and maintain fisher records.</p> <p>Each state and NOAA, federally, maintain databases for current permit holders eligible to fish in the state</p>	No response required

Clause	Peer Reviewer comment	Assessment team response
	<p>and/or federal waters in the Gulf. Additionally, the US Coast Guard requires a USCG Captain's License and Drill Conductor Training for captains in the Gulf Shrimp Fleet.</p> <p>These records are considered accurate and effective for management purposes, with data on fishers held in various agencies. Depending on the type of license, application processes require individuals to register information for qualification requirements. Every individual operating or assisting in the operation of any commercial fishing gear or fishing boat must have a commercial fishing license or crewmember license, and licenses are required for any boat, vessel, or floating craft used in the taking of food fish or shellfish for commercial purposes.</p> <p>The USCG also maintains records and issues credentials for licenses for crewmembers, including engineers, captains, mates, deckhands, etc. These records are considered accurate and are a necessary component of routine fishery monitoring and the effective functioning of Gulf shrimp management.</p> <p>Overall, the evidence presented confirms that the fishery management organization maintains records of fishers' service and qualifications, in accordance with national laws. This demonstrates full conformance with the clause.</p>	
10. Effective legal and administrative framework		
10.1.	<p>The assessment team's evaluation of Supporting Clause 10.1 demonstrates its relevance to the fishery, emphasizing the establishment of effective mechanisms for fisheries monitoring, surveillance, control, and enforcement to ensure compliance with conservation and management measures. The process evaluation confirms the presence of clear mechanisms for monitoring, surveillance, control, and enforcement, supported by comprehensive MCS systems.</p> <p>In Texas, the Texas Parks and Wildlife Department's Law Enforcement Division oversees a statewide law enforcement program, employing approximately 500 wardens and operating 28 field offices. These wardens enforce various regulations, including those related to commercial fisheries, with the authority to arrest violators and ensure compliance. The LED collaborates with federal agencies like NMFS through Joint</p>	No response required

Clause	Peer Reviewer comment	Assessment team response
	<p>Enforcement Agreements, enhancing law enforcement presence and capabilities in offshore waters.</p> <p>Similarly, Louisiana's Department of Wildlife and Fisheries – Enforcement Division enforces state and federal laws related to hunting, fishing, and boating safety. The division operates specialized units with specific missions, utilizing various vehicles and vessels for patrols and enforcement activities. Joint enforcement agreements with NOAA - OLE facilitate federal law enforcement efforts in state and federal waters off the coast of Louisiana.</p> <p>Mississippi's marine enforcement program, housed within the Office of Marine Patrol, provides enforcement of state and federal laws pertaining to marine resources and boating safety. The program's patrols cover a significant area of marine waters and shoreline, contributing to the protection and conservation of Mississippi's seafood and aquatic life.</p> <p>Alabama's Enforcement Section within the Marine Resources Division is responsible for enforcing state laws related to marine resources and collaborates with federal fisheries enforcement agencies to protect federal fisheries resources in federal waters adjacent to Alabama. Joint enforcement agreements with NOAA - OLE provide resources and support for law enforcement efforts.</p> <p>Florida's Law Enforcement Division of the Commission ensures compliance with state and federal laws related to natural resources protection. The division operates a fleet of specialized patrol vessels and conducts joint patrols with federal agencies to enforce marine fisheries and wildlife laws.</p> <p>NOAA's Office of Law Enforcement plays a crucial role in protecting marine wildlife and habitat by enforcing domestic laws and supporting international treaty requirements. The agency conducts various enforcement activities, including patrols, investigations, and partnerships with state and federal agencies.</p> <p>Observer programs, such as those administered by NOAA, collect essential data on commercial fishing activities, supporting fisheries management and compliance efforts. These programs ensure that fishing activities are monitored effectively, and relevant regulations are enforced.</p>	

Clause	Peer Reviewer comment	Assessment team response
	<p>Overall, the evidence provided demonstrates that effective mechanisms are in place for fisheries monitoring, surveillance, control, and enforcement in the Gulf of Mexico commercial shrimp fishery. These mechanisms include observer programs, inspection schemes, and vessel monitoring systems, contributing to the compliance with conservation and management measures for the fishery.</p>	
10.2.	<p>The assessment team's evaluation of Supporting Clause 10.2 indicates its relevance to the fishery, emphasizing the necessity of fishing vessels obtaining specific authorization before operating on the stock under consideration. The process evaluation confirms the presence of mechanisms or systems established to maintain records of fishing authorizations across all Gulf jurisdictions.</p> <p>In NOAA's Southeast Region, the commercial licensing program for vessels participating in the Gulf of Mexico shrimp fishery in federally-managed waters is administered through the Southeast Fisheries Permit System. This system includes both online and paper applications, with specific requirements for permit renewal and expiration dates based on various criteria such as vessel ownership and type.</p> <p>Similarly, states like Texas, Louisiana, Mississippi, Alabama, and Florida have comprehensive commercial licensing requirements for shrimp harvesters and vessels operating in state waters. These requirements include licenses for different types of fishing activities, such as bait shrimp fishing, bay shrimp fishing, and Gulf shrimp fishing, each with specific eligibility criteria and renewal procedures.</p> <p>For instance, Texas imposes a moratorium on the sale of commercial licenses for the bay and bait shrimp fishery, requiring purchase of the previous year's license to retain eligibility. Louisiana requires annual registration of harvesters and vessels participating in the commercial shrimp fishery in state waters, along with associated fees for gear types and seafood dealers.</p> <p>Mississippi's Department of Marine Resources oversees licensing programs for fishing activities and categories, with licenses expiring annually on April 30th. Alabama's commercial licensing program is administered by the DMR, with specific regulations for license issuance, vessel decals, and non-resident fees.</p>	No response required

Clause	Peer Reviewer comment	Assessment team response
	<p>In Florida, the Fish and Wildlife Conservation Commission oversees commercial licensing requirements for saltwater products, including shrimp harvesting. These requirements are detailed in the Florida Administrative Code and include residency criteria, license validity periods, and mandatory vessel registration for commercial harvesting activities.</p> <p>Overall, the evidence provided demonstrates the effectiveness of mechanisms for maintaining records of fishing authorizations and ensuring that fishing vessels operate with appropriate authorization across all Gulf of Mexico federal and state fishery management agencies. Enforcement agents verify compliance both at sea and at dockside, contributing to the effective management and conservation of shrimp stocks in the Gulf.</p>	
10.3.	<p>The evaluation of Supporting Clause 10.3 indicates its irrelevance to the fishery, as it pertains to cooperation among states involved in fisheries that operate outside their jurisdiction. Since the fishery under consideration operates solely within the U.S. Exclusive Economic Zone (EEZ) in the Gulf of Mexico, international cooperation frameworks for monitoring, control, surveillance, and enforcement outside the U.S. EEZ are not applicable.</p>	No response required
10.3.1.	<p>The evaluation of Supporting Clause 10.3.1 indicates its irrelevance to the fishery, as it pertains to measures aimed at deterring activities of vessels flying the flag of non-member or non-participant states, which undermine conservation and management measures established by fisheries management organizations. Since the fishery operates solely within the U.S. Exclusive Economic Zone (EEZ) in the Gulf of Mexico, there is no involvement with vessels flying the flag of non-member or non-participant states, making this clause not applicable.</p>	No response required
10.4.	<p>This clause pertains to flag states ensuring that fishing vessels flying their flag are authorized to fish on the high seas or in waters under the jurisdiction of other states. However, since no foreign vessels are licensed to operate in the U.S. Exclusive Economic Zone (EEZ) of the Gulf of Mexico, this clause holds no relevance to the fishery.</p>	No response required
10.4.1.	<p>This clause pertains to fishing vessels authorized to operate on the high seas or in waters under the jurisdiction of a state other than their flag state, requiring them to be marked according to</p>	No response required

Clause	Peer Reviewer comment	Assessment team response
	<p>internationally recognizable vessel marking systems. However, since no foreign vessels are licensed to operate in the U.S. Exclusive Economic Zone (EEZ) of the Gulf of Mexico, this clause is not applicable to the fishery.</p>	
11. Framework for sanctions		
11.1.	<p>The assessment team's finding indicates high support for the overall score of 10 with corresponding high confidence and full conformance. The evidence presented highlights the stringent regulatory framework and effective enforcement mechanisms across the Gulf of Mexico states, ensuring compliance and deterring violations in the commercial fisheries. Each state's laws outline specific penalties for various violations, including fines, imprisonment, license suspensions, and forfeitures of equipment. The penalties are proportionate to the severity of the offense, aiming to prevent recurrence and protect natural resources. Federal agencies like NOAA-OLE and the USCG collaborate with state authorities to enforce laws within and beyond the US Exclusive Economic Zone (EEZ). The Penalty Policy issued by NOAA-OLE guides the assessment of civil penalties and permit sanctions, ensuring consistency and fairness in enforcement actions. The evidence reflects extensive monitoring, surveillance, and enforcement efforts, resulting in significant penalties for violators. The low level of recidivism and high compliance observed during site visits further validates the effectiveness of the regulatory framework and enforcement measures in the Gulf fisheries. Overall, the evidence substantiates that state and federal laws provide adequate severity to enforce effective sanctions, contributing to the sustainable management of fisheries resources in the Gulf of Mexico.</p>	No response required
11.2.	<p>The assessment team's finding supports an overall score of 10 with high confidence and full conformance. Clause 11.2 emphasizes the necessity for sanctions to be sufficiently severe to deter violations and illegal activities in fishing operations. The evidence provided demonstrates that both federal agencies and Gulf states have established punitive measures, including fines, seizures, license suspensions, and incarceration, to address non-compliance effectively. Operational procedures guide prosecutors in determining appropriate punitive measures based on the seriousness of the offense and the offender's history.</p>	No response required

Clause	Peer Reviewer comment	Assessment team response
	<p>Site visits and discussions with enforcement officials and industry representatives during July 9 - 19, 2023, confirmed the effectiveness of available sanctions in maintaining compliance within the commercial shrimp fishery. Recidivism levels are reported to be low, indicating the deterrent effect of sanctions. Stakeholders express satisfaction with the enforcement efforts of federal and state agencies, with no evidence of systemic non-compliance across the Gulf fishery. Overall, the evidence substantiates that sanctions applicable to violations and illegal activities are adequately severe, securing compliance and discouraging violations effectively throughout the Gulf region.</p>	
11.3.	<p>Clause 11.3 regarding sanctions for IUU fishing is not relevant in the context of the Gulf of Mexico's commercial shrimp fishery; there's no evidence of IUU fishing occurring there. Since the clause primarily addresses the need for effective sanctions to combat IUU fishing, its relevance diminishes when there's no indication of such illegal activities in the specific fishery in question.</p>	No response required
11.4.	<p>Not applicable, there are no foreign vessels fish in the State's EEZ.</p>	No response required

12.3.3.4 Section D: Serious Impacts of the Fishery on the Ecosystem

Clause	Peer Reviewer comment	Assessment team response
12. Impacts of the fishery on the ecosystem		
12.1.	<p>The assessment team's finding of high support for the overall score, with full conformance, aligns with the evaluation of Clause 12.1. This clause emphasizes the importance of assessing the impacts of environmental factors on target stocks and associated or dependent species within the same ecosystem, as well as understanding the relationships among populations in that ecosystem. The evidence provided demonstrates that NOAA has established a robust process for monitoring climatic and oceanographic conditions, particularly in the Gulf of Mexico. Through the NOAA Atlantic Oceanographic and Meteorological Laboratory's Physical Oceanography Division (PhOD), real-time monitoring of ocean conditions is conducted, allowing for assessments of environmental impacts on target and associated species. The evidence further indicates that assessments have been conducted to determine these impacts and relationships, providing detailed information for informed fishery management.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>The NOAA PhOD website offers products and analyses focused on monitoring ocean conditions in response to events like the Mississippi River water discharge and the Deepwater Horizon oil spill, showcasing a wealth of data on ocean currents, sea surface temperature, sea level, and chlorophyll-a concentrations. This evidence demonstrates NOAA's commitment to understanding and monitoring environmental factors and their impacts on fisheries, thus meeting the requirements of Clause 12.1 effectively.</p>	
12.2.	<p>The assessment team's finding of high support for the overall score, with full conformance, aligns with the evaluation of Clause 12.2. This clause emphasizes the importance of assessing and addressing the most probable adverse impacts from human activities, including fishery effects on the ecosystem and environment. It highlights the need to consider available scientific information and local knowledge in addressing these impacts. While Clause 12.2 is a non-scoring clause with no associated evaluation parameters, the provided information offers insight into the approach taken to assess and address adverse impacts in the Gulf of Mexico (GOM) shrimp fishery. Despite the absence of specific evaluation parameters, the assessment team appears to have utilized various data sets, including observer data, to characterize the main and minor associated species within the fishery. This approach enables the identification and understanding of potential adverse impacts on the ecosystem. By using multi-year datasets and excluding older data deemed not representative of current fishing practices, the assessment team ensures a more reliable characterization of bycatch for each gear type analyzed. While there may be challenges, such as limited data for certain gear types like the butterfly net, the effort to consolidate available information demonstrates a commitment to addressing adverse impacts comprehensively. Overall, the approach taken by the assessment team aligns with the spirit of Clause 12.2, contributing to the full conformance of the GOM shrimp fishery to the relevant standard.</p>	<p>Thank you for your detailed comment on this Supporting Clause. Despite not being a non-scoring clause, the support of the approach used provide reassurance to the assessment team that the information provided is appropriate.</p>
12.2.1.	<p>The assessment team's conclusion of high support for the overall score, with full conformance, is substantiated by the evaluation of Supporting Clause 12.2.1. This clause underscores the importance of considering and addressing the most probable adverse impacts of the unit of certification on main associated species. The assessment process involves evaluating</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>available scientific evidence and local knowledge to ensure that catches, including discards, do not pose a serious risk to these non-target species. The evidence provided indicates that the fishery management organization, including NOAA and The Council, has established processes to assess and address these impacts. Through programs such as the Southeast Fisheries Observer Program, data on catch and bycatch are collected and monitored, enabling informed management decisions. Specifically, for the Gulf of Mexico shrimp fishery, main associated species like Atlantic croaker, sand/silver seatrout, and Gulf menhaden are evaluated. Despite the absence of formal stock assessments for some species, such as Atlantic croaker and sand/silver seatrout, the assessment team utilizes alternative approaches to gauge their status and susceptibility to fishing pressure. For instance, trends in CPUE data are examined to assess population responses to fishing effort. Additionally, species like hardhead and Gafftopsail catfish are evaluated through a Data Deficient Framework, considering their life history characteristics and interactions with fishing gear. The vulnerability scores for these species indicate low risk, further supporting the conclusion that they are not threatened by the fishery. Overall, the evidence provided demonstrates the robustness of the assessment process in addressing adverse impacts on main associated species, aligning with the requirements of Supporting Clause 12.2.1 and contributing to the full conformance of the Gulf of Mexico shrimp fishery to the relevant standard.</p>	
12.2.2.	<p>The assessment team's conclusion of high support for the overall score, with full conformance, is validated by the evaluation of Supporting Clause 12.2.2, which pertains to the consideration of adverse impacts on minor associated species. This clause emphasizes the importance of assessing and addressing the potential impacts of the fishery on these non-target species, ensuring that their populations are not threatened by extinction, recruitment overfishing, or other irreversible impacts. The evidence provided demonstrates that the fishery management organization, including NOAA and The Council, has established processes to account for these impacts. Through programs such as the Southeast Fisheries Observer Program, comprehensive data on catch and</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>bycatch are collected and analyzed, enabling informed management decisions. The observer program's efforts, which include monitoring interactions between the fleet and protected species, contribute to ensuring that minor associated species are not unduly threatened by the fishery activities. Moreover, the evidence indicates that appropriate remedial action is taken if such impacts are identified, highlighting the responsiveness and effectiveness of the management measures. Overall, the robustness of the assessment process in addressing the impacts on minor associated species aligns with the requirements of Supporting Clause 12.2.2 and contributes to the full conformance of the Gulf of Mexico shrimp fishery to the relevant standard.</p>	
12.2.3.	<p>The assessment team's determination of high support for the overall score, with full conformance, is corroborated by the evaluation of Clause 12.2.3, which focuses on the establishment of outcome indicators aligned with management objectives for non-target species. The evidence indicates that the Gulf of Mexico (GOM) Shrimp fishery has incorporated fishery-specific management objectives aimed at optimizing shrimp yield, promoting habitat protection, ensuring consistency with relevant regulations, and minimizing adverse impacts on non-target species. Notably, measures such as BRDs and TEDs have been implemented to reduce the incidental catch of non-target species, including endangered and threatened species. Mandatory observer programs have been instrumental in documenting the effectiveness of these measures, with reports demonstrating significant reductions in bycatch and increased shrimp survivability. Research efforts, supported by federal funding and industry collaboration, have contributed to the development and certification of various BRD designs, further enhancing their effectiveness in mitigating bycatch. The availability and adequacy of evidence support the conclusion that the fishery has established effective outcome indicators consistent with achieving management objectives for non-target species, thereby demonstrating full conformance with the relevant standard. This comprehensive approach underscores the commitment of the fishery management organization to sustainable practices and conservation efforts within the GOM Shrimp fishery.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>
12.2.4.	<p>The assessment team's finding indicating high support for the overall score, with a corresponding confidence rating of high and full conformance level, aligns with the thorough evaluation of the fishery management</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>organization's consideration of the most probable adverse impacts on ETP (Endangered, Threatened, and Protected) species. The evaluation parameters demonstrate a robust process in place to address these impacts, utilizing both generic evidence and specific information where available.</p> <p>Evidence presented outlines well-defined processes at both state and federal levels for listing and managing ETP species, with a focus on the Gulf of Mexico (GOM) region. This includes lists and procedures based on scientific evidence and stakeholder input, overseen by entities such as NMFS and USFWS. Species-specific data highlights the distribution and interaction of ETP species with the US GOM shrimp fishery, emphasizing the need for tailored management strategies.</p> <p>The current status and effectiveness assessment indicate proactive measures within the Gulf of Mexico Shrimp FMP (Fishery Management Plan) to ensure the longevity of ETP species. Legal frameworks such as the Magnuson-Stevens Act, Marine Mammal Protection Act, and the US Endangered Species Act provide further guidance and protection. Specific examples, such as the protection of bottlenose dolphins under the MMPA and the recovery of the brown pelican post-DDT ban, demonstrate the efficacy of conservation efforts.</p> <p>For species lacking long-term monitoring data, such as the smalltooth sawfish, efforts are made to estimate populations and mitigate impacts based on available information. Projected interactions and mortalities are calculated to inform management decisions, ensuring that nonlethal takes do not threaten population levels.</p> <p>Overall, the evidence supports the conclusion that the fishery management organization effectively considers and addresses the adverse impacts on ETP species, thereby maintaining conformance with relevant regulations and contributing to the sustainability of the US GOM shrimp fishery.</p>	
12.2.5.	<p>The assessment team's conclusion regarding the presence of established outcome indicators consistent with protecting ETP (Endangered, Threatened, and Protected) species from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts likely to be irreversible or very slowly reversible, aligns with the comprehensive evidence provided.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>The evidence outlines well-defined processes at both state and federal levels for listing and managing ETP species, with a focus on the Gulf of Mexico (GOM) region. Entities such as NMFS and USFWS are responsible for maintaining lists and managing species under the ESA, with measures in place to ensure compliance with regulations and conservation efforts. Specific examples highlight conservation strategies, recovery plans, critical habitat designations, and ongoing monitoring programs aimed at protecting ETP species.</p> <p>For species lacking long-term monitoring data, such as the smalltooth sawfish and giant manta ray, alternative methods are employed to estimate population trends and assess threats. Management measures, including habitat protections, effort controls, and the use of Turtle Excluder Devices (TEDs), demonstrate a proactive approach to minimizing adverse impacts on ETP species within the US GOM shrimp fishery.</p> <p>The appropriateness and effectiveness of current management measures are supported by evidence of population recovery, reduction in bycatch incidents, and ongoing monitoring efforts. For example, the recovery of the brown pelican post-DDT ban and the infrequent interactions between US fishing activities and the threatened giant manta ray indicate the efficacy of conservation measures in place.</p> <p>Overall, the established outcome indicators and ongoing monitoring programs provide assurance that fishing activities within the unit of certification do not impede the recovery of ETP species or jeopardize their long-term survival. This aligns with national and international requirements for species protection, ensuring the sustainability of the fishery while minimizing adverse impacts on vulnerable species.</p>	
12.2.6.	<p>The assessment team's review of the material confirms that the fishery management organization effectively considers adverse impacts in accordance with Clause 12.2.6. This clause stipulates that the organization must evaluate and, where necessary, address or correct the most probable adverse impacts on habitats by utilizing the best scientific evidence available and local knowledge. For the Butterfly net UoAs, there is no interaction with habitats, thereby meeting the clause's requirements. For skimmer and otter trawl UoAs, the fishery primarily operates over soft, mud bottom</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>habitats in the Gulf of Mexico, characterized by soft/mixed sediments with minimal interaction with rocky reefs or sensitive habitats. The fishery avoids sensitive areas like seagrass beds, oyster beds, and coral communities to prevent gear damage and negative ecological impacts. The management process involves immediate responses or further analysis to mitigate risks, using specific or generic evidence based on the risk level. NOAA and the Gulf Council's actions support these mitigation efforts, ensuring that non-target species are monitored and protected from serious or irreversible impacts. This comprehensive approach substantiates the organization's adherence to Clause 12.2.6, achieving full conformance with a high confidence rating.</p>	
12.2.7.	<p>I appreciate the assessment team's review of this material and find that the fishery management organization does consider adverse impacts. Clause 12.2.7 is well supported, as it mandates knowledge of essential habitats for the stock under consideration and potential fishery impacts on them, ensuring that impacts on these habitats are avoided, minimized, or mitigated. For the Butterfly net UoAs, there is no habitat interaction, meeting the clause's requirements. For skimmer and otter trawl UoAs, the primary habitat is soft, mud bottoms with minimal interaction with vulnerable habitats like seagrass beds and coral reefs. Extensive documentation and research, such as the 'Gulf of Mexico Ecosystem: A Coastal and Marine Atlas,' support that the GOM Shrimp fishery does not significantly affect these habitats. Management measures are in place to achieve the objectives of avoiding significant adverse impacts, and there is sufficient evidence to substantiate the adequacy of these measures. The overall conformance to this clause is confirmed with high confidence.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>
12.2.8.	<p>I appreciate the assessment team's review of this material and find that the fishery management organization does consider adverse impacts. Clause 12.2.8 is well supported, requiring outcome indicators consistent with management objectives for avoiding, minimizing, or mitigating impacts on essential habitats and those highly vulnerable to damage by the fishing gear of the unit of certification. Mechanisms are in place through the Council and NMFS to establish such indicators for Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPCs). For skimmer and otter trawl UoAs, successful amendments to Fishery Management Plans (FMPs) have been made, including Coral Amendment 9, which established 13 new HAPCs in the Gulf of Mexico, prohibiting bottom contact gear</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>in these areas to protect vulnerable habitats. These management measures and outcome indicators align with the objectives and demonstrate effective protection and mitigation efforts for essential and vulnerable habitats.</p>	
12.2.9.	<p>I appreciate the assessment team's review of this material and find that the fishery management organization does consider adverse impacts. Clause 12.2.9 is well supported, requiring the assessment of probable adverse impacts of the fishery on the ecosystem using scientific information and local knowledge. The process in place allows for immediate management responses or further analysis based on identified risks. For the shrimp species under consideration, studies indicate that they are not key prey species for any specific predator, with generalist predators having diverse diets. The role of these shrimp in the food web has been analyzed through models like the Atlantis Ecosystem model and food web diagrams, which support that reductions in shrimp abundance are unlikely to impact predator populations significantly. The mechanisms for monitoring and mitigating impacts on the ecosystem are effective, demonstrating full conformance with the clause.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>
12.2.10	<p>The assessment team's review of this material is thorough and documents that Clause 12.2.10 is well supported. This clause requires outcome indicators consistent with achieving management objectives to minimize adverse impacts on aquatic ecosystems that are likely to be irreversible or very slowly reversible. The process includes drafting effective outcome indicators and ensuring that any habitat modifications for enhancing the stock are reversible and do not cause serious or irreversible harm to the ecosystem. Evidence from the Gulf of Mexico Shrimp Fishery Management Plan (FMP) demonstrates collaboration between state and federal governments to achieve these objectives, including habitat protection, bycatch minimization, and ecosystem preservation. This evidence supports that effective outcome indicators and management measures are in place, ensuring that adverse impacts are minimized and that any habitat modifications are reversible, maintaining the ecosystem's structure, processes, and function.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>
12.2.11	<p>The assessment team's review of this material is thorough and documents that Clause 12.2.11 is well supported. This clause mandates that the fishery management organization must consider, assess, and, where appropriate, address or correct the most probable adverse human impacts on the stock and ecosystem under consideration, using available</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	<p>scientific information and local knowledge. The Gulf of Mexico Shrimp Fishery Management Plan (FMP) exemplifies this process, incorporating assessments of ecosystem impacts, associated species, and habitat interactions. Studies such as the 2015 Atlantis Ecosystem model by Ainsworth et al. provide comprehensive data on trophic dynamics and human impacts, facilitating informed management decisions. This rigorous process ensures that adverse impacts are monitored and mitigated effectively, preserving the ecosystem's structure and function.</p>	
12.3.	<p>The assessment team's review of this material is thorough and provides a summary and justification that Clause 12.3 is well supported. The role of brown, white, and pink shrimp in the Gulf of Mexico (GOM) food web has been adequately assessed. Despite being prey for various predators, these shrimp species are not considered key prey for any single predator. The Atlantis Ecosystem model and other studies confirm that these shrimp species, which have high fecundity and rapid growth, are resilient to fishing pressures and environmental variability. Management measures are in place to monitor and sustain shrimp populations, ensuring that the fishery does not adversely affect the ecosystem's structure, processes, or function.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>
12.4.	<p>The assessment team's review of this material is thorough and provides a summary and justification that Clause 12.4 is well supported. Since the stock under consideration (brown, white, and pink shrimp in the Gulf of Mexico) is not a key prey species, the requirement for outcome indicators to avoid severe adverse impacts on dependent predators is not relevant. Evidence confirms that these shrimp are not critical to any single predator species and are resilient to fishing pressures due to their biological traits. Thus, no specific outcome indicators are necessary to meet the management objectives regarding dependent predators.</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>
12.5.	<p>The assessment team's review of this material is thorough and provides a summary and justification that Clause 12.5 is well supported. The United States has introduced and effectively enforces laws and regulations based on the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) through the Act to Prevent Pollution from Ships (APPS). This act applies to both state and federal jurisdictions and includes enforcement protocols managed by the US EPA and USCG, ensuring compliance with MARPOL standards. The effectiveness of these measures is further evidenced by the significant penalties imposed</p>	<p>Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.</p>

Clause	Peer Reviewer comment	Assessment team response
	for violations, demonstrating robust enforcement and adherence to international regulations.	
12.6.	The assessment team's review of this material is thorough and provides summary and justification that Clause 12.6 is well supported. Research on the environmental and social impacts of fishing gear, particularly Turtle Excluder Devices (TEDs) and Bycatch Reduction Devices (BRDs), has been promoted extensively within the US GOM shrimp fishery. TEDs have been mandatory since the late 1980s, and ongoing research has optimized their effectiveness in excluding turtles and other large marine animals. Similarly, BRDs have been developed and tested to reduce finfish bycatch, with several certified devices now in use. This research aims to enhance biodiversity and support coastal fishing communities, with substantial evidence demonstrating the ongoing commitment to improving fishing gear and practices across all jurisdictions.	Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.
12.7.	The assessment team's review indicates that Clause 12.7 is well supported. There is a robust process in place at the state, federal, and council levels for the consideration and establishment of Marine Protected Areas (MPAs) as a tool for fisheries management. Evidence demonstrates the utilization of MPAs, including seasonal and areal closures, to safeguard critical habitats, protect marine biodiversity, and ensure the sustainability of fish stocks and fisheries in the Gulf of Mexico. These MPAs serve as integral components of effective management strategies aimed at conserving marine resources and ecosystems.	Thank you for your detailed comment on this Supporting Clause. It provides reassurance the information was assessed appropriately.

12.3.4 Conclusion – Peer Reviewer 2

Peer Reviewer Comments	Assessment Team Response
General Comments	
Based on the evidence presented in the assessment report, I agree with the conclusion of the assessment team regarding Minor nonconformance 1 of 3 for the fishery-specific management system for Alabama. The lack of documentary evidence demonstrating the continuous review of the components of the state's fishery management system for the commercial shrimp fishery is indeed a valid concern. It is appropriate to address this non-conformance by establishing procedures to continuously review and revise conservation and management measures based on new information. The proposed Corrective Action Plan, which involves developing short and long-term objectives and associated metrics in collaboration with state officials and stakeholders, appears suitable for addressing this non-conformance within the specified timeframe. However, it will be crucial for the client to	No response needed

ensure diligent implementation of the plan to effectively address the identified gaps in the fishery management system.

Based on the evidence provided in the assessment report, I agree with the conclusion of the assessment team regarding Non-conformance 2 (of 3) for clause 3.1 in Alabama's fishery management system. The non-conformance is appropriate as there is a need to clearly define long-term objectives, ensure they are based on scientific evidence, measurable, and translated into a management plan or regulations. The Corrective Action Plan outlined, which involves developing long-term objectives and associated metrics in collaboration with state officials and stakeholders, appears appropriate and likely to address the non-conformance within the specified timeframe. However, it will be essential for the client to ensure active participation and commitment from all interested parties to effectively translate these objectives into actionable plans or regulations for the fishery management system.

Based on the evidence presented in the assessment report, I agree with the conclusion of the assessment team regarding Non-conformance 3 (of 3) for clause 12.2.5. The non-conformance is appropriate as there is insufficient evidence to assess the impacts of the fishery on the smalltooth sawfish and giant manta ray. The Corrective Action Plan outlined appears appropriate and likely to address the non-conformance within the specified timeframe. The plan involves discussions with management authorities to improve data collection practices for observer programs, implementation of agreed-upon plans, and initiation of data collection to clarify the impacts on these species. It's crucial for the client to ensure the active collaboration of stakeholders and the timely implementation of the proposed actions to effectively address the non-conformance.

I am thoroughly satisfied with the narrative and evidence provided in the assessment report for the U.S. Gulf of Mexico shrimp fishery. The assessment team has demonstrated commendable dedication and attention to detail in conducting a comprehensive evaluation aligned with the FAO Code of Conduct for Responsible Fisheries and the Guidelines for the Eco-labelling of marine capture fisheries products. Their work encompassed thorough desktop reviews, consultations with key stakeholders, and meticulous analysis of various documents and data sources, resulting in a well-rounded assessment of the fishery's management system, scientific activities, management measures, and ecosystem impacts. I fully endorse the conclusions reached in the assessment document, and I commend the assessment team for their exemplary work in ensuring the sustainability and responsible management of the Gulf of Mexico shrimp fishery.

12.4 Appendix 2 – Stakeholder submissions and Assessment Team Responses

There were no stakeholder submissions received.

12.5 Appendix 3 – Data Deficient Framework

Introduction

The aim of this analysis was to apply the PSA technique to assess the relative vulnerability of US GOM shrimp populations as well as the hardhead catfish, Gafftopsail catfish, cownose ray, and Atlantic sting ray by 1) assessing the productivity based on biological attributes, 2) assessing the susceptibility to fishing activities 3) combining productivity and susceptibility indices to evaluate the overall vulnerability of species to fishing activities. Understanding the relative vulnerability of US GOM shrimp should help guide management decisions such as the prioritization of data collection and stock assessment efforts, how precautionary management should be, prioritization of marine reserve sites, and whether to reduce, increase, or stabilize allowable catch.

Material and Methods

Productivity-susceptibility analysis was applied to US GOM Shrimp well as the hardhead catfish, Gafftopsail catfish, cownose ray, and Atlantic sting ray, in order to determine their relative vulnerability to fishing activities. For each species, productivity and susceptibility were ranked by assigning scores against a series of attributes (Patrick *et al.*, 2010).

Data on life history parameters such as age at maturation, reproductive biology, growth, and natural mortality as well as impacts of fishing activities on their status and their habitats were obtained from Sealifebase.org and Fishbase.org) and published literature to assess productivity and susceptibility attributes. Information was also taken from the RBF meeting during an MSC/RFM joint certification audits held on July 18, 2023.

To calculate the final productivity and susceptibility score, the average of each of the productivity and susceptibility attribute rankings were taken. Attributes were not weighted (Patrick *et al.*, 2010) as little information on the relative importance of the attributes is available. Finally, overall vulnerability scores of individual species were calculated as the Euclidean distance from the origin to the point at which a species is plotted.

Results and Discussion

This study examined the utility of PSA analyses in assessing the relative risk associated with the harvest of US GOM Shrimp. Productivity rankings were 3.0 for Pink Shrimp and 2.91 for both brown and white shrimp whereas susceptibility rankings ranged were 2.67 for all three species. The vulnerability values for all three species were calculated at 1.67.

According to the Data Deficient Framework 2.0, Vulnerability scores from 1 to 2.5 are consistent with a low potential risk or vulnerability to overfishing. The PSA results for US GOM Shrimp showed vulnerability scores of [$v=1.67$] suggesting that GOM shrimp may not be overfished or undergoing overfishing. This result is not surprising as these species have been considered an *r* species (Kruse, 1993). Species *r* selected possess characteristics such as sexual maturation at very young age, low maximum ages, high annual mortality rates, and high fecundity. In general, *r*-selected species are tolerant to high fishing mortality, and yield per recruit tends to be maximized at a young age. Because of this, *r* selected species fisheries are considered productive, and stocks often recover quickly from overharvesting. Finally, as for the other species, the vulnerabilities scores for the rest of the species were below 2.5 indicating low potential risk or vulnerability to overfishing.

However, due to the preliminary nature of the study, the results should be seen as indicative rather than conclusive. There is a need for closer examination of input parameters, finer scale analyses by area/fishery, and sensitivity analyses for some of the necessary assumptions. Because the rankings that drive the PSA analysis are

subjective, a panel of experts tasked with vetting the rankings could mitigate the subjective nature of this approach.

Finally, PSA is a useful approach for evaluating the vulnerability of species based on their life history characteristics and susceptibility to fishing activities. Vulnerability scores can help rapidly identify species of interest for conservation. Data quality scores can identify species in need of basic biological parameters or fisheries data, helping to prioritize research. Productivity and/or susceptibility scores may also provide information useful for setting of catch levels for data-poor species or at least for indicating the direction in which allowable catches should change (increase, stay the same, or decrease).

Table 39. Summary of the results of the PSA for US GOM Shrimp, Hardhead Catfish, Gafftopsail Catfish, Cownose ray and Atlantic Stingray.

Record Num.	Stock	Productivity Score	Productivity Quality Score	Susceptibility Score	Susceptibility Quality Score	Vulnerability
1	Brown Shrimp	3	1.91	2.67	2.75	1.67
2	White Shrimp	2.91	1.91	2.67	2.67	1.67
3	Pink Shrimp	2.91	1.91	2.67	2.67	1.67
4	Hardhead catfish	2	2.22	2.5	2.6	1.8
5	Gafftopsail catfish	1.78	2.33	2.7	2.4	2.09
6	Cownose ray	1.9	1.8	2.56	1.67	1.91
7	Atlantic Stingray	2	1.67	2.33	2.11	1.67

12.5.1 Information of productivity and susceptibility attributes for PSA analysis

Table 40. Productivity analysis for the brown shrimp (*Farfantepenaeus aztecus*).

Productivity (brown shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
Population growth (r): This is the intrinsic rate of population growth or maximum population growth that would be expected to occur in a population under natural conditions (i.e., no fishing), and thus directly reflects stock productivity. The scoring definitions were taken from Musick (1999), who stated that r should take precedence over other productivity attributes (e.g., given a weighting of 4) as it combines many of the other attributes defined below.	>0.5	0.5- 0.16 (midpoint 0.10)	>0.16	3	3	Based on Sealife base prior is 0.52 .	http://www.sealifebase.ca/summary/Penaeus-aztecus.html
Maximum age (tmax): Maximum age is a direct indication of the natural mortality rate (M), where low levels of M are negatively correlated with high maximum ages (Hoenig 1983). The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The tmax for a majority of these fish ranges between 10 to 30 years.	<10 years	10-30 years (midpoint 20 years)	>30 years	3	1	Brown shrimp are short-lived (18-24 months), seldom living longer than one year. Females mature early at 5.5" total length.	www.fisheries.noaa.gov/species/brown-shrimp Louisiana Department of Wildlife and Fisheries 2016. Louisiana Shrimp Fishery Management Plan.
Maximum size (Lmax): Maximum size is also correlated with productivity, with large fish tending to have lower levels of productivity (Roberts and Hawkins 1999), though this relationship tends to degrade at higher taxonomic levels. The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The Lmax for a majority of these fish ranges between 60 to 150 cm TL.	<60 cm	60-150 cm (midpoint 105 cm)	>150 cm	3	1	Max length: 19.5 cm TL male/unsexed; 23.6 cm TL (female)	http://www.sealifebase.ca/summary/Penaeus-aztecus.html
Growth coefficient (k): The von Bertalanffy growth coefficient measures how rapidly a fish reaches its maximum size, where long-lived, low-productivity stocks tend to have low values of k (Froese and Binohlan 2000). The attribute scoring definitions based upon the	>0.25	0.15 – 0.25	<0.15	3	3	Growth coefficient k range from 1.94 to 4.038.	http://www.sealifebase.ca/PopDyn/PopGrowthList.php?ID=14595&GenusName=Penaeus&SpeciesName=aztecus&fc=9


Productivity (brown shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.15 to 0.25. This is roughly consistent with the values obtained from Froese and Binohlan's (2000) empirical relationship $k = 3 / t_{max}$ of 0.1 to 0.3, based upon t_{max} values of 10 and 30.							
Natural mortality (M): Natural mortality rate directly reflects population productivity, as stocks with high rates of natural mortality will require high levels of production in order to maintain population levels. Several methods for estimating M rely upon the negative relationship between M and t_{max} , including Hoenig's (1983) regression based upon empirical data, the quantile method that depends upon exponential mortality rates (Hoenig 1983), and Alverson and Carney's (1975) relationship between mortality, growth, and t_{max} . The attribute scoring thresholds from the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.2 to 0.4 and were roughly consistent with those produced from Hoenig's (1983) empirical regression of 0.14 to 0.4, based on t_{max} values of 10 and 30.	>0.40	0.20 – 0.40	<0.20	3	3	The natural mortality assumed by Hart (2018) and Nichols (1984) is 3.24	Hart RA. 2018c. Stock assessment update for brown shrimp (<i>Farfantepenaeus aztecus</i>) in the US Gulf of Mexico for the 2017 fishing year. NOAA Fisheries, Southeast Fisheries Science Center. Gavelson, Texas. https://gulfcouncil.org/wp-content/uploads/D-4a-Brown-Assess_Rpt_2017-CPT.pdf Nichols, S. 1984. Updated assessments of brown, white, and pink shrimp in the US Gulf of Mexico. Paper presented the Workshop on Stock Assessment. Miami, Florida, May 1984
Fecundity: Fecundity (i.e., the number of eggs produced by a female for a given spawning event or period) varies with size and age of the spawner, so the authors followed Musick's (1999) recommendation that fecundity should be measured at the age of first maturity. As Musick (1999) noted, low values of fecundity imply low population productivity, but high values of fecundity do not necessarily imply high population productivity; thus, this attribute may be	>10e4	10e2 – 10e3	<10e2	3	1	Females typically release about 500,000 to 1 million eggs near the ocean floor.	https://www.fisheries.noaa.gov/species/brown-shrimp

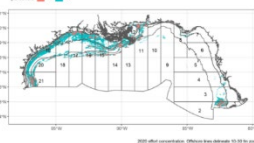
Productivity (brown shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
more useful at the lower fecundity values. The scoring definitions were taken from Musick (1999), which range between fecundities of 1,000 and 100,000.							
<p>Breeding strategy: The breeding strategy of a stock provides an indication of the level of mortality that might be expected for the offspring in the first stages of life. To estimate offspring mortality, the authors used Winemiller's (1989) index of parental investment. The index ranges in score from 0 to 14 and is composed of: 1) the placement of larvae or zygotes (i.e., in nest or into water column; score ranges from 0 to 2); 2) the length of time of parental protection of zygotes or larvae (score) ranges from 0 to 4); and 3) the length of gestation period or nutritional contribution (score ranges from 0 to 8). To translate Winemiller's index into our 1-3 ranking system, the authors examined King and McFarlane's (2003) parental investment scores for 42 North Pacific stocks. These 42 stocks covered a wide range of life-histories and habitats, including 10 surface pelagic, 3 mid-water pelagic, 3 deep-water pelagic, 18 near-shore benthic, and 9 offshore benthic stocks. Thirty-one percent of the stocks had a Winemiller score of zero, and 40% had a Winemiller score of 4 or higher, so 0 and 4 were used as the breakpoints between the ranking categories.</p>	0	Between 1 and 3	≥4	3	1	Broadcast spawner. Female brown shrimp release eggs at the bottom and these are fertilized as they fall to the seafloor. These eggs usually hatch within 24 hours after fertilization	https://www.sealifebase.ca/Reproduction/FishReproSummary.php?ID=14595&GenusName=Penaeus&SpeciesName=aztecus&fc=9&StockCode=451
<p>Recruitment pattern: Stocks with sporadic and infrequent recruitment success often are long-lived and thus might be expected to have lower levels of productivity (Musick 1999). This attribute is intended as a coarse index to distinguish stocks with sporadic recruitment patterns and high frequency of year-class failures from those with relatively steady recruitment. Thus, the frequency of year-class success (defined as exceeding a recruitment level associated with year-class failure) was used for this attribute. Because this attribute was viewed as a coarse index, 10% and 75% were chosen as the breakpoints between the ranking</p>	Highly frequent recruitment success (>75% of year classes are successful)	Moderately frequent recruitment success (between 10% and 75% of year classes are successful)	Infrequent recruitment success (<10% of year classes are successful)	3	3	The species is highly productive and resilient to fishing. Brown shrimp are essentially an "annual crop". Abundance is driven primarily by environmental conditions and as long as these are favourable, populations can rebound from low abundance one year to high abundance the next.	http://www.sealifebase.ca/summary/Penaeus-aztecus.html

Productivity (brown shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
categories so that scores of 1 and 3 identified relatively extreme differences in recruitment patterns.							
Age at maturity (tmat): Age at maturity tends to be positively related with maximum age (tmax), as long-lived, lower productivity stocks will have higher ages at maturity relative to short-lived stocks. The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 2 to 4 years. This range is lower than that observed from Froese and Binohlan's (2000) empirical relationship between tmat and tmax, which was 3 to 9 based upon values of tmax of 10 and 30. However, Froese and Binohlan (2000) used data from many fish stocks around the world, which may not be representative of US stocks. For the PSA, the thresholds obtained from the ANOVA applied to stocks considered representative of U.S fisheries were used.	< 2 years	2 – 4 years	>4 years	3	1	< 5 years. Brown shrimp are short-lived (18-24 months), seldom living longer than one year. Females mature early at 5.5" total length.	www.fisheries.noaa.gov/species/brown-shrimp Louisiana Department of Wildlife and Fisheries 2016. Louisiana Shrimp Fishery Management Plan
Mean trophic level: The position of a stock within the larger fish community can be used to infer stock productivity, with lower-trophic-level stocks generally being more productive than higher-trophic-level stocks. The trophic level of a stock can be computed as a function of the trophic levels of the organisms in its diet. For this attribute, stocks with trophic levels higher than 3.5 were categorized as low productivity stocks and stocks with trophic levels less than 2.5 were categorized as high-productivity stocks, with moderate productivity stocks falling between these bounds. These attribute threshold roughly categorize piscivores to higher trophic levels, omnivores to intermediate trophic levels, and planktivores to lower trophic levels (Pauly <i>et al.</i> 1998).	< 2.5	2.5 – 3.5	>3.5	2	1	Brown shrimp larvae feed on phytoplankton and zooplankton. Postlarvae feed mostly on phytoplankton, epiphytes, and detritus. Juveniles and adults feed on polychaetes, amphipods, insect larvae, as well as detritus and algae. Brown shrimp are a primary food source for many finfish and large crustaceans, including southern flounder, spotted seatrout, sand seatrout, Atlantic croaker, and red drum (see references above). A trophic level ~ 2.93 has been determined for brown shrimp.	http://www.sealifebase.ca/TrophicEco/FoodItemsList.php?vstockcode=451&genus=Penaeus&species=aztecus https://www.sealifebase.se/Ecology/FishEcologySummary.php?StockCode=451&GenusName=Penaeus&SpeciesName=aztecus

Table 41. Susceptibility analysis for the brown shrimp (*Farfantepenaeus aztecus*).

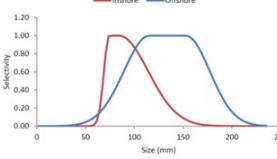
Susceptibility (brown shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Management strategy: The susceptibility of a stock to overfishing may largely depend on the effectiveness of fishery management procedures used to control catch (Sethi <i>et al.</i> 2005, Rosenberg <i>et al.</i> 2007, Shertzer <i>et al.</i> 2008, Dankel <i>et al.</i>, 2008). Stocks that are managed using catch limits for which the fishery can be closed before the catch limit is exceeded (i.e., in-season or proactive accountability measures) re considered to have a low susceptibility to overfishing. However, stocks that do not have specified catch limits or accountability measures are highly susceptible to overfishing if their abundance trends are not monitored. Stocks that are managed using catch limits and reactive accountability measures (e.g., catch levels are not determined until after the fishing season) are considered to be moderately susceptible to overfishing or becoming overfished.</p>	Targeted stocks have catch limits and proactive account ability measures; non target stocks are closely monitored	Targeted stocks have catch limits and reactive account ability measures	Targeted stocks do not have catch limits or account ability measures; non target stocks are not closely monitored	3	1	<p>Brown shrimp stocks do not have catch limits or accountability measures; However non target stocks are closely monitored. Brown shrimp in the Gulf of Mexico, are managed under the Gulf of Mexico Shrimp Fishery Management Plan:</p> <ul style="list-style-type: none"> • Permits are required to harvest shrimp in federal waters. • Currently no new permits are being issued to prevent an increase in the number of boats participating in the fishery. • Electronic logbooks must be installed and selected fishermen must submit trip reports for each fishing trip. • Observers must be carried aboard vessels if selected, to collect data on the catch, bycatch, fishing effort, and fishing gear. • Each year all shrimping in federal waters off Texas is closed from approximately mid-May to mid-July. <p>A score of 3 is assigned.</p>	https://www.fisheries.noaa.gov/species/brown-shrimp
<p>Areal overlap: This attribute pertains to the extent of geographic overlap between the known distribution of a stock and the distribution of the fishery. Greater overlap implies greater susceptibility, as some degree of geographical overlap is necessary for a fishery to impact a stock. The simplest approach is to determine,</p>	<25% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	>50% of stock occurs in the area fished	2	1	In the RBF workshop, there was agreement that the degree of overlap of the overall fishery with the distribution of commercial concentrations of brown	Brown H, Gruss A, Hanisko D, Primrose J, Rester J, Rivero C, Sicheloff L, Williams J. Brown Shrimp In Gulf of Mexico Data Atlas [Internet].

Susceptibility (brown shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>either qualitatively or quantitatively, the proportion of the spatial distribution of a given fishery that overlaps that of the stock, based on known geographical distributions of both. If data regarding spatial distributions are lacking, inferences on areal overlap may be made from knowledge of depth distributions of the fishery and the stock. For example, an upper bound estimate of areal overlap may be made from knowledge of the portion of fishing effort that occurs in the areas which encompass the depths occupied by a species.</p>						<p>shrimp is > 30%. The species is targeted broadly by the three gears under consideration over most of the species' distribution across the US Gulf of Mexico. Pink, white, and brown shrimp are widely distributed around the Gulf, but each has a definite center of abundance. In US waters, the brown shrimp is primarily distributed from west of the Mississippi River to south Texas. This is illustrated in Figure M below from the Gulf of Mexico Data Atlas showing probability of encounter of adult brown shrimp.</p>  <p>Figure M. Annual distribution maps for the adult stages of brown shrimp were produced by fitting geostatistical binomial generalized linear mixed models (GLMMs) to encounter/non-encounter data from a large monitoring database for the US Gulf of Mexico (US GOM).</p>	<p>Stennis Space Center (MS): National Centers for Environmental Information; 2019. [10 screens]. Available from: https://gulfatlas.noaa.gov/</p> <p>https://www.ncei.noaa.gov/maps/gulf-data-atlas/atlas.htm?plate=Invertebrates%20-%20Brown%20Shrimp</p> <p>Dettloff, K. and A. Lowther 2023. Gulf of Mexico Effort Estimation. Presentation to GMFMC SSC March 7, 2023.</p>

Susceptibility (brown shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
						 <p>Figure N. Distribution of shrimp fishing effort in the US GOM in 2020. Orange indicates areas within statistical units where 50% of the effort is distributed and blue areas include 95% of the effort.</p> <p>The foregoing supports the agreement at the RBF workshop that the degree of overlap of the fishery with the distribution of commercial concentrations of brown shrimp is > 25%-50% . Therefore, the score for this attribute should be 2.</p>	
<p>Geographic concentration: Geographical concentration is the extent to which the stock is concentrated into small areas. The rationale for including this attribute is that a stock with a relatively even distribution across its range may be less susceptible than a highly aggregated stock. For some species, a useful measure of this attribute is the minimum estimate of the proportion of area occupied by a certain percentage of the stock (Swain and Sinclair 1994), which can be computed in cases where survey data exist.</p> <p>For many stocks, this index gives a general index of areal coverage that relates well to geographic concentration. However, some stocks can cover a small area even though the stocks were not concentrated in a small number of locations (i.e., a “patchy” stock that is distributed over the survey area). Thus, some</p>	<p>Stock is distributed in >50% of its total range</p>	<p>Stock is distributed in 25% to 50% of its total range</p>	<p>Stock is distributed in <25% of its total range</p>	<p>2</p>	<p>5</p>	<p>Stock is distributed in 25% to 50% of its total range</p>	

Susceptibility (brown shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
refinements to the index may be necessary to characterize geographic concentration in these cases.							
Vertical overlap: Similar to geographical overlap, this attribute concerns the position of the stock within the water column (i.e., demersal or pelagic) relative to the fishing gear. Information on the depth at which gear is deployed (e.g., depth range of hooks for a pelagic longline fishery) and the depth preference of the species (e.g., obtained from archival tagging or other sources) can be used to estimate the degree of vertical overlap between fishing gear and a stock.	<25% of the stock occurs in the depths fished.	Between 25% and 50% of the stock occurs in the depths fished	>50% of stock occurs in the depths fished	3	3	The position of all three shrimp species within the water column relative to the position and deployment characteristics of otter, skimmer and butterfly fishing gear is considered high, as these gears are designed for the capture of these shrimp species.	3
Fishing mortality rate (relative to M): This criterion is applicable to stocks where estimates of both fishing mortality rates (F) and (M) are available. Because sustainable fisheries management typically involves conserving the reproductive potential of a stock, it is recommended that the average F on mature fish be used where possible as opposed to the fully selected or “peak” F. We base our thresholds on the conservative rule of thumb that the M should be an upper limit of F (Thompson 1993; Restrepo <i>et al.</i> 1998), and thus F/M should not exceed 1. For this attribute, we define intermediate F/M values as those between 0.5 and 1.0; values above 1.0 or below 0.5 are defined as high and low susceptibility, respectively.	<0.5	0.5 – 1.0	>1.0	1	4	Based On Masi 2020 the F2018 was 1.4 and the natural mortality was calculated as 3.24 F2018/M=0.43	Masi, M. 2020a. 2019 Gulf of Mexico Penaeid Shrimp Stock Assessments (2018 Terminal Year). Presentation to GMFMC SSC. In Meetings Materials folder for March 11, 2020, available at: https://gulfcouncil.org/meetings/meetingsarchive/Scientific&StatisticalMeetingsArchive
Biomass of Spawners (SSB) or other proxies: Analogous to fishing mortality rate, the extent to which fishing has depleted the biomass of a stock relative to expected unfished levels offers information on realized susceptibility. One way to measure this is to compare the current stock biomass against an estimate of B0 (the estimated biomass with no fishing). If B0 is not available, one could compare the current stock size against the maximum observed from a time series of population size estimates (e.g., from a research survey). If a time series is used, it should be of adequate length (e.g., > 5 years). Note that the maximum observed	B is >40% of B0 (or maximum observed from time series of biomass estimates)	B is between 25% and 40% of B0 (or maximum observed from time series of biomass estimates)	B is <35% of B0 (or maximum observed from time series of biomass estimates)	2	4	Based on inferences of the SSB and CPUE plots by Masi 2020a.	Masi, M. 2020a. 2019 Gulf of Mexico Penaeid Shrimp Stock Assessments (2018 Terminal Year). Presentation to GMFMC SSC. In Meetings Materials folder for March 11, 2020, available at: https://gulfcouncil.org/meetings/meetingsarchive/

Susceptibility (brown shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
survey estimate may not correspond to the true maximum biomass for stocks with substantial observation errors in survey biomass estimates. Additionally, stocks may decline in abundance from environmental factors not related to susceptibility to the fishery, so this should be considered in evaluating depletion estimates. Notwithstanding these issues, which can be addressed with the data quality score described below, some measure of current stock abundance was viewed as a useful attribute.							Scientific&StatisticalMeetingsArchive
Seasonal migrations: Seasonal migrations either to or from the fishery area (i.e., spawning or feeding migrations) could affect the overlap between the stock and the fishery. This attribute also pertains to cases where the location of the fishery changes seasonally, which may be relevant for stocks captured as bycatch.	Seasonal migrations decrease overlap with the fishery	Seasonal migrations do not substantially affect the overlap with the fishery.	Seasonal migrations increase overlap with the fishery	3	3	There is evidence for brown shrimp that is normally fished in the warm months.	https://americanshrimp.com/ridin-the-tide-out/
Schooling, aggregation, and other behavior's: This attribute encompasses behavioral responses of both individual fish and the stock in response to fishing. Individual responses may include, for example, herding or gear avoidance behavior that would affect catchability. An example of a population-level response is a reduction in the area of stock distribution with reduction in population size, potentially leading to increases in catchability (MacCall 1990).	Behavioral responses decrease catchability of the gear	Behavioral responses do not substantially affect the catchability of the gear	Behavioral responses increase the catchability of the gear (i.e. hyperstability of CPUE with schooling behavior).	3	4	There is evidence for brown shrimp that is normally fished in the warm months.	https://americanshrimp.com/ridin-the-tide-out/
Morphology affecting capture: This attribute pertains to the ability of the fishing gear to capture fish based on their morphological characteristics (e.g., body shape, spiny versus soft rayed fins). Because gear selectivity varies with size and age, this measure should be based on the age or size classes most representative of the entire stock.	Species shows low selectivity to the fishing gear	Species show moderate selectivity of the fishing gear	Species show high selectivity to the fishing gear	3	1	Brown shrimp mature at 140 mm total length (see section 7.2.3) and commercial size selection figures in Hart (2018b) indicate that they are fully retained in commercial catches at sizes well below size at maturity (Figure P).	

Susceptibility (brown shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
						 <p>Figure P. Brown shrimp commercial fishery size selectivity from Hart 2018b. This means that individual brown shrimp < size at maturity are captured in more than 50% of gear deployments. Therefore, the risk score for category (a) should be 3</p>	
<p>Survival after capture and release: Fish survival after capture and release varies by species, region, and gear type or even market conditions, and thus can affect the susceptibility of the stock. When data are lacking, the VEWG suggest using NMFS' National Bycatch Report to estimate bycatch mortality (see the following for Alaska Region http://www.nmfs.noaa.gov/by_catch/BREP2011/Factsheets/NBRfactsheet_AK.pdf). The report provides comprehensive estimates of bycatch of fish, marine mammals, and non-marine mammal protected resources in major US commercial fisheries and should allow users to develop a proxy based on similar fisheries.</p>	Probability of survival >67%	Probability of survival between 33% and 67%	Probability of survival <33%	3	1	Brown shrimp are target species. Thus. There are no catch and release	
<p>Desirability/value of the fishery: This attribute assumes that highly valued fish stocks are more susceptible to overfishing or becoming overfished by recreational or commercial fishermen due to increased effort. To identify the value of the fish, the authors suggest using the price per pound or annual landing value for commercial stocks (using the higher of the two values) or the retention rates for recreational fisheries</p>	Stock is not highly values or desired by the fishery	Stock is moderately values or desired by the fishery	Stock is highly valued or desired by the fishery	3	1	The Gulf shrimp fishery is the largest of the US shrimp fisheries. In 2018, the 215.4 million lbs. and \$393.6 million of Gulf shrimp landings represented approximately 74% of the US combined shrimp landings by weight and 79% by value.	

Susceptibility (brown shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
(Table 3). Commercial landings and recreational retention rates can be found at: www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html and www.st.nmfs.noaa.gov/st1/recreational/queries/index.html							
<p>Fishery impact on habitat: A fishery may have an indirect effect on a species via adverse impacts on habitat. Defining these effects is the focus of environmental impact statements or essential fish habitat evaluations that have been conducted by NMFS, and this work can be used to evaluate this attribute. Thus, the impacts on habitat may be categorized with respect to whether adverse impacts on habitat are minimal, temporary, or mitigated.</p>	Adverse effects absent, minimal or temporary	Adverse effects more than minimal or temporary, but are mitigated	Adverse effects more than minimal or temporary and are not mitigated	2	1	Penaeid shrimp in the Gulf and South Atlantic are fished by bottom trawls on silt, mud, shell, or sand benthos (SAFMC 2009a) (NMFS 2012a). Moderate mitigations of impacts to habitat from shrimp fisheries are in place. In the Gulf, the EFH Generic Amendment 3 prohibited trawling (as well as other gear types) on all coral areas throughout the Gulf EEZ and required weak links in tickler chains of bottom trawls in all habitats (GMFMC 2005b). Although indirect, the substantial decline in fishing effort has effectively reduced the habitat impact of shrimp fisheries. Fishing effort in the Gulf during 2008–2009 was an estimated 61% less than in 2001. A 10-year moratorium on issuing new federal commercial shrimp vessel permits was established in 2006 and extended another 10 years in 2016 (GMFMC 2016).	

Table 42. Productivity analysis for the white shrimp (*Litopenaeus setiferus*).

Productivity (white shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
Population growth (r): This is the intrinsic rate of population growth or maximum population growth that would be expected to occur in a population under natural conditions (i.e., no fishing), and thus directly reflects stock productivity. The scoring definitions were taken from Musick (1999), who stated that <i>r</i> should take precedence over other productivity attributes (e.g., given a weighting of 4) as it combines many of the other attributes defined below.	>0.5	0.5-0.16 (midpoint 0.10)	<0.16	3	3	Based on Sealife base prior is 0.56 .	https://www.sealifebase.se/summary/Penaeus-setiferus.html
Maximum age (tmax): Maximum age is a direct indication of the natural mortality rate (<i>M</i>), where low levels of <i>M</i> are negatively correlated with high maximum ages (Hoenig 1983). The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A). The <i>t max</i> for a majority of these fish ranges between 10 to 30 years.	<10 years	10-30 years (midpoint 20 years)	>30 years	3	1	< 5 years. White shrimp are short-lived (18-24 months), seldom living longer than one year. Females mature early at 5.5" total length.	www.fisheries.noaa.gov/species/white-shrimp Louisiana Department of Wildlife and Fisheries 2016. Louisiana Shrimp Fishery Management Plan.
Maximum size (Lmax): Maximum size is also correlated with productivity, with large fish tending to have lower levels of productivity (Roberts and Hawkins 1999), though this relationship tends to degrade at higher taxonomic levels. The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A). The <i>Lmax</i> for a majority of these fish ranges between 60 to 150 cm TL.	<60 cm	60-150 cm (midpoint 105 cm)	>150 cm	3	1	Max length : 19.5 cm TL male/unsexed; 23.6 cm TL (female)	http://www.sealifebase.ca/summary/Penaeus-aztecus.html
Growth coefficient (k): The von Bertalanffy growth coefficient measures how rapidly a fish reaches its maximum size, where long-lived, low-productivity stocks tend to have low values of <i>k</i> (Froese and Binohlan 2000). The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.15 to 0.25. This is roughly consistent with the values obtained from Froese and Binohlan's (2000) empirical relationship $k = 3 / t_{max}$ of 0.1 to 0.3, based upon <i>tmax</i> values of 10 and 30.	>0.25	0.15-0.25 (midpoint 0.20)	<0.15	3	3	Growth coefficient <i>k</i> range from 1.250 to 9.804 with a median of 2.3	https://www.sealifebase.ca/PopDyn/PopGrowthList.php?ID=14915&GenusName=Penaeus&SpeciesName=setiferus&fc=9

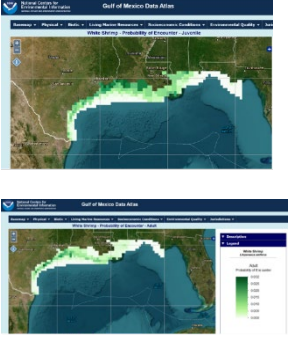
Productivity (white shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
<p>Natural mortality (M): Natural mortality rate directly reflects population productivity, as stocks with high rates of natural mortality will require high levels of production in order to maintain population levels. Several methods for estimating M rely upon the negative relationship between M and <i>t</i>_{max}, including Hoenig's (1983) regression based upon empirical data, the quantile method that depends upon exponential mortality rates (Hoenig 1983), and Alverson and Carney's (1975) relationship between mortality, growth, and <i>t</i>_{max}. The attribute scoring thresholds from the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.2 to 0.4 and were roughly consistent with those produced from Hoenig's (1983) empirical regression of 0.14 to 0.4, based on <i>t</i>_{max} values of 10 and 30.</p>	>0.40	0.20-0.40 (midpoint 0.30)	<0.20	3	3	The natural mortality range 2.03 to 3.21	https://www.sealifebase.se/PopDyn/PopGrowthList.php?ID=14915&GenusName=Penaeus&SpeciesName=setiferus&fc=9
<p>Fecundity (i.e., the number of eggs produced by a female for a given spawning event or period) varies with size and age of the spawner, so we followed Musick's (1999) recommendation that fecundity should be measured at the age of first maturity. As Musick (1999) noted, low values of fecundity imply low population productivity, but high values of fecundity do not necessarily imply high population productivity; thus, this attribute may be more useful at the lower fecundity values. The scoring definitions were taken from Musick (1999), which range between fecundities of 1,000 and 100,000.</p>	>100,000	1000-10,000	<1000	3	1	Females typically release about 500,000 to 1 million eggs near the ocean floor.	https://www.fisheries.noaa.gov/species/white-shrimp
<p>Breeding strategy: The breeding strategy of a stock provides an indication of the level of mortality that might be expected for the offspring in the first stages of life. To estimate offspring mortality, we used Winemiller's (1989) index of parental investment.</p> <p>The index ranges in score from 0 to 14 and is composed of:</p> <ol style="list-style-type: none"> 1. the placement of larvae or zygotes (i.e., in nest or into water column; score ranges from 0 to 2). 2. the length of time of parental protection of zygotes or larvae (score ranges from 0 to 4); and 3. the length of gestation period or nutritional contribution (score 	0	1-3	>4	3	1	Broadcast spawner. At mating, the male places a spermatophore on the female's abdomen and when the female releases the eggs the spermatophore releases sperm and fertilizes the eggs externally. Eggs are found near the seafloor. See references above.	https://www.sealifebase.se/Reproduction/FishReproSummary.php?ID=14915&GenusName=Penaeus&SpeciesName=setiferus&fc=9&StockCode=525

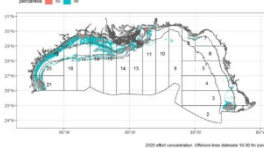
Productivity (white shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
<p>ranges from 0 to 8).</p> <p>To translate Winemiller's index into our 1-3 ranking system, we examined King and McFarlane's (2003) parental investment scores for 42 North Pacific stocks. These 42 stocks covered a wide range of life-histories and habitats, including 10 surface pelagic, 3 mid-water pelagic, 3 deep-water pelagic, 18 near-shore benthic, and 9 offshore benthic stocks. Thirty-one percent of the stocks had a Winemiller score of zero, and 40% had a Winemiller score of 4 or higher, so 0 and 4 were used as the breakpoints between our ranking categories.</p>							
<p>Recruitment pattern: Stocks with sporadic and infrequent recruitment success often are long-lived and thus might be expected to have lower levels of productivity (Musick 1999). This attribute is intended as a coarse index to distinguish stocks with sporadic recruitment patterns and high frequency of year-class failures from those with relatively steady recruitment. Thus, the frequency of year-class success (defined as exceeding a recruitment level associated with year-class failure) was used for this attribute. Because this attribute was viewed as a coarse index, the VEWG chose 10% and 75% as the breakpoints between our ranking categories so that scores of 1 and 3 identified relatively extreme differences in recruitment patterns.</p>	Highly frequent recruitment success (>75% of year classes are successful).	Moderately frequent recruitment success (between 10% and 75% of year classes are).	Infrequent recruitment success (<10% of year classes are successful).	3	3	The species is highly productive and resilient to fishing. White shrimp are essentially an "annual crop". Abundance is driven primarily by environmental conditions and as long as these are favorable, populations can rebound from low abundance one year to high abundance the next	https://www.sealifebase.se/summary/Penaeus-setiferus.html
<p>Age at maturity (tmat): Age at maturity tends to be positively related with maximum age (tmax), as long-lived, lower productivity stocks will have higher ages at maturity relative to short-lived stocks. The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 2 to 4 years. This range is lower than that observed from Froese and Binohlan's (2000) empirical relationship between tmat and tmax, which was 3 to 9 based upon values of tmax of 10 and 30. However, the Froese and Binohlan (2000) used data from many fish stocks around the world, which may not be representative of US stocks. For the PSA, the thresholds obtained from the ANOVA</p>	<2 years	2-4 years (midpoint 3.0 years)	>4 years	3	1	< 5 years. White shrimp are short-lived (18-24 months), seldom living longer than one year. Females mature early at 5.5" total length.	www.fisheries.noaa.gov/species/white-shrimp Louisiana Department of Wildlife and Fisheries 2016. Louisiana Shrimp Fishery Management Plan.

Productivity (white shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
applied to stocks considered representative of US fisheries were used.							
<p>Mean trophic level: The position of a stock within the larger fish community can be used to infer stock productivity, with lower-trophic-level stocks generally being more productive than higher-trophic-level stocks. The trophic level of a stock can be computed as a function of the trophic levels of the organisms in its diet. For this attribute, stocks with trophic levels higher than 3.5 were categorized as low productivity stocks and stocks with trophic levels less than 2.5 were categorized as high-productivity stocks, with moderate productivity stocks falling between these bounds. These attribute threshold roughly categorize piscivores to higher trophic levels, omnivores to intermediate trophic levels, and planktivores to lower trophic levels (Pauly <i>et al.</i> 1998).</p>	<2.5	2.5–3.5 (midpoint 3)	>3.5	2	1	<p>Brown shrimp larvae feed on phytoplankton and zooplankton. Postlarvae feed mostly on phytoplankton, epiphytes, and detritus. Juveniles and adults feed on polychaetes, amphipods, insect larvae, as well as detritus and algae. Brown shrimp are a primary food source for many finfish and large crustaceans, including southern flounder, spotted seatrout, sand seatrout, Atlantic croaker, and red drum (see references above). A trophic level ~ 2.88 has been determined for brown shrimp.</p>	https://www.sealifebase.se/Ecology/FishEcologySummary.php?StockCode=525&GenusName=Penaeus&SpeciesName=setiferus

Table 43. Susceptibility analysis for the white shrimp (*Litopenaeus setiferus*).

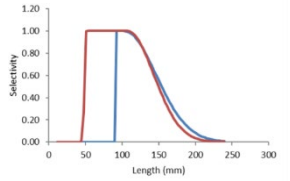
Susceptibility (white shrimp)	Low (1)	Moder ate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Management strategy: The susceptibility of a stock to overfishing may largely depend on the effectiveness of fishery management procedures used to control catch (Sethi <i>et al.</i>, 2005, Rosenberg <i>et al.</i> 2007, Shertzer <i>et al.</i> 2008, Dankel <i>et al.</i> 2008). Stocks that are managed using catch limits for which the fishery can be closed before the catch limit is exceeded (i.e., in-season or proactive accountability measures) re considered to have a low susceptibility to overfishing. However, stocks that do not have specified catch limits or accountability measures are highly susceptible to overfishing if their abundance trends are not monitored. Stocks that are managed using catch limits and reactive accountability measures (e.g., catch levels are not determined until after the fishing season) are considered to be moderately susceptible to overfishing or becoming overfished.</p>	<p>Targeted stocks have catch limits and proactive account ability measures; non target stocks are closely monitored.</p>	<p>Targeted stocks have catch limits and reactive account ability measures.</p>	<p>Targeted stocks do not have catch limits or accountability measure s; non-target stocks are not closely monitored.</p>	3	1	<p>White shrimp stocks do not have catch limits or accountability measures. White shrimp in the Gulf of Mexico, are managed under the Gulf of Mexico Shrimp Fishery Management Plan:</p> <ul style="list-style-type: none"> • Permits are required to harvest shrimp in federal waters. • Currently no new permits are being issued to prevent an increase in the number of boats participating in the fishery. • Electronic logbooks must be installed and selected fishermen must submit trip reports for each fishing trip. • Observers must be carried aboard vessels if selected, to collect data on the catch, bycatch, fishing effort, and fishing gear. • Each year all shrimping in federal waters off Texas is closed from approximately mid-May to mid-July. <p>A score of 3 is assigned.</p>	<p>https://www.fisheries.noaa.gov/species/white-shrimp</p>
<p>Area overlap: This attribute pertains to the extent of geographic overlap between the known distribution of a stock and the distribution of the fishery. Greater overlap implies greater susceptibility, as some degree of geographical overlap is necessary for a fishery to impact</p>	<p>< 25% of the stock occurs in the area fished.</p>	<p>Between 25% and 50% of the stock occurs in the area fished.</p>	<p>>50% of the stock occurs in the area fished.</p>	3	3	<p>The species is targeted mainly in shallow water (inshore) areas and the fishery is not as broadly distributed as for brown shrimp. Pink, white</p>	<p>Brown, H., Gruss, A., Hanisko, D., Primrose, J., Rester, J., Rivero C, Siceloff, L., Williams, J. Brown Shrimp In Gulf of</p>

Susceptibility (white shrimp)	Low (1)	Moder ate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>a stock. The simplest approach is to determine, either qualitatively or quantitatively, the proportion of the spatial distribution of a given fishery that overlaps that of the stock, based on known geographical distributions of both. If data regarding spatial distributions are lacking, inferences on areal overlap may be made from knowledge of depth distributions of the fishery and the stock. For example, an upper bound estimate of areal overlap may be made from knowledge of the portion of fishing effort that occurs in the areas which encompass the depths occupied by a species.</p>						<p>and brown shrimp are widely distributed around the Gulf, but each has a definite centre of abundance. In US waters, the white shrimp is primarily distributed from the Florida panhandle to the coastal bend of Texas in state and federal waters. This is illustrated in Figure R from the Gulf of Mexico Data Atlas showing probability of encounter of juvenile (above) and adult (below) white shrimp. Many of these pixels indicate large abundances of juveniles in inshore estuaries, with adult abundances farther offshore.</p>  <p>Figure R. Annual distribution maps for the juvenile (top) and adult (bottom) stages of white shrimp were produced by fitting geostatistical binomial generalized linear mixed models (GLMMs) to encounter/non-encounter data from a large monitoring</p>	<p>Mexico Data Atlas [Internet]. Stennis Space Center (MS): National Centers for Environmental Information; 2019. [10 screens]. Available from: https://gulfatlas.noaa.gov/. https://www.ncei.noaa.gov/maps/gulf-data-atlas/atlas.htm?plate=Invertebrates%20-%20White%20Shrimp</p> <p>Dettloff, K., A. Lowther. 2023. Gulf of Mexico Effort Estimation. Presentation to GMFMC SSC March 7, 2023.</p>

Susceptibility (white shrimp)	Low (1)	Moder ate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
						<p>database for the US Gulf of Mexico (US GOM).</p>  <p>Figure S. Distribution of shrimp fishing effort in the US GOM in 2020. Orange indicates areas within statistical units where 50% of the effort is distributed and blue areas include 95% of the effort.</p> <p>In the RBF workshop, there was agreement that the degree of overlap of the overall fishery with the distribution of commercial concentrations of white shrimp was > 30%. However, the available figures of shrimp fishing effort do not provide evidence to clearly support that conclusion. Rather, the available evidence suggests the overlap is likely > 30%.</p> <p>Therefore, the score for this attribute is 3.</p>	
<p>Geographic concentration: Geographical concentration is the extent to which the stock is concentrated in small areas. The rationale for including this attribute is that a stock with a relatively even distribution across its range may be less susceptible than a highly aggregated stock. For some species, a useful measure of this attribute is the minimum estimate of the proportion of area</p>	<p>Stock is distributed in >50% of its total range.</p>	<p>Stock is distributed in 25% to 50% of its total range.</p>	<p>Stock is distributed in <25% of its total range.</p>	<p>2</p>	<p>4</p>	<p>Stock is distributed in 25% to 50% of its total range.</p>	

Susceptibility (white shrimp)	Low (1)	Moder ate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
occupied by a certain percentage of the stock (Swain and Sinclair 1994), which can be computed in cases where survey data exist. For many stocks, this index gives a general index of areal coverage that relates well to geographic concentration. However, some stocks can cover a small area even though the stocks were not concentrated in a small number of locations (i.e., a “patchy” stock that is distributed over the survey area). Thus, some refinements to the index may be necessary to characterize geographic concentration in these cases.							
Vertical overlap: Similar to geographical overlap, this attribute concerns the position of the stock within the water column (i.e., demersal, or pelagic) relative to the fishing gear. Information on the depth at which gear is deployed (e.g., depth range of hooks for a pelagic longline fishery) and the depth preference of the species (e.g., obtained from archival tagging or other sources) can be used to estimate the degree of vertical overlap between fishing gear and a stock.	<25% of the stock occurs in the depths fished.	Between 25% and 50% of the stock occurs in the depths fished.	>50% of stock occurs in the depths fished.	3	3	The position of all three shrimp species within the water column relative to the position and deployment characteristics of otter, skimmer and butterfly fishing gear is considered high, as these gears are designed for the capture of these shrimp species.	3
Fishing mortality rate (relative to M): This criterion is applicable to stocks where estimates of both fishing mortality rates (<i>F</i>) and (<i>M</i>) are available. Because sustainable fisheries management typically involves conserving the reproductive potential of a stock, it is recommended that the average <i>F</i> on mature fish be used where possible as opposed to the fully selected or “peak” <i>F</i> . We base our thresholds on the conservative rule of thumb that the <i>M</i> should be an upper limit of <i>F</i> (Thompson 1993; Restrepo <i>et al.</i> 1998), and thus <i>F</i> / <i>M</i> should not exceed 1. For this attribute, we define intermediate <i>F</i> / <i>M</i> values as those between 0.5 and 1.0; values above 1.0 or below 0.5 are defined as high and low susceptibility, respectively.	<0.5	0.5-1.0	>1	1	4	Based on Masi 2020 the F2018 was 1.1 and the mean natural mortality was calculated as 2.61 F2018/M=0.43	Masi, M. 2020a. 2019 Gulf of Mexico Penaeid Shrimp Stock Assessments (2018 Terminal Year). Presentation to GMFMC SSC. In Meetings Materials folder for March 11, 2020. Available at: https://gulfcouncil.org/meetings/meetingsarchive/Scientific&StatisticalMeetingsArchive
Biomass of Spawners (SSB) or other proxies: Analogous to fishing mortality rate, the extent to which fishing has depleted the biomass of a stock relative to expected unfished levels offers information on realized	B is >40% of B0 (or maximum observed	B is between 25% and 40% of B0 (or maximum observed from	B is <25% of B0 (or maximum observed	2	4	Based on inferences of the SSB and CPUE plots by Masi 2020a.	Masi, M. 2020a. 2019 Gulf of Mexico Penaeid Shrimp Stock Assessments (2018 Terminal Year). Presentation

Susceptibility (white shrimp)	Low (1)	Moder ate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>susceptibility. One way to measure this is to compare the current stock biomass against an estimate of BO (the estimated biomass with no fishing). If BO is not available, one could compare the current stock size against the maximum observed from a time series of population size estimates (e.g., from a research survey). If a time series is used, it should be of adequate length (e.g., > 5 years). Note that the maximum observed survey estimate may not correspond to the true maximum biomass for stocks with substantial observation errors in survey biomass estimates. Additionally, stocks may decline in abundance from environmental factors not related to susceptibility to the fishery, so this should be considered in evaluating depletion estimates.</p> <p>Notwithstanding these issues, which can be addressed with the data quality score described below, some measure of current stock abundance was viewed as a useful attribute.</p>	from time series of biomass estimates).	time series of biomass estimates).	from time series of biomass estimates).				to GMFMC SSC. In Meetings Materials folder for March 11, 2020, available at: https://gulfcouncil.org/meetings/meetingsarchive/Scientific&StatisticalMeetingsArchive
<p>Seasonal migrations: Seasonal migrations either to or from the fishery area (i.e., spawning or feeding migrations) could affect the overlap between the stock and the fishery. This attribute also pertains to cases where the location of the fishery changes seasonally, which may be relevant for stocks captured as bycatch.</p>	Seasonal migrations decrease overlap with the fishery.	Seasonal migration do not substantially affect the overlap with the fishery.	Seasonal migration increase overlap with the fishery.	3	1	There is evidence for penaeid species such as white shrimp that is normally fished in the warm months	https://americanshrimp.com/ridin-the-tide-out/
<p>Schooling, aggregation, and other behaviors: This attribute encompasses behavioral responses of both individual fish and the stock in response to fishing. Individual responses may include, for example, herding or gear avoidance behavior that would affect catchability. An example of a population-level response is a reduction in the area of stock distribution with reduction in population size, potentially leading to increases in catchability (MacCall 1990).</p>	Behavioral responses decrease the catchability of the gear	Behavioral responses do not substantially affect the catchability of the gear	Behavioral response s increase the catchability of the gear (i.e., hyper-stability of the CPUE with schooling behavior).	3	4	Due to their seasonal migrations, they are more susceptible to being caught.	

Susceptibility (white shrimp)	Low (1)	Moder ate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Morphology affecting capture: This attribute pertains to the ability of the fishing gear to capture fish based on their morphological characteristics (e.g., body shape, spiny versus soft rayed fins). Because gear selectivity varies with size and age, this measure should be based on the age or size classes most representative of the entire stock.</p>	<p>Species shows low selectivity to the fishing gear.</p>	<p>Species shows moderate selectivity to the fishing gear.</p>	<p>Species shows high selectivity to the fishing gear.</p>	<p>3</p>	<p>1</p>	<p>White shrimp mature at 140 mm total length (see section 7.2.4) and commercial size selection figures in Hart (2018c)⁶¹⁹ indicate that they are fully retained in commercial catches at sizes well below size at maturity (Figure U).</p>  <p>This means that individual white shrimp < size at maturity are captured in more than 50% of gear deployments. Therefore, the risk score for category (a) should be 3.</p>	
<p>Survival after capture and release: Fish survival after capture and release varies by species, region, and gear type or even market conditions, and thus can affect the susceptibility of the stock. When data are lacking, the VEWG suggest using NMFS' forthcoming National Bycatch Report to estimate bycatch mortality. The report will provide comprehensive estimates of bycatch of fish, marine mammals, and non-marine mammal protected resources in major US commercial fisheries and should allow users to develop a proxy based on similar fisheries.</p>	<p>> 67% probability of survival</p>	<p>< 33% -67% probability of survival</p>	<p>< 33% probability of survival</p>	<p>3</p>	<p>1</p>	<p>White shrimp is target species.</p>	

⁶¹⁹ Hart. R. A. 2018c. Stock Assessment Update for White Shrimp (*Litopenaeus setiferus*) in the U.S. Gulf of Mexico for the 2017 Fishing Year. December 2018. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551. https://gulfcouncil.org/wp-content/uploads/D-4d-White-Assess_Rpt_2018_CPT.pdf

Susceptibility (white shrimp)	Low (1)	Moder ate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Desirability/value of the fishery: This attribute assumes that highly valued fish stocks are more susceptible to overfishing or becoming overfished by recreational or commercial fishermen due to increased effort. To identify the value of the fish, we suggest using the price per pound or annual landing value for commercial stocks (using the higher of the two values, see table 3 in the report). Commercial landings can be found at: www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html and www.st.nmfs.noaa.gov/st1/recreational/queries/index.html</p>	Stock is not highly valued or desired by the fishery	Stock is moderately valued or desired by the fishery	Stock is highly valued or desired by the fishery	3	1	In 2021, landings of white shrimp totaled 112 million pounds and were valued at \$274 million, according to the NOAA Fisheries commercial fishing landings database.	https://www.fisheries.noaa.gov/species/white-shrimp
<p>Fishery Impacts to EFH or Habitat in general for non-targets. A fishery may have an indirect effect on a species via adverse impacts on habitat. Defining these effects is the focus of environmental impact statements or essential fish habitat evaluations that have been conducted by NMFS, and this work can be used to evaluate this attribute. Thus, the impacts on habitat may be categorized with respect to whether adverse impacts on habitat are minimal, temporary, or mitigated.</p>	Adverse effects absent, minimal or temporary.	Adverse effects more than minimal or temporary but are mitigated.	Adverse effects more than minimal or temporary and are not mitigated.	2	1	Penaeid shrimp in the Gulf and South Atlantic are fished by bottom trawls on silt, mud, shell, or sand benthos (SAFMC 2009a)(NMFS 2012a). Moderate mitigations of impacts to habitat from shrimp fisheries are in place. In the Gulf, the Essential Fish Habitat (EFH) Generic Amendment 3 prohibited trawling (as well as other gear types) on all coral areas throughout the Gulf exclusive economic zone (EEZ) and required weak links in tickler chains of bottom trawls in all habitats {GMFMC 2005b}. Although indirect, the substantial decline in fishing effort has effectively reduced the habitat impact of shrimp fisheries. Fishing effort in the Gulf during 2008–2009	

Susceptibility (white shrimp)	Low (1)	Moder ate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
						was an estimated 61% less than in 2001 A 10-year moratorium on issuing new federal commercial shrimp vessel permits was established in 2006 and extended another 10 years in 2016 (GMFMC 2016).	

Table 44. Productivity analysis for the pink shrimp (*Farfantepenaeus duorarum*).

Productivity (pink shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
Population growth (r): This is the intrinsic rate of population growth or maximum population growth that would be expected to occur in a population under natural conditions (i.e., no fishing), and thus directly reflects stock productivity. The scoring definitions were taken from Musick (1999), who stated that r should take precedence over other productivity attributes (e.g., given a weighting of 4) as it combines many of the other attributes defined below.	>0.5	0.5- 0.16 (midpoint 0.10)	>0.16	3	1	Based on Sealife base prior is 0.51 .	http://www.sealifebase.ca/summary/Penaeus-duorarum.html
Maximum age (tmax): Maximum age is a direct indication of the natural mortality rate (M), where low levels of M are negatively correlated with high maximum ages (Hoenig 1983). The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The tmax for a majority of these fish ranges between 10 to 30 years.	<10 years	10-30 years (midpoint 20 years)	>30 years	3	1	Pink shrimp are short-lived (18-24 months), seldom living longer than one year. Females mature early at 3.3" total length.	www.fisheries.noaa.gov/species/pink-shrimp
Maximum size (Lmax): Maximum size is also correlated with productivity, with large fish tending to have lower levels of productivity (Roberts and Hawkins 1999), though this relationship tends to degrade at higher taxonomic levels. The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The Lmax for a majority of these fish ranges between 60 to 150 cm TL.	<60 cm	60-150 cm (midpoint 105 cm)	>150 cm	3	1	Max length: 26.9 cm TL male/unsexed; 28 cm TL (female); m	http://www.sealifebase.ca/summary/Penaeus-duorarum.html
Growth coefficient (k): The von Bertalanffy growth coefficient measures how rapidly a fish reaches its maximum size, where long-lived, low-productivity stocks tend to have low values of k (Froese and Binohlan 2000). The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.15 to 0.25. This is	>0.25	0.15 – 0.25	<0.15	3	3	Growth coefficient k range from 1.2 to 2.868 With a median of 1.5	http://www.sealifebase.ca/PopDyn/PopGrowthList.php?ID=14599&GenusName=Penaeus&SpeciesName=duorarum&fc=9

Productivity (pink shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
roughly consistent with the values obtained from Froese and Binohlan's (2000) empirical relationship $k = 3 / t_{max}$ of 0.1 to 0.3, based upon t_{max} values of 10 and 30.							
Natural mortality (M): Natural mortality rate directly reflects population productivity, as stocks with high rates of natural mortality will require high levels of production in order to maintain population levels. Several methods for estimating M rely upon the negative relationship between M and t_{max} , including Hoenig's (1983) regression based upon empirical data, the quantile method that depends upon exponential mortality rates (Hoenig 1983), and Alverson and Carney's (1975) relationship between mortality, growth, and t_{max} . The attribute scoring thresholds from the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.2 to 0.4 and were roughly consistent with those produced from Hoenig's (1983) empirical regression of 0.14 to 0.4, based on t_{max} values of 10 and 30.	>0.40	0.20 – 0.40	<0.20	3	3	The natural mortality ranges from 2.99 to 3.00	http://www.sealifebase.ca/PopDyn/PopGrowthList.php?ID=14599&GenusName=Penaeus&SpeciesName=duorarum&fc=9
Fecundity: Fecundity (i.e., the number of eggs produced by a female for a given spawning event or period) varies with size and age of the spawner, so the authors followed Musick's (1999) recommendation that fecundity should be measured at the age of first maturity. As Musick (1999) noted, low values of fecundity imply low population productivity, but high values of fecundity do not necessarily imply high population productivity; thus, this attribute may be more useful at the lower fecundity values. The scoring definitions were taken from Musick (1999), which range between fecundities of 1,000 and 100,000.	>10e4	10e2 – 10e3	<10e2	3	1	Females typically release about 500,000 to 1 million eggs near the ocean floor.	https://www.fisheries.noaa.gov/species/pink-shrimp
Breeding strategy: The breeding strategy of a stock provides an indication of the level of mortality that might be expected for the offspring in the first stages of life. To estimate offspring mortality, the authors used Winemiller's (1989) index of parental investment. The index ranges in score from 0 to 14 and is composed of:	0	Between 1 and 3	≥4	3	1	Broadcast spawner. Female pink shrimp release eggs near the ocean floor and these are fertilized as they are released.	http://www.sealifebase.ca/Reproduction/FishReproSummary.php?ID=14599&GenusName=Penaeus&SpeciesName=duorarum&fc=9&StockCode=466

Productivity (pink shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
<p>1) the placement of larvae or zygotes (i.e., in nest or into water column; score ranges from 0 to 2); 2) the length of time of parental protection of zygotes or larvae (score ranges from 0 to 4); and 3) the length of gestation period or nutritional contribution (score ranges from 0 to 8). To translate Winemiller's index into our 1-3 ranking system, the authors examined King and McFarlane's (2003) parental investment scores for 42 North Pacific stocks. These 42 stocks covered a wide range of life-histories and habitats, including 10 surface pelagic, 3 mid-water pelagic, 3 deep-water pelagic, 18 near-shore benthic, and 9 offshore benthic stocks. Thirty-one percent of the stocks had a Winemiller score of zero, and 40% had a Winemiller score of 4 or higher, so 0 and 4 were used as the breakpoints between the ranking categories.</p>							
<p>Recruitment pattern: Stocks with sporadic and infrequent recruitment success often are long-lived and thus might be expected to have lower levels of productivity (Musick 1999). This attribute is intended as a coarse index to distinguish stocks with sporadic recruitment patterns and high frequency of year-class failures from those with relatively steady recruitment. Thus, the frequency of year-class success (defined as exceeding a recruitment level associated with year-class failure) was used for this attribute. Because this attribute was viewed as a coarse index, 10% and 75% were chosen as the breakpoints between the ranking categories so that scores of 1 and 3 identified relatively extreme differences in recruitment patterns.</p>	Highly frequent recruitment success (>75% of year classes are successful)	Moderately frequent recruitment success (between 10% and 75% of year classes are successful)	Infrequent recruitment success (<10% of year classes are successful)	3	3	The species is highly productive and resilient to fishing. White shrimp are essentially an "annual crop". Abundance is driven primarily by environmental conditions and as long as these are favourable, populations can rebound from low abundance one year to high abundance the next	http://www.sealifebase.ca/summary/Penaeus-duorarum.html
<p>Age at maturity (tmat): Age at maturity tends to be positively related with maximum age (tmax), as long-lived, lower productivity stocks will have higher ages at maturity relative to short-lived stocks. The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 2 to 4 years. This range is lower than that observed from Froese and Binohlan's (2000) empirical</p>	< 2 years	2 – 4 years	>4 years	3	1	White shrimp are short-lived (18-24 months), seldom living longer than one year. Females mature early at 5.5" total length.	http://www.sealifebase.ca/summary/Penaeus-duorarum.htm


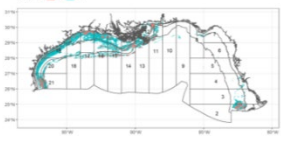
Productivity (pink shrimp)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
<p>relationship between t_{mat} and t_{max}, which was 3 to 9 based upon values of t_{max} of 10 and 30. However, Froese and Binohlan (2000) used data from many fish stocks around the world, which may not be representative of US stocks. For the PSA, the thresholds obtained from the ANOVA applied to stocks considered representative of US fisheries were used.</p>							
<p>Mean trophic level: The position of a stock within the larger fish community can be used to infer stock productivity, with lower-trophic-level stocks generally being more productive than higher-trophic-level stocks. The trophic level of a stock can be computed as a function of the trophic levels of the organisms in its diet. For this attribute, stocks with trophic levels higher than 3.5 were categorized as low productivity stocks and stocks with trophic levels less than 2.5 were categorized as high-productivity stocks, with moderate productivity stocks falling between these bounds. These attribute threshold roughly categorize piscivores to higher trophic levels, omnivores to intermediate trophic levels, and planktivores to lower trophic levels (Pauly <i>et al.</i> 1998).</p>	< 2.5	2.5 – 3.5	>3.5	2	1	<p>Juvenile and adult pink shrimp eat a variety of organisms including copepods, diatoms, algae and detritus. They in turn are prey for a wide variety of aquatic organisms including insects, other shrimp, blue crabs and a wide variety of finfish (see references above). This ecological role places pink shrimp at the low end of the food chain and at a trophic level < 2.5. A trophic level ~ 2.2 has been determined for pink shrimp.</p>	<p>http://www.sealifebase.ca/TrophicEco/DietCompoList.php?ID=14599&GenusName=Penaeus&SpeciesName=duorarum&fc=9&StockCode=466</p>

Table 45. Susceptibility analysis for the pink shrimp (*Farfantepenaeus duorarum*).

Susceptibility (pink shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Management strategy: The susceptibility of a stock to overfishing may largely depend on the effectiveness of fishery management procedures used to control catch (Sethi <i>et al.</i> 2005, Rosenberg <i>et al.</i> 2007, Shertzer <i>et al.</i> 2008, Dankel <i>et al.</i> 2008). Stocks that are managed using catch limits for which the fishery can be closed before the catch limit is exceeded (i.e., in-season or proactive accountability measures) re considered to have a low susceptibility to overfishing. However, stocks that do not have specified catch limits or accountability measures are highly susceptible to overfishing if their abundance trends are not monitored. Stocks that are managed using catch limits and reactive accountability measures (e.g., catch levels are not determined until after the fishing season) are considered to be moderately susceptible to overfishing or becoming overfished.</p>	Targeted stocks have catch limits and proactive accountability measures; non-target stocks are closely monitored	Targeted stocks have catch limits and reactive accountability measures	Targeted stocks do not have catch limits or accountability measures; non target stocks are not closely monitored	3	1	<p>Pink shrimp stocks do not have catch limits or accountability measures. Pink shrimp in the Gulf of Mexico, are managed under the Gulf of Mexico Shrimp Fishery Management Plan:</p> <ul style="list-style-type: none"> • Permits are required to harvest shrimp in federal waters. • Currently no new permits are being issued to prevent an increase in the number of boats participating in the fishery. • Electronic logbooks must be installed and selected fishermen must submit trip reports for each fishing trip. • Observers must be carried aboard vessels if selected, to collect data on the catch, bycatch, fishing effort, and fishing gear. • Each year all shrimping in federal waters off Texas is closed from approximately mid-May to mid-July. <p>A score of 3 is assigned.</p>	https://www.fisheries.noaa.gov/species/pink-shrimp
<p>Areal overlap: This attribute pertains to the extent of geographic overlap between the known distribution of a stock and the distribution of the fishery. Greater overlap implies greater susceptibility, as some degree of geographical overlap is necessary for a fishery to impact a stock. The simplest approach is to determine, either qualitatively or quantitatively, the proportion of the spatial distribution of a given fishery that overlaps that of the stock, based on known geographical distributions of</p>	<25% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	>50% of stock occurs in the area fished	1	1	<p>10-30% overlap = medium risk score of 2.</p> <p>In the RBF workshop, there was agreement that the degree of overlap of both the otter trawl and skimmer trawl fisheries with the distribution of commercial concentrations of pink</p>	Brown H, Gruss A, Hanisko D, Primrose J, Rester J, Rivero C, Siceloff L, Williams J. Pink Shrimp In Gulf of Mexico Data Atlas [Internet]. Stennis Space Center (MS): National Centers for Environmental Information; 2019. [10

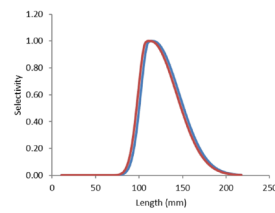
Susceptibility (pink shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>both. If data regarding spatial distributions are lacking, inferences on areal overlap may be made from knowledge of depth distributions of the fishery and the stock. For example, an upper bound estimate of areal overlap may be made from knowledge of the portion of fishing effort that occurs in the areas which encompass the depths occupied by a species.</p>						<p>shrimp was < 30%. The species is targeted primarily by Florida based vessels in SW Florida, and to a much lesser extent by Texas based vessels. In Texas, pink shrimp are targeted mainly for bait. While there is some use of skimmer trawls to target pink shrimp in Florida waters, it is minimal compared to the use of otter trawls, and skimmer trawls are not used by Texas based vessels (gear not allowed). Butterfly nets are little used to target shrimp except in Louisiana State waters, and even there only capture 2% of the overall State average shrimp landings per year. Pink, white, and brown shrimp are widely distributed around the Gulf but each has a definite centre of abundance. In US waters, the pink shrimp is distributed primarily in south and west Florida with a less abundant group off south Texas. This is illustrated in the figure below from the Gulf of Mexico Data Atlas⁶²⁰ showing probability of encounter of adult pink shrimp.</p>	<p>screens]. Available from: https://gulfatlas.noaa.gov/. https://www.ncei.noaa.gov/maps/gulf-data-atlas/atlas.htm?plate=Invertebrates%20-%20Pink%20Shrimp</p> <p>Dettloff, K. and A. Lowther 2023. Gulf of Mexico Effort Estimation. Presentation to GMFMC SSC March 7, 2023.</p>

⁶²⁰ Brown H, Gruss A, Hanisko D, Primrose J, Rester J, Rivero C, Sicheloff L, Williams J. Pink Shrimp In Gulf of Mexico Data Atlas [Internet]. Stennis Space Center (MS): National Centers for Environmental Information; 2019. [10 screens]. Available from: <https://gulfatlas.noaa.gov/>. <https://www.ncei.noaa.gov/maps/gulf-data-atlas/atlas.htm?plate=Invertebrates%20-%20Pink%20Shrimp>

Susceptibility (pink shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
						 <p>Figure E. Annual distribution maps for the adult stages of pink shrimp were produced by fitting geostatistical binomial generalized linear mixed models (GLMMs) to encounter/non-encounter data from a large monitoring database for the US Gulf of Mexico (US GOM).</p>  <p>Figure F. Distribution of shrimp fishing effort in the US GOM in 2020. Orange indicates areas within statistical units where 50% of the effort is distributed and blue areas include 95% of the effort.</p> <p>The foregoing supports agreement at the RBF workshop that the degree of overlap of the fishery with the distribution of commercial concentrations of pink shrimp is < 30% and likely between 10-30%. Therefore, the score for this attribute is 1.</p>	

Susceptibility (pink shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Geographic concentration: Geographical concentration is the extent to which the stock is concentrated into small areas. The rationale for including this attribute is that a stock with a relatively even distribution across its range may be less susceptible than a highly aggregated stock. For some species, a useful measure of this attribute is the minimum estimate of the proportion of area occupied by a certain percentage of the stock (Swain and Sinclair 1994), which can be computed in cases where survey data exist.</p> <p>For many stocks, this index gives a general index of areal coverage that relates well to geographic concentration. However, some stocks can cover a small area even though the stocks were not concentrated in a small number of locations (i.e., a “patchy” stock that is distributed over the survey area). Thus, some refinements to the index may be necessary to characterize geographic concentration in these cases.</p>	Stock is distributed in >50% of its total range	Stock is distributed in 25% to 50% of its total range.	Stock is distributed in <25% of its total range.	2	4	Stock is distributed in 25% to 50% of its total range.	
<p>Vertical overlap: Similar to geographical overlap, this attribute concerns the position of the stock within the water column (i.e., demersal or pelagic) relative to the fishing gear. Information on the depth at which gear is deployed (e.g., depth range of hooks for a pelagic longline fishery) and the depth preference of the species (e.g., obtained from archival tagging or other sources) can be used to estimate the degree of vertical overlap between fishing gear and a stock.</p>	<25% of the stock occurs in the depths fished.	Between 25% and 50% of the stock occurs in the depths fished	>50% of stock occurs in the depths fished	3	3	The position of all three shrimp species within the water column relative to the position and deployment characteristics of otter, skimmer and butterfly fishing gear is considered high, as these gears are designed for the capture of these shrimp species.	3
<p>Fishing mortality rate (relative to M): This criterion is applicable to stocks where estimates of both fishing mortality rates (F) and (M) are available. Because sustainable fisheries management typically involves conserving the reproductive potential of a stock, it is recommended that the average F on mature fish be used where possible as opposed to the fully selected or “peak” F. We base our thresholds on the conservative rule of thumb that the M should be an upper limit of F (Thompson 1993; Restrepo <i>et al.</i> 1998), and thus F/M should not exceed 1. For this attribute, we define intermediate F/M values as those between 0.5 and 1.0;</p>	<0.5	0.5 – 1.0	>1.0	1	2	Based On Masi 2020 the F2018 was 0.14 and the mean natural mortality was calculated as 3 F2018/M=0.047	Masi, M. 2020a. 2019 Gulf of Mexico Penaeid Shrimp Stock Assessments (2018 Terminal Year). Presentation to GMFMC SSC. In Meetings Materials folder for March 11, 2020, available at: https://gulfcouncil.org/meetings/meetingsarchive/Scientific&StatisticalMeetingsArchive

Susceptibility (pink shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
values above 1.0 or below 0.5 are defined as high and low susceptibility, respectively.							
Biomass of Spawners (SSB) or other proxies: Analogous to fishing mortality rate, the extent to which fishing has depleted the biomass of a stock relative to expected unfished levels offers information on realized susceptibility. One way to measure this is to compare the current stock biomass against an estimate of B0 (the estimated biomass with no fishing). If B0 is not available, one could compare the current stock size against the maximum observed from a time series of population size estimates (e.g., from a research survey). If a time series is used, it should be of adequate length (e.g., > 5 years). Note that the maximum observed survey estimate may not correspond to the true maximum biomass for stocks with substantial observation errors in survey biomass estimates. Additionally, stocks may decline in abundance from environmental factors not related to susceptibility to the fishery, so this should be considered in evaluating depletion estimates. Notwithstanding these issues, which can be addressed with the data quality score described below, some measure of current stock abundance was viewed as a useful attribute.	B is >40% of B0 (or maximum observed from time series of biomass estimates)	B is between 25% and 40% of B0 (or maximum observed from time series of biomass estimates)	B is <35% of B0 (or maximum observed from time series of biomass estimates)	2	4	Based on inference of SSB and CPUE plots	Masi, M. 2020a. 2019 Gulf of Mexico Penaeid Shrimp Stock Assessments (2018 Terminal Year). Presentation to GMFMC SSC. In Meetings Materials folder for March 11, 2020, available at: https://gulfcouncil.org/meetings/meetingsarchive/Scientific&StatisticalMeetingsArchive
Seasonal migrations: Seasonal migrations either to or from the fishery area (i.e., spawning or feeding migrations) could affect the overlap between the stock and the fishery. This attribute also pertains to cases where the location of the fishery changes seasonally, which may be relevant for stocks captured as bycatch.	Seasonal migrations decrease overlap with the fishery	Seasonal migrations do not substantially affect the overlap with the fishery	Seasonal migrations increase overlap with the fishery	3	4	There is evidence for penaeid species such as pink shrimp that is normally fished in the warm months.	https://americanshrimp.com/ridin-the-tide-out/
Schooling, aggregation, and other behavior's: This attribute encompasses behavioral responses of both individual fish and the stock in response to fishing. Individual responses may include, for example, herding or gear avoidance behavior that would affect catchability. An example of a population-level response is a reduction in the area of stock distribution with reduction in population size, potentially leading to increases in catchability (MacCall 1990).	Behavioral responses decrease catchability of the gear	Behavioral responses do not substantially affect the catchability of the gear	Behavioral responses increase the catchability of the gear (i.e., hyper-stability of CPUE with	3	4	Due to their seasonal migrations, they are more susceptible to be caught.	

Susceptibility (pink shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
			schooling behavior).				
<p>Morphology affecting capture: This attribute pertains to the ability of the fishing gear to capture fish based on their morphological characteristics (e.g., body shape, spiny versus soft rayed fins). Because gear selectivity varies with size and age, this measure should be based on the age or size classes most representative of the entire stock.</p>	Species shows low selectivity to the fishing gear	Species show moderate selectivity of the fishing gear	Species show high selectivity to the fishing gear	2	1	<p>In pink shrimp, which mature at 84 mm total length (see section 7.2.2), the commercial size selection figure in Hart (2018a) indicates this size is at the very low end of the range retained in commercial catches (Figure J).</p>  <p>It was agreed at the workshop that pink shrimp < size at maturity are caught in < 50% of gear deployments. Therefore, the risk score for category (a) should be 2.</p>	<p>Hart, R.A. 2018a. Stock Assessment Update for Pink Shrimp (<i>Farfantepenaeus duorarum</i>) in the US Gulf of Mexico for the 2017 Fishing Year. NOAA Fisheries, Southeast Fisheries Science Center, Galveston Laboratory, Galveston, TX 77551. https://gulfcouncil.org/wp-content/uploads/D-4c-Pink-Assess_Rpt-2018_CPT.pdf</p>
<p>Survival after capture and release: Fish survival after capture and release varies by species, region, and gear type or even market conditions, and thus can affect the susceptibility of the stock. When data are lacking, the VEWG suggest using NMFS' National Bycatch Report to estimate bycatch mortality (see the following for Alaska Region http://www.nmfs.noaa.gov/by_catch/BREP2011/Factsheets/NBRfactsheet_AK.pdf). The report provides comprehensive estimates of bycatch of fish, marine mammals, and non-marine mammal protected resources in major US commercial fisheries and should allow users to develop a proxy based on similar fisheries.</p>	Probability of survival >67%	Probability of survival between 33% and 67%	Probability of survival <33%	3	1	White shrimp is target species. Thus, there are no catch and release.	

Susceptibility (pink shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Desirability/value of the fishery: This attribute assumes that highly valued fish stocks are more susceptible to overfishing or becoming overfished by recreational or commercial fishermen due to increased effort. To identify the value of the fish, the authors suggest using the price per pound or annual landing value for commercial stocks (using the higher of the two values) or the retention rates for recreational fisheries (Table 3). Commercial landings and recreational retention rates can be found at: www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html and www.st.nmfs.noaa.gov/st1/recreational/queries/index.html</p>	Stock is not highly valued or desired by the fishery	Stock is moderately valued or desired by the fishery	Stock is highly valued or desired by the fishery	3	1	In 2021, landings of pink shrimp totalled 12.3 million pounds and were valued at \$37 million, according to the NOAA Fisheries commercial fishing landings database.	https://www.fisheries.noaa.gov/species/pink-shrimp
<p>Fishery impact on habitat: A fishery may have an indirect effect on a species via adverse impacts on habitat. Defining these effects is the focus of environmental impact statements or essential fish habitat evaluations that have been conducted by NMFS, and this work can be used to evaluate this attribute. Thus, the impacts on habitat may be categorized with respect to whether adverse impacts on habitat are minimal, temporary, or mitigated.</p>	Adverse effects absent, minimal or temporary	Adverse effects more than minimal or temporary, but are mitigated	Adverse effects more than minimal or temporary and are not mitigated	2	1	Penaeid shrimp in the Gulf and South Atlantic are fished by bottom trawls on silt, mud, shell, or sand benthos (SAFMC 2009a)(NMFS 2012a). Moderate mitigations of impacts to habitat from shrimp fisheries are in place. In the Gulf, the Essential Fish Habitat (EFH) Generic Amendment 3 prohibited trawling (as well as other gear types) on all coral areas throughout the Gulf exclusive economic zone (EEZ) and required weak links in tickler chains of bottom trawls in all habitats (GMFMC 2005b). Although indirect, the substantial decline in fishing effort has effectively reduced the habitat impact of shrimp fisheries. Fishing effort in the Gulf during 2008–2009	https://www.fisheries.noaa.gov/species/pink-shrimp

Susceptibility (pink shrimp)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
						was an estimated 61% less than in 2001. A 10-year moratorium on issuing new federal commercial shrimp vessel permits was established in 2006 and extended another 10 years in 2016 (GMFMC 2016).	

Table 46. Productivity analysis for the hardhead catfish (*Arius felis*).

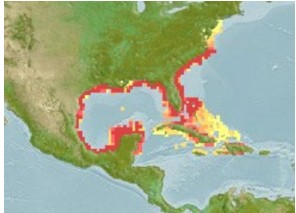
Productivity (hardhead catfish)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
Population growth (r): This is the intrinsic rate of population growth or maximum population growth that would be expected to occur in a population under natural conditions (i.e., no fishing), and thus directly reflects stock productivity. The scoring definitions were taken from Musick (1999), who stated that r should take precedence over other productivity attributes (e.g., given a weighting of 4) as it combines many of the other attributes defined below.	>0.5	0.5- 0.16 (midpoint 0.10)	>0.16	1	3	Based on Fishbase assessment of population doubling time, r is between 0.05 and 0.15.	https://www.fishbase.se/summary/Ariopsis-felis
Maximum age (tmax): Maximum age is a direct indication of the natural mortality rate (M), where low levels of M are negatively correlated with high maximum ages (Hoenig 1983). The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The tmax for a majority of these fish ranges between 10 to 30 years.	<10 years	10-30 years (midpoint 20 years)	>30 years	2	1	Hardhead catfish live between 18 and 24 years.	Flynn, S., Midway, S. and Ostrowski, A. (2019), Age and Growth of Hardhead Catfish and Gafftopsail Catfish in Coastal Louisiana, USA. Mar Coast Fish, 11: 362-371. https://doi.org/10.1002/mcf2.10089
Maximum size (Lmax): Maximum size is also correlated with productivity, with large fish tending to have lower levels of productivity (Roberts and Hawkins 1999), though this relationship tends to degrade at higher taxonomic levels. The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The Lmax for a majority of these fish ranges between 60 to 150 cm TL.	<60 cm	60-150 cm (midpoint 105 cm)	>150 cm	3	2	Max length: 50cm to 70cm	https://www.fishbase.se/summary/Ariopsis-felis reference: IGFA, 2001. Database of IGFA angling records until 2001.
Growth coefficient (k): The von Bertalanffy growth coefficient measures how rapidly a fish reaches its maximum size, where long-lived, low-productivity stocks tend to have low values of k (Froese and Binohlan 2000). The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.15 to 0.25. This is roughly consistent with the values obtained from Froese and Binohlan's	>0.25	0.15 – 0.25	<0.15	2	3	Growth coefficient k: 0.18	https://www.fishbase.se/summary/Ariopsis-felis

Productivity (hardhead catfish)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
(2000) empirical relationship $k = 3/t_{max}$ of to 0.3, based upon t_{max} values of 10 and 30.							
Natural mortality (M): Natural mortality rate directly reflects population productivity, as stocks with high rates of natural mortality will require high levels of production in order to maintain population levels. Several methods for estimating M rely upon the negative relationship between M and t_{max} , including Hoenig's (1983) regression based upon empirical data, the quantile method that depends upon exponential mortality rates (Hoenig 1983), and Alverson and Carney's (1975) relationship between mortality, growth, and t_{max} . The attribute scoring thresholds from the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.2 to 0.4 and were roughly consistent with those produced from Hoenig's (1983) empirical regression of 0.14 to 0.4, based on t_{max} values of 10 and 30.	>0.40	0.20 – 0.40	<0.20	2	3	Natural mortality (M): 0.31	https://www.fishbase.se/summary/Ariopsis-felis
Fecundity: Fecundity (i.e., the number of eggs produced by a female for a given spawning event or period) varies with size and age of the spawner, so the authors followed Musick's (1999) recommendation that fecundity should be measured at the age of first maturity. As Musick (1999) noted, low values of fecundity imply low population productivity, but high values of fecundity do not necessarily imply high population productivity; thus, this attribute may be more useful at the lower fecundity values. The scoring definitions were taken from Musick (1999), which range between fecundities of 1,000 and 100,000.	>10e4	10e2 – 10e3	<10e2	1	1	Estimated mean fecundity is 86 oocytes with a range of 35 to 195.	Pensinger L. G. 2020. Reproductive Biology and Trophic Niche of Hardhead Catfish in the Northern Gulf of Mexico. LSU Master thesis. https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=6089&context=gradschool_theses#:~:text=Mean%20fecundity%20is%2086%20oocytes,range%20of%2035%2D196%20oocytes
Breeding strategy: The breeding strategy of a stock provides an indication of the level of mortality that might be expected for the offspring in the first stages of life. To estimate offspring mortality, the authors used Winemiller's (1989) index of parental investment. The index ranges in score from 0 to 14 and is composed of: 1) the placement of larvae or zygotes (i.e., in nest or into water column; score ranges from 0 to 2); 2) the length of	0	Between 1 and 3	≥4	3	1	Mouth brooder. Males carry fertilized eggs in their mouths until the offspring hatch. This reproductive strategy is functionally equivalent to live bearing reproductive strategy.	Pensinger L. G. 2020. Reproductive Biology and Trophic Niche of Hardhead Catfish in the Northern Gulf of Mexico. LSU Master thesis. https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?

Productivity (hardhead catfish)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
time of parental protection of zygotes or larvae (score ranges from 0 to 4); and 3) the length of gestation period or nutritional contribution (score ranges from 0 to 8). To translate Winemiller's index into our 1-3 ranking system, the authors examined King and McFarlane's (2003) parental investment scores for 42 North Pacific stocks. These 42 stocks covered a wide range of life-histories and habitats, including 10 surface pelagic, 3 mid-water pelagic, 3 deep-water pelagic, 18 near-shore benthic, and 9 offshore benthic stocks. Thirty-one percent of the stocks had a Winemiller score of zero, and 40% had a Winemiller score of 4 or higher, so 0 and 4 were used as the breakpoints between the ranking categories.							rticle=6089&context=gradschool_theses#:~:text=Mean%20fecundity%20is%2086%20oocytes,range%20of%2035%2D196%20oocytes
Recruitment pattern: Stocks with sporadic and infrequent recruitment success often are long-lived and thus might be expected to have lower levels of productivity (Musick 1999). This attribute is intended as a coarse index to distinguish stocks with sporadic recruitment patterns and high frequency of year-class failures from those with relatively steady recruitment. Thus, the frequency of year-class success (defined as exceeding a recruitment level associated with year-class failure) was used for this attribute. Because this attribute was viewed as a coarse index, 10% and 75% were chosen as the breakpoints between the ranking categories so that scores of 1 and 3 identified relatively extreme differences in recruitment patterns.	Highly frequent recruitment success (>75% of year classes are successful)	Moderately frequent recruitment success (between 10% and 75% of year classes are successful)	Infrequent recruitment success (<10% of year classes are successful)	N/A	5		
Age at maturity (tmat): Age at maturity tends to be positively related with maximum age (tmax), as long-lived, lower productivity stocks will have higher ages at maturity relative to short-lived stocks. The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 2 to 4 years. This range is lower than that observed from Froese and Binohlan's (2000) empirical relationship between tmat and tmax, which was 3 to 9 based upon values of tmax of 10 and 30. However, Froese and Binohlan (2000) used data from many fish stocks around the world, which may not be representative of US stocks.	< 2 years	2 – 4 years	>4 years	2	3	3.6 years	https://www.fishbase.org/summary/Ariopsis-felis

Productivity (hardhead catfish)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
For the PSA, the thresholds obtained from the ANOVA applied to stocks considered representative of US fisheries were used.							
Mean trophic level: The position of a stock within the larger fish community can be used to infer stock productivity, with lower-trophic-level stocks generally being more productive than higher-trophic-level stocks. The trophic level of a stock can be computed as a function of the trophic levels of the organisms in its diet. For this attribute, stocks with trophic levels higher than 3.5 were categorized as low productivity stocks and stocks with trophic levels less than 2.5 were categorized as high-productivity stocks, with moderate productivity stocks falling between these bounds. These attribute threshold roughly categorize piscivores to higher trophic levels, omnivores to intermediate trophic levels, and planktivores to lower trophic levels (Pauly <i>et al.</i> 1998).	< 2.5	2.5 – 3.5	>3.5	2	3	Trophic level: 3.2	https://www.fishbase.se/summary/Ariopsis-felis

Table 47. Susceptibility analysis for the hardhead catfish (*Arius felis*).

Susceptibility (hardhead catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Management strategy: The susceptibility of a stock to overfishing may largely depend on the effectiveness of fishery management procedures used to control catch (Sethi <i>et al.</i> 2005, Rosenberg <i>et al.</i> 2007, Shertzer <i>et al.</i> 2008, Dankel <i>et al.</i> 2008). Stocks that are managed using catch limits for which the fishery can be closed before the catch limit is exceeded (i.e., in- season or proactive accountability measures) re considered to have a low susceptibility to overfishing. However, stocks that do not have specified catch limits or accountability measures are highly susceptible to overfishing if their abundance trends are not monitored. Stocks that are managed using catch limits and reactive accountability measures (e.g., catch levels are not determined until after the fishing season) are considered to be moderately susceptible to overfishing or becoming overfished.</p>	Targeted stocks have catch limits and proactive accountability measures; non target stocks are closely monitored	Targeted stocks have catch limits and reactive accountability measures	Targeted stocks do not have catch limits or accountability measures; non target stocks are not closely monitored	2	2	Management for the hardhead catfish is often grouped by like fishes. In Texas, there are limits on the number of catfish that can be taken in recreational fishing. In Florida, it is part of the “unregulated” species grouping which limits anglers to two fish or 100 lbs., whichever is larger.	https://myfwc.com/fishing/saltwater/recreational/unregulated/ https://tpwd.texas.gov/regulations/outdoor-annual/fishing/saltwater-fishing/bag-length-limits/catfish-bag-length-limits-saltwater
<p>Areal overlap: This attribute pertains to the extent of geographic overlap between the known distribution of a stock and the distribution of the fishery. Greater overlap implies greater susceptibility, as some degree of geographical overlap is necessary for a fishery to impact a stock. The simplest approach is to determine, either qualitatively or quantitatively, the proportion of the spatial distribution of a given fishery that overlaps that of the stock, based on known geographical distributions of both. If data regarding spatial distributions are lacking, inferences on areal overlap may be made from knowledge of depth distributions of the fishery and the stock. For example, an upper bound estimate of areal overlap may be made from knowledge of the portion of fishing effort that occurs in the areas which encompass the depths occupied by a species.</p>	<25% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	>50% of stock occurs in the area fished	3	3	<p>This species is known to occur in the GOM and the southern Atlantic coast of the US. In the GOM, they are commonly found in inshore brackish waters. As much of the fishery occurs in offshore waters outside of the coastal geographic distribution of the stock, there is low overlap between the stock and the fishery.</p>  <p>Score: <25%</p>	https://www.fishbase.se/summary/Ariopsis-felis
<p>Geographic concentration: Geographical concentration is the extent to which the stock is concentrated into small</p>	Stock is distributed in	Stock is distributed in	Stock is distributed in	3	3	There is fairly uniform distribution of these species	https://www.fishbase.se/summary/Ariopsis-felis

Susceptibility (hardhead catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>areas. The rationale for including this attribute is that a stock with a relatively even distribution across its range may be less susceptible than a highly aggregated stock. For some species, a useful measure of this attribute is the minimum estimate of the proportion of area occupied by a certain percentage of the stock (Swain and Sinclair 1994), which can be computed in cases where survey data exist.</p> <p>For many stocks, this index gives a general index of areal coverage that relates well to geographic concentration. However, some stocks can cover a small area even though the stocks were not concentrated in a small number of locations (i.e., a “patchy” stock that is distributed over the survey area). Thus, some refinements to the index may be necessary to characterize geographic concentration in these cases.</p>	>50% of its total range	25% to 50% of its total range	<25% of its total range			around the GOM, however, they are concentrated closer to the coast where the water experiences a gradient of salinities. Thus, the total abundance of the GOM stock is distributed in >50% of the GOM.	
<p>Vertical overlap: Similar to geographical overlap, this attribute concerns the position of the stock within the water column (i.e., demersal or pelagic) relative to the fishing gear. Information on the depth at which gear is deployed (e.g., depth range of hooks for a pelagic longline fishery) and the depth preference of the species (e.g., obtained from archival tagging or other sources) can be used to estimate the degree of vertical overlap between fishing gear and a stock.</p>	<25% of the stock occurs in the depths fished.	Between 25% and 50% of the stock occurs in the depths fished	>50% of stock occurs in the depths fished	1	3	The hardhead catfish is a benthic species that occurs over soft, muddy bottoms. This habitat type is the ideal shrimping habitat. There is high vertical overlap between this species and the gear types.	https://www.fishbase.se/su/mmary/Ariopsis-felis
<p>Fishing mortality rate (relative to M): This criterion is applicable to stocks where estimates of both fishing mortality rates (F) and (M) are available. Because sustainable fisheries management typically involves conserving the reproductive potential of a stock, it is recommended that the average F on mature fish be used where possible as opposed to the fully selected or “peak” F. We base our thresholds on the conservative rule of thumb that the M should be an upper limit of F (Thompson 1993; Restrepo <i>et al.</i> 1998), and thus F/M should not exceed 1. For this attribute, we define intermediate F/M values as those between 0.5 and 1.0; values above 1.0 or below 0.5 are defined as high and low susceptibility, respectively.</p>	<0.5	0.5 – 1.0	>1.0	N/A	5		

Susceptibility (hardhead catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
Biomass of Spawners (SSB) or other proxies: Analogous to fishing mortality rate, the extent to which fishing has depleted the biomass of a stock relative to expected unfished levels offers information on realized susceptibility. One way to measure this is to compare the current stock biomass against an estimate of B0 (the estimated biomass with no fishing). If B0 is not available, one could compare the current stock size against the maximum observed from a time series of population size estimates (e.g., from a research survey). If a time series is used, it should be of adequate length (e.g., > 5 years). Note that the maximum observed survey estimate may not correspond to the true maximum biomass for stocks with substantial observation errors in survey biomass estimates. Additionally, stocks may decline in abundance from environmental factors not related to susceptibility to the fishery, so this should be considered in evaluating depletion estimates. Notwithstanding these issues, which can be addressed with the data quality score described below, some measure of current stock abundance was viewed as a useful attribute.	B is >40% of B0 (or maximum observed from time series of biomass estimates)	B is between 25% and 40% of B0 (or maximum observed from time series of biomass estimates)	B is <35% of B0 (or maximum observed from time series of biomass estimates)	N/A	5		
Seasonal migrations: Seasonal migrations either to or from the fishery area (i.e., spawning or feeding migrations) could affect the overlap between the stock and the fishery. This attribute also pertains to cases where the location of the fishery changes seasonally, which may be relevant for stocks captured as bycatch.	Seasonal migrations decrease overlap with the fishery.	Seasonal migrations do not substantially affect the overlap with the fishery.	Seasonal migrations increase overlap with the fishery.	2	4	There are no seasonal migrations of the hardhead catfish and as such migrations neither increase nor decrease overlap between the stock and the fishery.	https://www.ohwy.com/us/h/hardhead.htm
Schooling, aggregation, and other behavior's: This attribute encompasses behavioral responses of both individual fish and the stock in response to fishing. Individual responses may include, for example, herding or gear avoidance behavior that would affect catchability. An example of a population-level response is a reduction in the area of stock distribution with reduction in population size, potentially leading to increases in catchability (MacCall 1990).	Behavioral responses decrease catchability of the gear.	Behavioral responses do not substantially affect the catchability of the gear.	Behavioral responses increase the catchability of the gear (i.e., hyper-stability of CPUE with schooling behavior).	2	4	This species is an opportunistic bottom-feeder which consumes both live and recently deceased animals. They are often found in large, loosely formed school outside of spawning events.	https://www.wlf.louisiana.gov/species/detail/hardhead-catfish
Morphology affecting capture: This attribute pertains to the ability of the fishing gear to capture fish based on their	Species shows low	Species show moderate	Species show high	3	3	This species is not a frequently caught species by	https://www.fishbase.se/su/mmary/Ariopsis-felis

Susceptibility (hardhead catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>morphological characteristics (e.g., body shape, spiny versus soft rayed fins). Because gear selectivity varies with size and age, this measure should be based on the age or size classes most representative of the entire stock.</p>	<p>selectivity to the fishing gear</p>	<p>selectivity of the fishing gear</p>	<p>selectivity to the fishing gear</p>			<p>otter trawl and butterfly net gear types. As these species are larger than shrimp, they will not escape the mesh of the codend of the net. However, it is possible that larger individuals of the species can be excluded from the gear via the TEDs and BRDs that are required on otter trawl vessels >40ft. Butterfly nets are often fixed to a dock to fish the water column during changing tides. Although the shrimp do not have the ability to outswim the current and escape the gear, these catfish species can escape the stationary butterfly nets.</p>	
<p>Survival after capture and release: Fish survival after capture and release varies by species, region, and gear type or even market conditions, and thus can affect the susceptibility of the stock. When data are lacking, the VEWG suggest using NMFS' National Bycatch Report to estimate bycatch mortality (see the following for Alaska Region http://www.nmfs.noaa.gov/by_catch/BREP2011/Factsheets/NBRfactsheet_AK.pdf). The report provides comprehensive estimates of bycatch of fish, marine mammals, and non-marine mammal protected resources in major US commercial fisheries and should allow users to develop a proxy based on similar fisheries.</p>	<p>Probability of survival >67%</p>	<p>Probability of survival between 33% and 67%</p>	<p>Probability of survival <33%</p>	<p>3</p>	<p>1</p>	<p>These catfish are not a retained species. Furthermore, catfish species are considered very hardy fish (Peyton Cagle, LDWF Crustacean Program pers. comm). This can be also deducted from Table 3 of the GULF RFM Louisiana Blue crab fishery 3rd Surveillance report where, of all of the catfish species caught in derelict crab traps (i.e. lost traps with very high soak time) in Pontchartrain, Barataria and Terrebonne Basins from 2016-2017, 89% were found alive. The post capture mortality in (mostly passive) butterfly nets, considering the 1-2 hours</p>	<p>Ciccia Romito V., Lipcius R. 2020. Audubon Nature Institute Gulf United For Lasting Fisheries (G.U.L.F.) Responsible Fisheries. Management Certification Scheme 3rd Surveillance Assessment Report For The Louisiana Blue Crab Commercial Fishery https://www.audubongulf.org/wp-content/uploads/2020/05/Form-9i-1-GULF-RFM-LA-</p>

Susceptibility (hardhead catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
						soak time, is conceivably higher if not at least comparable to that a derelict trap mortality. Hardhead and gafftopsail catfish are not generally retained and are therefore released back in the water. The effective bycatch and mortality of these catfish species is therefore considered nominal. The chance that, if captured, both catfish species would be released and in a condition permitting subsequent survival is considered high, equivalent to a risk score of 3 =Evidence of majority released post-capture and survival.	Blue-Crab-3rd-Surveillance-FINAL-28Jan2020.pdf
Desirability/value of the fishery: This attribute assumes that highly valued fish stocks are more susceptible to overfishing or becoming overfished by recreational or commercial fishermen due to increased effort. To identify the value of the fish, the authors suggest using the price per pound or annual landing value for commercial stocks (using the higher of the two values) or the retention rates for recreational fisheries (Table 3). Commercial landings and recreational retention rates can be found at: www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html and www.st.nmfs.noaa.gov/st1/recreational/queries/index.html	Stock is not highly valued or desired by the fishery	Stock is moderately valued or desired by the fishery	Stock is highly valued or desired by the fishery	3	2	Commercial landing of this species is low to non-existent. This species is often discarded for multiple reasons including lack of monetary value, avoidance of slimy cleanup, and most of all, safety to due to the venomous spines on dorsal and pectoral fins. This indicates that the species is discarded from gear and not retained for any value.	www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.htm
Fishery impact on habitat: A fishery may have an indirect effect on a species via adverse impacts on habitat. Defining these effects is the focus of environmental impact statements or essential fish habitat evaluations that have been conducted by NMFS, and this work can be used to evaluate this attribute. Thus, the impacts on	Adverse effects absent, minimal or temporary	Adverse effects more than minimal or temporary, but are mitigated	Adverse effects more than minimal or temporary and are not mitigated	3	1	Hardhead catfish live on muddy bottoms where the primary habitat for shrimp fishing occurs. It is well documented that the effects from otter trawl and butterfly	Jennings, S., Pinnegar, J.K., Polunin, N.V. and Warr, K.J., 2001. Impacts of trawling disturbance on the trophic structure of benthic invertebrate communities.

Susceptibility (hardhead catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>habitat may be categorized with respect to whether adverse impacts on habitat are minimal, temporary, or mitigated.</p>						<p>nets do not adversely affect the structure, functionality, biotic composition of muddy and other soft bottom habitats. Thus, the effects from these gears do not affect the habitat that negatively impacts the species.</p>	<p>Marine Ecology Progress Series, 213, pp.127-142. https://www.jstor.org/stable/24864207?seq=1</p> <p>Hiddink, J. G., Jennings, S., Sciberras, M., Szostek, C. L., Hughes, K. M., Ellis, N., Rijnsdorp, A. D., McConnaughey, R. A., Mazor, T., Hilborn, R., Collie, J. S., Pitcher, C. R., Amoroso, R. O., Parma, A. M., Suuronen, P., & Kaiser, M. J. 2017. Global analysis of depletion and recovery of seabed biota after bottom trawling disturbance. Proceedings of the National Academy of Sciences of the United States of America, 114(31), 8301–8306. https://doi.org/10.1073/pnas.1618858114</p>

Table 48. Productivity analysis for the Gafftopsail catfish (*Barge marinus*).


Productivity (Gafftopsail catfish)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
Population growth (r): This is the intrinsic rate of population growth or maximum population growth that would be expected to occur in a population under natural conditions (i.e., no fishing), and thus directly reflects stock productivity. The scoring definitions were taken from Musick (1999), who stated that r should take precedence over other productivity attributes (e.g., given a weighting of 4) as it combines many of the other attributes defined below.	>0.5	0.5- 0.16 (midpoint 0.10)	>0.16	1	3	Based on Fishbase assessment of population doubling time, r is between 0.05 and 0.15.	https://fishbase.mnhn.fr/speciessummary.php?ID=959&AT=gafftopsail+catfish
Maximum age (tmax): Maximum age is a direct indication of the natural mortality rate (M), where low levels of M are negatively correlated with high maximum ages (Hoenig 1983). The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The tmax for a majority of these fish ranges between 10 to 30 years.	<10 years	10-30 years (midpoint 20 years)	>30 years	3	1	Hardhead catfish live between 9 and 10 years.	Flynn, S., Midway, S. and Ostrowski, A. (2019), Age and Growth of Hardhead Catfish and Gafftopsail Catfish in Coastal Louisiana, USA. Mar Coast Fish, 11: 362-371. https://doi.org/10.1002/mcf2.10089
Maximum size (Lmax): Maximum size is also correlated with productivity, with large fish tending to have lower levels of productivity (Roberts and Hawkins 1999), though this relationship tends to degrade at higher taxonomic levels. The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The Lmax for a majority of these fish ranges between 60 to 150 cm TL.	<60 cm	60-150 cm (midpoint 105 cm)	>150 cm	2	3	Max length: 69 cm	https://fishbase.mnhn.fr/speciessummary.php?ID=959&AT=gafftopsail+catfish
Growth coefficient (k): The von Bertalanffy growth coefficient measures how rapidly a fish reaches its maximum size, where long-lived, low-productivity stocks tend to have low values of k (Froese and Binohlan 2000). The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.15 to 0.25. This is roughly consistent with the values obtained from Froese and Binohlan's (2000) empirical relationship $k = 3 / t_{max}$ of 0.1 to 0.3, based upon tmax values of 10 and 30.	>0.25	0.15 – 0.25	<0.15	2	3	Growth coefficient k: 0.19	https://fishbase.mnhn.fr/speciessummary.php?ID=959&AT=gafftopsail+catfish

Productivity (Gafftopsail catfish)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
<p>Natural mortality (M): Natural mortality rate directly reflects population productivity, as stocks with high rates of natural mortality will require high levels of production in order to maintain population levels. Several methods for estimating M rely upon the negative relationship between M and tmax, including Hoenig's (1983) regression based upon empirical data, the quantile method that depends upon exponential mortality rates (Hoenig 1983), and Alverson and Carney's (1975) relationship between mortality, growth, and tmax. The attribute scoring thresholds from the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.2 to 0.4 and were roughly consistent with those produced from Hoenig's (1983) empirical regression of 0.14 to 0.4, based on tmax values of 10 and 30.</p>	>0.40	0.20 – 0.40	<0.20	2	3	Natural mortality (M): 0.32	https://fishbase.mnhn.fr/summary/SpeciesSummary.php?ID=959&AT=gafftopsail+catfish
<p>Fecundity: Fecundity (i.e., the number of eggs produced by a female for a given spawning event or period) varies with size and age of the spawner, so the authors followed Musick's (1999) recommendation that fecundity should be measured at the age of first maturity. As Musick (1999) noted, low values of fecundity imply low population productivity, but high values of fecundity do not necessarily imply high population productivity; thus, this attribute may be more useful at the lower fecundity values. The scoring definitions were taken from Musick (1999), which range between fecundities of 1,000 and 100,000.</p>	>10e4	10e2 – 10e3	<10e2	1	1	Estimated mean fecundity is 33 oocytes with a range of 21 to 62.	Pensinger L. G. 2020. Reproductive Biology and Trophic Niche of Hardhead Catfish in the Northern Gulf of Mexico. LSU Master thesis. https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=6089&context=gradschool_theses#:~:text=Mean%20fecundity%20is%2086%20oocytes,range%20of%2035%2D196%20oocytes
<p>Breeding strategy: The breeding strategy of a stock provides an indication of the level of mortality that might be expected for the offspring in the first stages of life. To estimate offspring mortality, the authors used Winemiller's (1989) index of parental investment. The index ranges in score from 0 to 14 and is composed of: 1) the placement of larvae or zygotes (i.e., in nest or into water column; score ranges from 0 to 2); 2) the length of time of parental protection of zygotes or larvae (score ranges from 0 to 4); and 3) the length of gestation period or nutritional contribution (score ranges from 0 to 8). To</p>	0	Between 1 and 3	≥4	1	1	Mouth brooder. Males carry fertilized eggs in their mouths until the offspring hatch. This reproductive strategy is functionally equivalent to live bearing reproductive strategy.	Pensinger L. G. 2020. Reproductive Biology and Trophic Niche of Hardhead Catfish in the Northern Gulf of Mexico. LSU Master thesis. https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=6089&context=gradschool_theses#:~:text=Mean%20fecundity%20is%2086%20oocytes,range%20of%2035%2D196%20oocytes

Productivity (Gafftopsail catfish)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
translate Winemiller's index into our 1-3 ranking system, the authors examined King and McFarlane's (2003) parental investment scores for 42 North Pacific stocks. These 42 stocks covered a wide range of life-histories and habitats, including 10 surface pelagic, 3 mid-water pelagic, 3 deep-water pelagic, 18 near-shore benthic, and 9 offshore benthic stocks. Thirty-one percent of the stocks had a Winemiller score of zero, and 40% had a Winemiller score of 4 or higher, so 0 and 4 were used as the breakpoints between the ranking categories.							20ocytes.range%20of%2035%2D196%20ocytes
Recruitment pattern: Stocks with sporadic and infrequent recruitment success often are long-lived and thus might be expected to have lower levels of productivity (Musick 1999). This attribute is intended as a coarse index to distinguish stocks with sporadic recruitment patterns and high frequency of year-class failures from those with relatively steady recruitment. Thus, the frequency of year-class success (defined as exceeding a recruitment level associated with year-class failure) was used for this attribute. Because this attribute was viewed as a coarse index, 10% and 75% were chosen as the breakpoints between the ranking categories so that scores of 1 and 3 identified relatively extreme differences in recruitment patterns.	Highly frequent recruitment success (>75% of year classes are successful)	Moderately frequent recruitment success (between 10% and 75% of year classes are successful)	Infrequent recruitment success (<10% of year classes are successful)	N/A	5		
Age at maturity (tmat): Age at maturity tends to be positively related with maximum age (tmax), as long-lived, lower productivity stocks will have higher ages at maturity relative to short-lived stocks. The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 2 to 4 years. This range is lower than that observed from Froese and Binohlan's (2000) empirical relationship between tmat and tmax, which was 3 to 9 based upon values of tmax of 10 and 30. However, Froese and Binohlan (2000) used data from many fish stocks around the world, which may not be representative of US stocks. For the PSA, the thresholds obtained from the ANOVA applied to stocks considered representative of US fisheries were used.	< 2 years	2 – 4 years	>4 years	2	3	3.4 years	https://fishbase.mnhn.fr/summary/SpeciesSummary.php?ID=959&AT=gafftopsail+catfish

Productivity (Gafftopsail catfish)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
<p>Mean trophic level: The position of a stock within the larger fish community can be used to infer stock productivity, with lower-trophic-level stocks generally being more productive than higher-trophic-level stocks. The trophic level of a stock can be computed as a function of the trophic levels of the organisms in its diet. For this attribute, stocks with trophic levels higher than 3.5 were categorized as low productivity stocks and stocks with trophic levels less than 2.5 were categorized as high-productivity stocks, with moderate productivity stocks falling between these bounds. These attribute threshold roughly categorize piscivores to higher trophic levels, omnivores to intermediate trophic levels, and planktivores to lower trophic levels (Pauly <i>et al.</i> 1998).</p>	< 2.5	2.5 – 3.5	>3.5	2	3	Trophic level: 3.5	https://fishbase.mnhn.fr/summary/SpeciesSummary.php?ID=959&AT=gafftopsail+catfish

Table 49. Susceptibility analysis for the Gafftopsail catfish (*Barge marinus*).

Susceptibility (Gafftopsail catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Management strategy: The susceptibility of a stock to overfishing may largely depend on the effectiveness of fishery management procedures used to control catch (Sethi <i>et al.</i> 2005, Rosenberg <i>et al.</i> 2007, Shertzer <i>et al.</i> 2008, Dankel <i>et al.</i> 2008). Stocks that are managed using catch limits for which the fishery can be closed before the catch limit is exceeded (i.e., in- season or proactive accountability measures) re considered to have a low susceptibility to overfishing. However, stocks that do not have specified catch limits or accountability measures are highly susceptible to overfishing if their abundance trends are not monitored. Stocks that are managed using catch limits and reactive accountability measures (e.g., catch levels are not determined until after the fishing season) are considered to be moderately susceptible to overfishing or becoming overfished.</p>	<p>Targeted stocks have catch limits and proactive account ability measures; non target stocks are closely monitored</p>	<p>Targeted stocks have catch limits and reactive account ability measures</p>	<p>Targeted stocks do not have catch limits or account ability measures; non target stocks are not closely monitored</p>	2	2	<p>Management for the Gafftopsail catfish is often grouped by like fishes. In Texas, there are limits on the number of catfish that can be taken in recreational fishing. In Florida, it is part of the “unregulated” species grouping which limits anglers to two fish or 100 lb, whichever is larger.</p>	<p>https://myfwc.com/fishing/saltwater/recreational/unregulated/</p> <p>https://tpwd.texas.gov/regulations/outdoor-annual/fishing/saltwater-fishing/bag-length-limits/catfish-bag-length-limits-saltwater</p>
<p>Areal overlap: This attribute pertains to the extent of geographic overlap between the known distribution of a stock and the distribution of the fishery. Greater overlap implies greater susceptibility, as some degree of geographical overlap is necessary for a fishery to impact a stock. The simplest approach is to determine, either qualitatively or quantitatively, the proportion of the spatial distribution of a given fishery that overlaps that of the stock, based on known geographical distributions of both. If data regarding spatial distributions are lacking, inferences on areal overlap may be made from knowledge of depth distributions of the fishery and the stock. For example, an upper bound estimate of areal overlap may be made from knowledge of the portion of fishing effort that occurs in the areas which encompass the depths occupied by a species.</p>	<p><25% of stock occurs in the area fished</p>	<p>Between 25% and 50% of the stock occurs in the area fished</p>	<p>>50% of stock occurs in the area fished</p>	3	3	<p>This species is known to occur in south American Atlantic coast, GOM and the southern Atlantic coast of the US In the GOM, they are commonly found in inshore brackish waters. As much of the fishery occurs in offshore waters outside of the coastal geographic distribution of the stock, there is low overlap between the stock and the fishery.</p>  <p>Score: <25%</p>	<p>https://fishbase.mnhn.fr/suimary/SpeciesSummary.php?ID=959&AT=gafftopsail+catfish</p>

Susceptibility (Gafftopsail catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Geographic concentration: Geographical concentration is the extent to which the stock is concentrated into small areas. The rationale for including this attribute is that a stock with a relatively even distribution across its range may be less susceptible than a highly aggregated stock. For some species, a useful measure of this attribute is the minimum estimate of the proportion of area occupied by a certain percentage of the stock (Swain and Sinclair 1994), which can be computed in cases where survey data exist. For many stocks, this index gives a general index of areal coverage that relates well to geographic concentration. However, some stocks can cover a small area even though the stocks were not concentrated in a small number of locations (i.e., a “patchy” stock that is distributed over the survey area). Thus, some refinements to the index may be necessary to characterize geographic concentration in these cases.</p>	Stock is distributed in >50% of its total range.	Stock is distributed in 25% to 50% of its total range.	Stock is distributed in <25% of its total range.	3	3	There is fairly uniform distribution of these species around the GOM, however, they are concentrated closer to the coast where the water experiences a gradient of salinities. Thus, the total abundance of the GOM stock is distributed in >50% of the GOM.	https://fishbase.mnhn.fr/su/mmary/SpeciesSummary.php?ID=959&AT=gafftopsail+catfish
<p>Vertical overlap: Similar to geographical overlap, this attribute concerns the position of the stock within the water column (i.e., demersal or pelagic) relative to the fishing gear. Information on the depth at which gear is deployed (e.g., depth range of hooks for a pelagic longline fishery) and the depth preference of the species (e.g., obtained from archival tagging or other sources) can be used to estimate the degree of vertical overlap between fishing gear and a stock.</p>	<25% of the stock occurs in the depths fished.	Between 25% and 50% of the stock occurs in the depths fished.	>50% of stock occurs in the depths fished.	3	4	The Gafftopsail catfish is a benthic species that occurs over soft, muddy bottoms. This habitat type is the ideal shrimping habitat. There is high vertical overlap between this species and the gear types.	https://fishbase.mnhn.fr/su/mmary/SpeciesSummary.php?ID=959&AT=gafftopsail+catfish
<p>Fishing mortality rate (relative to M): This criterion is applicable to stocks where estimates of both fishing mortality rates (F) and (M) are available. Because sustainable fisheries management typically involves conserving the reproductive potential of a stock, it is recommended that the average F on mature fish be used where possible as opposed to the fully selected or “peak” F. We base our thresholds on the conservative rule of thumb that the M should be an upper limit of F (Thompson 1993; Restrepo <i>et al.</i> 1998), and thus F/M should not exceed 1. For this attribute, we define intermediate F/M values as those between 0.5 and 1.0; values above 1.0 or</p>	<0.5	0.5 – 1.0	>1.0	N/A	5		

Susceptibility (Gafftopsail catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
below 0.5 are defined as high and low susceptibility, respectively.							
Biomass of Spawners (SSB) or other proxies: Analogous to fishing mortality rate, the extent to which fishing has depleted the biomass of a stock relative to expected unfished levels offers information on realized susceptibility. One way to measure this is to compare the current stock biomass against an estimate of B0 (the estimated biomass with no fishing). If B0 is not available, one could compare the current stock size against the maximum observed from a time series of population size estimates (e.g., from a research survey). If a time series is used, it should be of adequate length (e.g., > 5 years). Note that the maximum observed survey estimate may not correspond to the true maximum biomass for stocks with substantial observation errors in survey biomass estimates. Additionally, stocks may decline in abundance from environmental factors not related to susceptibility to the fishery, so this should be considered in evaluating depletion estimates. Notwithstanding these issues, which can be addressed with the data quality score described below, some measure of current stock abundance was viewed as a useful attribute.	B is >40% of B0 (or maximum observed from time series of biomass estimates)	B is between 25% and 40% of B0 (or maximum observed from time series of biomass estimates)	B is <35% of B0 (or maximum observed from time series of biomass estimates)	N/A	5		
Seasonal migrations: Seasonal migrations either to or from the fishery area (i.e., spawning or feeding migrations) could affect the overlap between the stock and the fishery. This attribute also pertains to cases where the location of the fishery changes seasonally, which may be relevant for stocks captured as bycatch.	Seasonal migrations decrease overlap with the fishery	Seasonal migrations do not substantially affect the overlap with the fishery	Seasonal migrations increase overlap with the fishery	2	1	There are no seasonal migrations of the hardhead catfish and as such migrations neither increase nor decrease overlap between the stock and the fishery.	https://www.scielo.org.mx/scielo.php?pid=S0188-88972005000300003&script=sci_abstract&tlng=en
Schooling, aggregation, and other behavior's: This attribute encompasses behavioral responses of both individual fish and the stock in response to fishing. Individual responses may include, for example, herding or gear avoidance behavior that would affect catchability. An example of a population-level response is a reduction in the area of stock distribution with reduction in population size, potentially leading to increases in catchability (MacCall 1990).	Behavioral responses decrease catchability of the gear	Behavioral responses do not substantially affect the catchability of the gear	Behavioral responses increase the catchability of the gear (i.e., hyper-stability of CPUE with schooling behavior)	2	4	This species is an opportunistic feeder which feeds in both the water column and the seafloor. They are often found in large, loosely formed school outside of spawning events (even schools composed of hardhead catfish as well).	https://www.floridagofishin.com/species/catfish-gafftopsail.html

Susceptibility (Gafftopsail catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Morphology affecting capture: This attribute pertains to the ability of the fishing gear to capture fish based on their morphological characteristics (e.g., body shape, spiny versus soft rayed fins). Because gear selectivity varies with size and age, this measure should be based on the age or size classes most representative of the entire stock.</p>	Species shows low selectivity to the fishing gear	Species show moderate selectivity of the fishing gear	Species show high selectivity to the fishing gear	3	3	<p>This species is not a frequently caught species by otter trawl and butterfly net gear types. As these species are larger than shrimp, they will not escape the mesh of the codend of the net. However, it is possible that larger individuals of the species can be excluded from the gear via the TEDs and BRDs that are required on otter trawl vessels >40ft. Butterfly nets are often fixed to a dock to fish the water column during changing tides. Although the shrimp do not have the ability to outswim the current and escape the gear, these catfish species can escape the stationary butterfly nets.</p>	<p>https://fishbase.mnhn.fr/summary/SpeciesSummary.php?ID=959&AT=gafftopsail-catfish</p>
<p>Survival after capture and release: Fish survival after capture and release varies by species, region, and gear type or even market conditions, and thus can affect the susceptibility of the stock. When data are lacking, the VEWG suggest using NMFS' National Bycatch Report to estimate bycatch mortality (see the following for Alaska Region http://www.nmfs.noaa.gov/by_catch/BREP2011/Factsheets/NBRfactsheet_AK.pdf). The report provides comprehensive estimates of bycatch of fish, marine mammals, and non-marine mammal protected resources in major US commercial fisheries and should allow users to develop a proxy based on similar fisheries.</p>	Probability of survival >67%	Probability of survival between 33% and 67%	Probability of survival <33%	3	1	<p>These catfish are not a retained species. Furthermore, catfish species are considered very hardy fish (Peyton Cagle, LDWF Crustacean Program pers. comm). This can be also deducted from Table 3 of the GULF RFM Louisiana Blue crab fishery 3rd Surveillance report where, of all of the catfish species caught in derelict crab traps (i.e. lost traps with very high soak time) in Pontchartrain, Barataria and Terrebonne Basins from 2016-2017, 89% were found alive. The post capture mortality in (mostly</p>	<p>Ciccia Romito V., Lipcius R. 2020. Audubon Nature Institute Gulf United For Lasting Fisheries (G.U.L.F.) Responsible Fisheries Management Certification Scheme 3rd Surveillance Assessment Report For The Louisiana Blue Crab Commercial Fishery https://www.audubongulf.org/wp-content/uploads/2020/05/Form-9i-1-GULF-RFM-LA-Blue-Crab-3rd-Surveillance-FINAL-28Jan2020.pdf</p> <p>https://www.audubongulf.org/wp-content/uploads/2020/05/F</p>

Susceptibility (Gafftopsail catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
						passive) butterfly nets, considering the 1-2 hours soak time, is conceivably higher if not at least comparable to that a derelict trap mortality. Hardhead and Gafftopsail catfish are not generally retained and are therefore released back in the water. The effective bycatch and mortality of these catfish species is therefore considered nominal. The chance that, if captured in good condition, both catfish species would be released and permitting subsequent survival is considered high, equivalent to a risk score of 3 = Evidence of majority released post-capture and survival.	orm-9i-1-GULF-RFM-LA-Blue-Crab-3rd-Surveillance-FINAL-28Jan2020.pdf
Desirability/value of the fishery: This attribute assumes that highly valued fish stocks are more susceptible to overfishing or becoming overfished by recreational or commercial fishermen due to increased effort. To identify the value of the fish, the authors suggest using the price per pound or annual landing value for commercial stocks (using the higher of the two values) or the retention rates for recreational fisheries (Table 3). Commercial landings and recreational retention rates can be found at: www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html and www.st.nmfs.noaa.gov/st1/recreational/queries/index.html	Stock is not highly values or desired by the fishery	Stock is moderately values or desired by the fishery	Stock is highly valued or desired by the fishery	3	2	Commercial landing of this species is low with total annual catches rarely exceeding 2500 lb. This species is often discarded for multiple reasons including lack of monetary value, avoidance of slimy cleanup, and most of all, safety to due to the venomous spines on dorsal and pectoral fins. This indicates that the species is discarded from gear and not retained for any value.	www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.htm https://www.floridagofishin.com/species/catfish-gafftopsail.html
Fishery impact on habitat: A fishery may have an indirect effect on a species via adverse impacts on habitat. Defining these effects is the focus of environmental impact statements or essential fish habitat evaluations that have been conducted by NMFS, and this work can be used to	Adverse effects absent, minimal or temporary	Adverse effects more than minimal or temporary, but are mitigated	Adverse effects more than minimal or temporary	3	1	Gafftopsail catfish live on muddy bottoms where the primary habitat for shrimp fishing occurs. It is well documented that the effects	Jennings, S., Pinnegar, J.K., Polunin, N.V. and Warr, K.J., 2001. Impacts of trawling disturbance on the trophic structure of benthic

Susceptibility (Gafftopsail catfish)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>evaluate this attribute. Thus, the impacts on habitat may be categorized with respect to whether adverse impacts on habitat are minimal, temporary, or mitigated.</p>			<p>and are not mitigated</p>			<p>from otter trawl and butterfly nets do not adversely affect the structure, functionality, biotic composition of muddy and other soft bottom habitats. Thus, the effects from these gears do not affect the habitat that negatively impacts the species.</p>	<p>invertebrate communities. Mar. Ecol. Prog. Ser. 213, pp.127-142. https://www.jstor.org/stable/24864207?seq=1 Hiddink <i>et al.</i>, 2017. Global analysis of depletion and recovery of seabed biota after bottom trawling disturbance. Proceedings of the National Academy of Sciences of the United States of America, 114(31), 8301–8306. https://doi.org/10.1073/pnas.1618858114</p>

Table 50. Productivity analysis for the cownose ray (*Rhinoptera bonasus*).

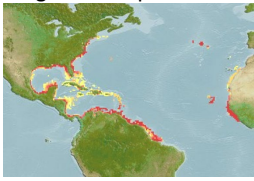
Productivity (cownose ray)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
Population growth (r): This is the intrinsic rate of population growth or maximum population growth that would be expected to occur in a population under natural conditions (i.e., no fishing), and thus directly reflects stock productivity. The scoring definitions were taken from Musick (1999), who stated that r should take precedence over other productivity attributes (e.g., given a weighting of 4) as it combines many of the other attributes defined below.	>0.5	0.5- 0.16 (midpoint 0.10)	>0.16	1	3	Based on Fishbase assessment of population doubling time, r is between 0.05 and 0.15	https://www.fishbase.org/species/summary/SpeciesSummary.php?ID=2584&AT=cownose+ray
Maximum age (tmax): Maximum age is a direct indication of the natural mortality rate (M), where low levels of M are negatively correlated with high maximum ages (Hoenig 1983). The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The tmax for a majority of these fish ranges between 10 to 30 years.	<10 years	10-30 years (midpoint 20 years)	>30 years	2	1	Max age is 21 years	Grubbs, <i>et al.</i> 2016. Critical assessment and ramifications of a purported marine trophic cascade. Scientific reports, 6(1), p.20970.
Maximum size (Lmax): Maximum size is also correlated with productivity, with large fish tending to have lower levels of productivity (Roberts and Hawkins 1999), though this relationship tends to degrade at higher taxonomic levels. The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The Lmax for a majority of these fish ranges between 60 to 150 cm TL.	<60 cm	60-150 cm (midpoint 105 cm)	>150 cm	2	3	Maximum size is 100.8 cm	https://www.fishbase.org/species/summary/SpeciesSummary.php?ID=2584&AT=cownose+ray
Growth coefficient (k): The von Bertalanffy growth coefficient measures how rapidly a fish reaches its maximum size, where long-lived, low-productivity stocks tend to have low values of k (Froese and Binohlan 2000). The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.15 to 0.25. This is roughly consistent with the values obtained from Froese and Binohlan's (2000) empirical relationship $k = 3 / t_{max}$ of to 0.3, based upon tmax values of 10 and 30.	>0.25	0.15 – 0.25	<0.15	2	1	Growth coefficient (k) = 0.19	Grubbs, <i>et al.</i> 2016. Critical assessment and ramifications of a purported marine trophic cascade. Scientific reports, 6(1), p.20970.

Productivity (cownose ray)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
Natural mortality (M): Natural mortality rate directly reflects population productivity, as stocks with high rates of natural mortality will require high levels of production in order to maintain population levels. Several methods for estimating M rely upon the negative relationship between M and tmax, including Hoenig's (1983) regression based upon empirical data, the quantile method that depends upon exponential mortality rates (Hoenig 1983), and Alverson and Carney's (1975) relationship between mortality, growth, and tmax. The attribute scoring thresholds from the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.2 to 0.4 and were roughly consistent with those produced from Hoenig's (1983) empirical regression of 0.14 to 0.4, based on tmax values of 10 and 30.	>0.40	0.20 – 0.40	<0.20	3	1	Natural mortality is (M) = 0.76	Grubbs, <i>et al.</i> 2016. Critical assessment and ramifications of a purported marine trophic cascade. Scientific reports, 6(1), p.20970.
Fecundity: Fecundity (i.e., the number of eggs produced by a female for a given spawning event or period) varies with size and age of the spawner, so the authors followed Musick's (1999) recommendation that fecundity should be measured at the age of first maturity. As Musick (1999) noted, low values of fecundity imply low population productivity, but high values of fecundity do not necessarily imply high population productivity; thus, this attribute may be more useful at the lower fecundity values. The scoring definitions were taken from Musick (1999), which range between fecundities of 1,000 and 100,000.	>10e4	10e2 – 10e3	<10e2	1	1	Fecundity varies from year to year and female to female, but it can be said with high confidence that the annual reproductive capacity is below 100 offspring.	Poulakis, G.R., 2013. Reproductive biology of the cownose ray in the Charlotte Harbor estuarine system, Florida. Mar. Coastal Fish. 5(1), pp.159-173.
Breeding strategy: The breeding strategy of a stock provides an indication of the level of mortality that might be expected for the offspring in the first stages of life. To estimate offspring mortality, the authors used Winemiller's (1989) index of parental investment. The index ranges in score from 0 to 14 and is composed of: 1) the placement of larvae or zygotes (i.e., in nest or into water column; score ranges from 0 to 2); 2) the length of time of parental protection of zygotes or larvae (score ranges from 0 to 4); and 3) the length of gestation period or nutritional contribution (score ranges from 0 to 8). To	0	Between 1 and 3	≥4	1	1	Cownose ray bears live young. This k-selective reproductive strategy produces very low levels of first stage of life mortality.	Poulakis, G.R., 2013. Reproductive biology of the cownose ray in the Charlotte Harbor estuarine system, Florida. Mar. Coastal Fish. 5(1), pp.159-173.

Productivity (cownose ray)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
translate Winemiller's index into our 1-3 ranking system, the authors examined King and McFarlane's (2003) parental investment scores for 42 North Pacific stocks. These 42 stocks covered a wide range of life-histories and habitats, including 10 surface pelagic, 3 mid-water pelagic, 3 deep-water pelagic, 18 near-shore benthic, and 9 offshore benthic stocks. Thirty-one percent of the stocks had a Winemiller score of zero, and 40% had a Winemiller score of 4 or higher, so 0 and 4 were used as the breakpoints between the ranking categories.							
Recruitment pattern: Stocks with sporadic and infrequent recruitment success often are long-lived and thus might be expected to have lower levels of productivity (Musick 1999). This attribute is intended as a coarse index to distinguish stocks with sporadic recruitment patterns and high frequency of year-class failures from those with relatively steady recruitment. Thus, the frequency of year-class success (defined as exceeding a recruitment level associated with year-class failure) was used for this attribute. Because this attribute was viewed as a coarse index, 10% and 75% were chosen as the breakpoints between the ranking categories so that scores of 1 and 3 identified relatively extreme differences in recruitment patterns.	Highly frequent recruitment success (>75% of year classes are successful)	Moderately frequent recruitment success (between 10% and 75% of year classes are successful)	Infrequent recruitment success (<10% of year classes are successful)	3	1	Unlike a lot of pelagic species that have high recruitment variability due to environmental conditions, cownose rays typically have annual breeding events with high regularity and high success.	Poulakis, G.R., 2013. Reproductive biology of the cownose ray in the Charlotte Harbor estuarine system, Florida. Mar. Coastal Fish. 5(1), pp.159-173.
Age at maturity (tmat): Age at maturity tends to be positively related with maximum age (tmax), as long-lived, lower productivity stocks will have higher ages at maturity relative to short-lived stocks. The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 2 to 4 years. This range is lower than that observed from Froese and Binohlan's (2000) empirical relationship between tmat and tmax, which was 3 to 9 based upon values of tmax of 10 and 30. However, Froese and Binohlan (2000) used data from many fish stocks around the world, which may not be representative of US stocks. For the PSA, the thresholds obtained from the ANOVA applied to stocks considered representative of U.S fisheries were used.	< 2 years	2 – 4 years	>4 years	2	3	3.2 years	https://www.fishbase.org/species/sumary/SpeciesSummary.php?ID=2584&AT=cownose+ray

Productivity (cownose ray)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
<p>Mean trophic level: The position of a stock within the larger fish community can be used to infer stock productivity, with lower-trophic-level stocks generally being more productive than higher-trophic-level stocks. The trophic level of a stock can be computed as a function of the trophic levels of the organisms in its diet. For this attribute, stocks with trophic levels higher than 3.5 were categorized as low productivity stocks and stocks with trophic levels less than 2.5 were categorized as high-productivity stocks, with moderate productivity stocks falling between these bounds. These attribute threshold roughly categorize piscivores to higher trophic levels, omnivores to intermediate trophic levels, and planktivores to lower trophic levels (Pauly <i>et al.</i> 1998).</p>	< 2.5	2.5 – 3.5	>3.5	2	3	Feeds on benthic invertebrates and molluscs. Trophic level is 3.2.	https://www.fishbase.org/species/summary/SpeciesSummary.php?ID=2584&AT=cownose+ray

Table 51. Susceptibility analysis for the cownose ray (*Rhinoptera bonasus*).

Susceptibility (cownose ray)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Management strategy: The susceptibility of a stock to overfishing may largely depend on the effectiveness of fishery management procedures used to control catch (Sethi <i>et al.</i> 2005, Rosenberg <i>et al.</i> 2007, Shertzer <i>et al.</i> 2008, Dankel <i>et al.</i> 2008). Stocks that are managed using catch limits for which the fishery can be closed before the catch limit is exceeded (i.e., in-season or proactive accountability measures) are considered to have a low susceptibility to overfishing. However, stocks that do not have specified catch limits or accountability measures are highly susceptible to overfishing if their abundance trends are not monitored. Stocks that are managed using catch limits and reactive accountability measures (e.g., catch levels are not determined until after the fishing season) are considered to be moderately susceptible to overfishing or becoming overfished.</p>	Targeted stocks have catch limits and proactive accountability measures; non-targeted stocks are closely monitored	Targeted stocks have catch limits and reactive accountability measures	Targeted stocks do not have catch limits or accountability measures; non-targeted stocks are not closely monitored	2	2	Management for the cownose ray is often grouped by like fishes. In Texas, there are limits on the number of catfish that can be taken in recreational fishing. In Florida, it is part of the “unregulated” species grouping which limits anglers to two fish or 100 lb, whichever is larger.	https://myfwc.com/fishing/saltwater/recreational/unregulated/ https://tpwd.texas.gov/regulations/outdoor-annual/fishing/saltwater-fishing/bag-length-limits/catfish-bag-length-limits-saltwater
<p>Areal overlap: This attribute pertains to the extent of geographic overlap between the known distribution of a stock and the distribution of the fishery. Greater overlap implies greater susceptibility, as some degree of geographical overlap is necessary for a fishery to impact a stock. The simplest approach is to determine, either qualitatively or quantitatively, the proportion of the spatial distribution of a given fishery that overlaps that of the stock, based on known geographical distributions of both. If data regarding spatial distributions are lacking, inferences on areal overlap may be made from knowledge of depth distributions of the fishery and the stock. For example, an upper bound estimate of areal overlap may be made from knowledge of the portion of fishing effort that occurs in the areas which encompass the depths occupied by a species.</p>	<25% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	>50% of stock occurs in the area fished	3	2	<p>This species is known to occur in the northern South American Atlantic coast, GOM/Caribbean, the southern Atlantic coast of the US, and parts of the west African coast. As this fishery only occurs in the US GOM, there is less than 25% overlap with the geographic range of the species.</p> 	https://www.fishbase.org/Summary/SpeciesSummary.php?ID=2584&AT=cownose+ray Schwartz, F.J., 1990. Mass migratory congregations and movements of several species of cownose rays, genus <i>Rhinoptera</i> : A world-wide review. Journal of the Elisha Mitchell Scientific Society, pp.10-13.
<p>Geographic concentration: Geographical concentration is the extent to which the stock is concentrated into small areas. The rationale for including this attribute is that a stock with a relatively even distribution across its range may be less susceptible than a highly aggregated stock.</p>	Stock is distributed in >50% of its total range	Stock is distributed in 25% to 50% of its total range	Stock is distributed in <25% of its total range	3	1	There is fairly uniform distribution of these species around the GOM, however, had slightly higher abundances on the inner	Craig, <i>et al.</i> 2010. Habitat use of cownose rays (<i>Rhinoptera bonasus</i>) in a highly productive, hypoxic continental shelf

Susceptibility (cownose ray)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>For some species, a useful measure of this attribute is the minimum estimate of the proportion of area occupied by a certain percentage of the stock (Swain and Sinclair 1994), which can be computed in cases where survey data exist.</p> <p>For many stocks, this index gives a general index of areal coverage that relates well to geographic concentration. However, some stocks can cover a small area even though the stocks were not concentrated in a small number of locations (i.e., a “patchy” stock that is distributed over the survey area). Thus, some refinements to the index may be necessary to characterize geographic concentration in these cases.</p>						<p>Louisiana shelf in the vicinity of the Mississippi and Atchafalaya river plumes. There are strong associations with river input waters where salinity is low, chlorophyll is high, and low bottom DO concentrations. Greater than 50% of GOM stock of cownose rays is distributed across the GOM geographic range.</p>	ecosystem. Fisheries Oceanography, 19(4), pp.301-317.
<p>Vertical overlap: Similar to geographical overlap, this attribute concerns the position of the stock within the water column (i.e., demersal or pelagic) relative to the fishing gear. Information on the depth at which gear is deployed (e.g., depth range of hooks for a pelagic longline fishery) and the depth preference of the species (e.g., obtained from archival tagging or other sources) can be used to estimate the degree of vertical overlap between fishing gear and a stock.</p>	<25% of the stock occurs in the depths fished.	Between 25% and 50% of the stock occurs in the depths fished	>50% of stock occurs in the depths fished	2	3	<p>Despite the cownose ray being primarily a benthic species, they are known to primarily occur in coastal waters, typically shallower than 22 meters. The fishery occurs in that depth range, but also deeper waters not typically inhabited by the cownose ray.</p>	<p>https://www.floridamuseum.ufl.edu/discover-fish/species-profiles/rhinoptera-bonassus/</p> <p>https://www.fishbase.org/summary/SpeciesSummary.php?ID=2584&AT=cownose-ray#</p>
<p>Fishing mortality rate (relative to M): This criterion is applicable to stocks where estimates of both fishing mortality rates (F) and (M) are available. Because sustainable fisheries management typically involves conserving the reproductive potential of a stock, it is recommended that the average F on mature fish be used where possible as opposed to the fully selected or “peak” F. We base our thresholds on the conservative rule of thumb that the M should be an upper limit of F (Thompson 1993; Restrepo <i>et al.</i> 1998), and thus F/M should not exceed 1. For this attribute, we define intermediate F/M values as those between 0.5 and 1.0; values above 1.0 or below 0.5 are defined as high and low susceptibility, respectively.</p>	<0.5	0.5 – 1.0	>1.0	N/A	5		
<p>Biomass of Spawners (SSB) or other proxies: Analogous to fishing mortality rate, the extent to which fishing has</p>	B is >40% of B0 (or	B is between 25% and 40% of	B is <35% of B0 (or	N/A	5		

Susceptibility (cownose ray)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
depleted the biomass of a stock relative to expected unfished levels offers information on realized susceptibility. One way to measure this is to compare the current stock biomass against an estimate of B0 (the estimated biomass with no fishing). If B0 is not available, one could compare the current stock size against the maximum observed from a time series of population size estimates (e.g., from a research survey). If a time series is used, it should be of adequate length (e.g., > 5 years). Note that the maximum observed survey estimate may not correspond to the true maximum biomass for stocks with substantial observation errors in survey biomass estimates. Additionally, stocks may decline in abundance from environmental factors not related to susceptibility to the fishery, so this should be considered in evaluating depletion estimates. Notwithstanding these issues, which can be addressed with the data quality score described below, some measure of current stock abundance was viewed as a useful attribute.	maximum observed from time series of biomass estimates)	B0 (or maximum observed from time series of biomass estimates)	maximum observed from time series of biomass estimates)				
Seasonal migrations: Seasonal migrations either to or from the fishery area (i.e., spawning or feeding migrations) could affect the overlap between the stock and the fishery. This attribute also pertains to cases where the location of the fishery changes seasonally, which may be relevant for stocks captured as bycatch.	Seasonal migrations decrease overlap with the fishery	Seasonal migrations do not substantially affect the overlap with the fishery	Seasonal migrations increase overlap with the fishery	2	1	Migratory patterns of GOM cownose rays are less defined, but it is thought that spawning aggregations occur prior to parturition period. There is no evidence that these migration patterns increase nor decrease the overlap with the GOM shrimp fishery.	Craig, <i>et al.</i> 2010. Habitat use of cownose rays (<i>Rhinoptera bonasus</i>) in a highly productive, hypoxic continental shelf ecosystem. <i>Fisheries Oceanography</i> , 19(4), pp.301-317.
Schooling, aggregation, and other behavior's: This attribute encompasses behavioral responses of both individual fish and the stock in response to fishing. Individual responses may include, for example, herding or gear avoidance behavior that would affect catchability. An example of a population-level response is a reduction in the area of stock distribution with reduction in population size, potentially leading to increases in catchability (MacCall 1990).	Behavioral responses decrease catchability of the gear	Behavioral responses do not substantially affect the catchability of the gear	Behavioral responses increase the catchability of the gear (i.e., hyper-stability of CPUE with schooling behavior)	2	2	Cownose rays exhibit schooling behavior; however, these schools are not targeted. If anything, cownose rays exhibiting schooling behavior are avoided by harvesters with technological equipment that has the ability to show large aggregations of fish. Because this schooling behavior has	Rogers, <i>et al.</i> 1990. Behavior, distribution, and relative abundance of cownose ray schools <i>Rhinoptera bonasus</i> in the northern Gulf of Mexico. <i>Gulf of Mexico Science</i> , 11(1), p.8.

Susceptibility (cownose ray)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
						the ability to increase capture (via higher density), but also decrease capture (avoidance), this attribute will be scored a 2 to indicate that the behavior has no effect in either direction in terms of the cownose ray's catchability.	
Morphology affecting capture: This attribute pertains to the ability of the fishing gear to capture fish based on their morphological characteristics (e.g., body shape, spiny versus soft rayed fins). Because gear selectivity varies with size and age, this measure should be based on the age or size classes most representative of the entire stock.	Species shows low selectivity to the fishing gear	Species show moderate selectivity of the fishing gear	Species show high selectivity to the fishing gear	3	1	The implementation of TEDs reduces the capture of more than just turtles. Larger fish, mammal, and shark/ray/skate species catches are reduced. They are not completely eliminated from the catch, however, the broad body shape of the cownose ray does not often pass through the TED and the individuals are removed from the catch via the TED flap.	Hataway, <i>et al.</i> 2016. Evaluations of turtle excluder devices (TEDs) with reduced bar spacing in the inshore penaeid shrimp fishery of the northern Gulf of Mexico.
Survival after capture and release: Fish survival after capture and release varies by species, region, and gear type or even market conditions, and thus can affect the susceptibility of the stock. When data are lacking, the VEWG suggest using NMFS' National Bycatch Report to estimate bycatch mortality (see the following for Alaska Region http://www.nmfs.noaa.gov/by_catch/BREP2011/Factsheets/NBRfactsheet_AK.pdf). The report provides comprehensive estimates of bycatch of fish, marine mammals, and non-marine mammal protected resources in major US commercial fisheries and should allow users to develop a proxy based on similar fisheries.	Probability of survival >67%	Probability of survival between 33% and 67%	Probability of survival <33%	3	1	~27% PCM rate	Broadhurst, M.K., Cullis, B.R., 2020. Mitigating the discard mortality of non-target, threatened elasmobranchs in bather-protection gillnets. Fisheries Research, 222, p.105435.
Desirability/value of the fishery: This attribute assumes that highly valued fish stocks are more susceptible to overfishing or becoming overfished by recreational or commercial fishermen due to increased effort. To identify	Stock is not highly values or desired by the fishery	Stock is moderately values or	Stock is highly valued or desired by the fishery	3	2	According to NOAA fisheries, this species has not been commercially landed in the GOM within the last 5 years.	www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html

Susceptibility (cownose ray)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>the value of the fish, the authors suggest using the price per pound or annual landing value for commercial stocks (using the higher of the two values) or the retention rates for recreational fisheries (Table 3). Commercial landings and recreational retention rates can be found at: www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html and www.st.nmfs.noaa.gov/st1/recreational/queries/index.html</p>		desired by the fishery				This species has low to non-existent value by the fishery to land. Therefore, it earns the score of 3.	
<p>Fishery impact on habitat: A fishery may have an indirect effect on a species via adverse impacts on habitat. Defining these effects is the focus of environmental impact statements or essential fish habitat evaluations that have been conducted by NMFS, and this work can be used to evaluate this attribute. Thus, the impacts on habitat may be categorized with respect to whether adverse impacts on habitat are minimal, temporary, or mitigated.</p>	Adverse effects absent, minimal or temporary	Adverse effects more than minimal or temporary, but are mitigated	Adverse effects more than minimal or temporary and are not mitigated	N/A	5		

Table 52. Productivity analysis for the Atlantic stingray (*Hypanus sabinus*)

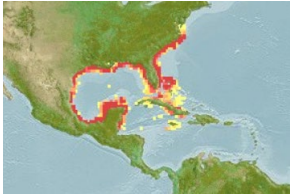
Productivity (Atlantic stingray)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
Population growth (r): This is the intrinsic rate of population growth or maximum population growth that would be expected to occur in a population under natural conditions (i.e., no fishing), and thus directly reflects stock productivity. The scoring definitions were taken from Musick (1999), who stated that r should take precedence over other productivity attributes (e.g., given a weighting of 4) as it combines many of the other attributes defined below.	>0.5	0.5- 0.16 (midpoint 0.10)	>0.16	N/A	5		
Maximum age (tmax): Maximum age is a direct indication of the natural mortality rate (M), where low levels of M are negatively correlated with high maximum ages (Hoenig 1983). The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The tmax for a majority of these fish ranges between 10 to 30 years.	<10 years	10-30 years (midpoint 20 years)	>30 years	2	1	6 to 11 years old to reach mean maximum size. Therefore, it can be reasonably concluded that the Atlantic stingray lives to a maximum age between 10 and 30 years.	Schmid, T.H., 1988. Age, growth, and movement patterns of the Atlantic stingray, <i>Dasyatis sabina</i> , in a Florida coastal lagoon system. https://stars.library.ucf.edu/cgi/viewcontent.cgi?article=5334&context=rted
Maximum size (Lmax): Maximum size is also correlated with productivity, with large fish tending to have lower levels of productivity (Roberts and Hawkins 1999), though this relationship tends to degrade at higher taxonomic levels. The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of US fisheries (Appendix A of the Patrick <i>et al.</i> 2009 report). The Lmax for a majority of these fish ranges between 60 to 150 cm TL.	<60 cm	60-150 cm (midpoint 105 cm)	>150 cm	2	1	Maximum size is greater than 61cm	Jargowsky, Matthew Bernard, "Life History Patterns and the Spatial and Trophic Ecology of Batoids in a Northern Gulf of Mexico Estuary" (2019). Theses and Dissertations. 2946. https://scholarsjunction.msstate.edu/td/2946
Growth coefficient (k): The von Bertalanffy growth coefficient measures how rapidly a fish reaches its maximum size, where long-lived, low-productivity stocks tend to have low values of k (Froese and Binohlan 2000). The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.15 to 0.25. This is roughly consistent with the values obtained from Froese and Binohlan's (2000) empirical relationship $k = 3 / t_{max}$ of 0.1 to 0.3, based upon tmax values of 10 and 30.	>0.25	0.15 – 0.25	<0.15	3	3	k=0.26-0.31	Froese, R. and D. Pauly. Editors. 2023. <i>Hypanus sabinus</i> Atlantic stringray. FishBase. World Wide Web electronic publication. www.fishbase.org, (06/2023). https://fishbase.mnhn.fr/su/mmary/Dasyatis-sabina.html

Productivity (Atlantic stingray)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
<p>Natural mortality (M): Natural mortality rate directly reflects population productivity, as stocks with high rates of natural mortality will require high levels of production in order to maintain 1population levels. Several methods for estimating M1 rely upon the negative relationship between M and tmax, including Hoenig’s (1983) regression based upon empirical data, the quantile method that depends upon exponential mortality rates (Hoenig 1983), and Alverson and Carney’s (1975) relationship between mortality, growth, and tmax. The attribute scoring thresholds from the ANOVA applied to the fish stocks considered to be representative of US fisheries was 0.2 to 0.4 and were roughly consistent with those produced from Hoenig’s (1983) empirical regression of 0.14 to 0.4, based on tmax values of 10 and 30.</p>	>0.40	0.20 – 0.40	<0.20	2	3	M=0.3	<p>Froese, R. and D. Pauly. Editors. 2023. <i>Hypanus sabinus</i> Atlantic stringray. FishBase. World Wide Web electronic publication. www.fishbase.org, (06/2023). https://fishbase.mnhn.fr/su/mmary/Dasyatis-sabina.html</p>
<p>Fecundity: Fecundity (i.e., the number of eggs produced by a female for a given spawning event or period) varies with size and age of the spawner, so the authors followed Musick’s (1999) recommendation that fecundity should be measured at the age of first maturity. As Musick (1999) noted, low values of fecundity imply low population productivity, but high values of fecundity do not necessarily imply high population productivity; thus, this attribute may be more useful at the lower fecundity values. The scoring definitions were taken from Musick (1999), which range between fecundities of 1,000 and 100,000.</p>	>10e4	10e2 – 10e3	<10e2	1	1	<100 pups per year	<p>Johnson, M.R. and Snelson Jr, F.F., 1996. Reproductive life history of the Atlantic stingray, <i>Dasyatis sabina</i> (Pisces, Dasyatidae), in the freshwater St. Johns River, Florida. Bulletin of Marine Science, 59(1), pp.74-88.</p> <p>Last, <i>et al.</i>, Eds., 2016. Rays of the World. CSIRO publishing.</p>
<p>Breeding strategy: The breeding strategy of a stock provides an indication of the level of mortality that might be expected for the offspring in the first stages of life. To estimate offspring mortality, the authors used Winemiller’s (1989) index of parental investment. The index ranges in score from 0 to 14 and is composed of: 1) the placement of larvae or zygotes (i.e., in nest or into water column; score ranges from 0 to 2); 2) the length of time of parental protection of zygotes or larvae (score ranges from 0 to 4); and 3) the length of gestation period or nutritional contribution (score ranges from 0 to 8). To</p>	0	Between 1 and 3	≥4	1	1	Bears live young	<p>Johnson, M.R., Snelson Jr, F.F., 1996. Reproductive life history of the Atlantic stingray, <i>Dasyatis sabina</i> (Pisces, Dasyatidae), in the freshwater St. Johns River, Florida. Bulletin of Marine Science, 59(1), pp.74-88.</p>

Productivity (Atlantic stingray)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
<p>translate Winemiller’s index into our 1-3 ranking system, the authors examined King and McFarlane’s (2003) parental investment scores for 42 North Pacific stocks. These 42 stocks covered a wide range of life-histories and habitats, including 10 surface pelagic, 3 mid-water pelagic, 3 deep-water pelagic, 18 near-shore benthic, and 9 offshore benthic stocks. Thirty-one percent of the stocks had a Winemiller score of zero, and 40% had a Winemiller score of 4 or higher, so 0 and 4 were used as the breakpoints between the ranking categories.</p>							
<p>Recruitment pattern: Stocks with sporadic and infrequent recruitment success often are long-lived and thus might be expected to have lower levels of productivity (Musick 1999). This attribute is intended as a coarse index to distinguish stocks with sporadic recruitment patterns and high frequency of year-class failures from those with relatively steady recruitment. Thus, the frequency of year-class success (defined as exceeding a recruitment level associated with year-class failure) was used for this attribute. Because this attribute was viewed as a coarse index, 10% and 75% were chosen as the breakpoints between the ranking categories so that scores of 1 and 3 identified relatively extreme differences in recruitment patterns.</p>	Highly frequent recruitment success (>75% of year classes are successful).	Moderately frequent recruitment success (between 10% and 75% of year classes are successful).	Infrequent recruitment success (<10% of year classes are successful).	3	1	Due to the nature of the species and reproductive strategy, there is a high chance of offspring survival.	Johnson, M.R., Snelson Jr, F.F., 1996. Reproductive life history of the Atlantic stingray, <i>Dasyatis sabina</i> (Pisces, Dasyatidae), in the freshwater St. Johns River, Florida. Bulletin of Marine Science, 59(1), pp.74-88.
<p>Age at maturity (tmat): Age at maturity tends to be positively related with maximum age (tmax), as long-lived, lower productivity stocks will have higher ages at maturity relative to short-lived stocks. The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of US fisheries was 2 to 4 years. This range is lower than that observed from Froese and Binohlan’s (2000) empirical relationship between tmat and tmax, which was 3 to 9 based upon values of tmax of 10 and 30. However, Froese and Binohlan (2000) used data from many fish stocks around the world, which may not be representative of US stocks. For the PSA, the thresholds obtained from the ANOVA applied to stocks considered representative of U.S fisheries were used.</p>	< 2 years	2 – 4 years	>4 years	2	1	Species matures between 2 and 3 years old and between 20 and 25 cm disc width.	Schmid, T.H., 1988. Age, growth, and movement patterns of the Atlantic stingray, <i>Dasyatis sabina</i> , in a Florida coastal lagoon system. Last, <i>et al.</i> , Eds., 2016. Rays of the World. CSIRO publishing.

Productivity (Atlantic stingray)	High (3)	Moderate (2)	Low (1)	Attribute Score	Data Quality Score	Comment	Reference
<p>Mean trophic level: The position of a stock within the larger fish community can be used to infer stock productivity, with lower-trophic-level stocks generally being more productive than higher-trophic-level stocks. The trophic level of a stock can be computed as a function of the trophic levels of the organisms in its diet. For this attribute, stocks with trophic levels higher than 3.5 were categorized as low productivity stocks and stocks with trophic levels less than 2.5 were categorized as high-productivity stocks, with moderate productivity stocks falling between these bounds. These attribute threshold roughly categorize piscivores to higher trophic levels, omnivores to intermediate trophic levels, and planktivores to lower trophic levels (Pauly <i>et al.</i> 1998).</p>	< 2.5	2.5 – 3.5	>3.5	2	3	Trophic level is equal to 3.5	Froese, R., D. Pauly. Editors. 2023. <i>Hypanus sabinus</i> Atlantic stringray. FishBase. World Wide Web electronic publication. www.fishbase.org, (06/2023). https://fishbase.mnhn.fr/su/mmary/Dasyatis-sabina.html

Table 53. Susceptibility analysis for the Atlantic stingray (*Hypanus sabinus*).

Susceptibility (Atlantic stingray)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>Management strategy: The susceptibility of a stock to overfishing may largely depend on the effectiveness of fishery management procedures used to control catch (Sethi <i>et al.</i> 2005, Rosenberg <i>et al.</i> 2007, Shertzer <i>et al.</i> 2008, Dankel <i>et al.</i> 2008). Stocks that are managed using catch limits for which the fishery can be closed before the catch limit is exceeded (i.e., in- season or proactive accountability measures) re considered to have a low susceptibility to overfishing. However, stocks that do not have specified catch limits or accountability measures are highly susceptible to overfishing if their abundance trends are not monitored. Stocks that are managed using catch limits and reactive accountability measures (e.g., catch levels are not determined until after the fishing season) are considered to be moderately susceptible to overfishing or becoming overfished.</p>	Targeted stocks have catch limits and proactive accountability measures; non target stocks are closely monitored	Targeted stocks have catch limits and reactive accountability measures	Targeted stocks do not have catch limits or accountability measures; non target stocks are not closely monitored	2	2	Management for the Atlantic stingray is often grouped by like fishes. In Texas, there are limits on the number of catfish that can be taken in recreational fishing. In Florida, it is part of the “unregulated” species grouping which limits anglers to two fish or 100 lb, whichever is larger.	https://myfwc.com/fishing/saltwater/recreational/unregulated/ https://tpwd.texas.gov/regulations/outdoor-annual/fishing/saltwater-fishing/bag-length-limits/catfish-bag-length-limits-saltwater
<p>Areal overlap: This attribute pertains to the extent of geographic overlap between the known distribution of a stock and the distribution of the fishery. Greater overlap implies greater susceptibility, as some degree of geographical overlap is necessary for a fishery to impact a stock. The simplest approach is to determine, either qualitatively or quantitatively, the proportion of the spatial distribution of a given fishery that overlaps that of the stock, based on known geographical distributions of both. If data regarding spatial distributions are lacking, inferences on areal overlap may be made from knowledge of depth distributions of the fishery and the stock. For example, an upper bound estimate of areal overlap may be made from knowledge of the portion of fishing effort that occurs in the areas which encompass the depths occupied by a species.</p>	<25% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	>50% of stock occurs in the area fished	3	3	<p>This species is known to occur in the GOM/Caribbean including off the coast of southern Mexico, and the southern Atlantic coast of the US. As this fishery only occurs in the US GOM, there is less than 25% overlap with the geographic range of the species.</p> 	<p>Froese, R., D. Pauly. Editors. 2023. <i>Hypanus sabinus</i> Atlantic stringray. FishBase. World Wide Web electronic publication. www.fishbase.org, (06/2023). https://fishbase.mnhn.fr/su/mmary/Dasyatis-sabina.html</p>
<p>Geographic concentration: Geographical concentration is the extent to which the stock is concentrated into small areas. The rationale for including this attribute is that a stock with a relatively even distribution across its range</p>	Stock is distributed in >50% of its total range.	Stock is distributed in 25% to 50% of its total range.	Stock is distributed in <25% of its total range.	3	1	There is fairly uniform distribution of these species around the GOM and the southern US Atlantic coast.	Ramsden, S., Cotton, C.F., Curran, M.C. 2017. Using acoustic telemetry to assess patterns in the

Susceptibility (Atlantic stingray)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
<p>may be less susceptible than a highly aggregated stock. For some species, a useful measure of this attribute is the minimum estimate of the proportion of area occupied by a certain percentage of the stock (Swain and Sinclair 1994), which can be computed in cases where survey data exist.</p> <p>For many stocks, this index gives a general index of areal coverage that relates well to geographic concentration. However, some stocks can cover a small area even though the stocks were not concentrated in a small number of locations (i.e., a “patchy” stock that is distributed over the survey area). Thus, some refinements to the index may be necessary to characterize geographic concentration in these cases.</p>						<p>The species is concentrated closer to shore in estuary and freshwater environments. Greater than 50% of the stock is distributed throughout the entirety of its range.</p>	<p>seasonal residency of the Atlantic stingray <i>Dasyatis sabina</i>. Environmental biology of fishes, 100, pp.89-98.</p>
<p>Vertical overlap: Similar to geographical overlap, this attribute concerns the position of the stock within the water column (i.e., demersal or pelagic) relative to the fishing gear. Information on the depth at which gear is deployed (e.g., depth range of hooks for a pelagic longline fishery) and the depth preference of the species (e.g., obtained from archival tagging or other sources) can be used to estimate the degree of vertical overlap between fishing gear and a stock.</p>	<p><25% of the stock occurs in the depths fished.</p>	<p>Between 25% and 50% of the stock occurs in the depths fished.</p>	<p>>50% of stock occurs in the depths fished.</p>	<p>3</p>	<p>1</p>	<p>This species is known to occur in estuary, brackish, and freshwater environments. These habitats and depths are rarely fished by the primary gears in the fishery, which is why it is likely that this species only appears in the catch profile of butterfly nets, which are operated over the tidal exchange in rivers and estuaries. The butterfly nets are fixed to a vessel or dock and fishes the water column as the tide changes. The Atlantic stingray is a benthic species and thus the overlap with the gear is considered low.</p>	<p>Ramsden, S., Cotton, C.F., Curran, M.C. 2017. Using acoustic telemetry to assess patterns in the seasonal residency of the Atlantic stingray <i>Dasyatis sabina</i>. Environmental biology of fishes, 100, pp.89-98.</p>
<p>Fishing mortality rate (relative to M): This criterion is applicable to stocks where estimates of both fishing mortality rates (F) and (M) are available. Because sustainable fisheries management typically involves conserving the reproductive potential of a stock, it is recommended that the average F on mature fish be used</p>	<p><0.5</p>	<p>0.5 – 1.0</p>	<p>>1.0</p>	<p>N/A</p>	<p>5</p>		

Susceptibility (Atlantic stingray)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
where possible as opposed to the fully selected or “peak” F. We base our thresholds on the conservative rule of thumb that the M should be an upper limit of F (Thompson 1993; Restrepo <i>et al.</i> 1998), and thus F/M should not exceed 1. For this attribute, we define intermediate F/M values as those between 0.5 and 1.0; values above 1.0 or below 0.5 are defined as high and low susceptibility, respectively.							
Biomass of Spawners (SSB) or other proxies: Analogous to fishing mortality rate, the extent to which fishing has depleted the biomass of a stock relative to expected unfished levels offers information on realized susceptibility. One way to measure this is to compare the current stock biomass against an estimate of B0 (the estimated biomass with no fishing). If B0 is not available, one could compare the current stock size against the maximum observed from a time series of population size estimates (e.g., from a research survey). If a time series is used, it should be of adequate length (e.g., > 5 years). Note that the maximum observed survey estimate may not correspond to the true maximum biomass for stocks with substantial observation errors in survey biomass estimates. Additionally, stocks may decline in abundance from environmental factors not related to susceptibility to the fishery, so this should be considered in evaluating depletion estimates. Notwithstanding these issues, which can be addressed with the data quality score described below, some measure of current stock abundance was viewed as a useful attribute.	B is >40% of B0 (or maximum observed from time series of biomass estimates).	B is between 25% and 40% of B0 (or maximum observed from time series of biomass estimates).	B is <35% of B0 (or maximum observed from time series of biomass estimates).	N/A	5		
Seasonal migrations: Seasonal migrations either to or from the fishery area (i.e., spawning or feeding migrations) could affect the overlap between the stock and the fishery. This attribute also pertains to cases where the location of the fishery changes seasonally, which may be relevant for stocks captured as bycatch.	Seasonal migrations decrease overlap with the fishery.	Seasonal migrations do not substantially affect the overlap with the fishery.	Seasonal migrations increase overlap with the fishery.	2	1	There are no significant seasonal migrations that would affect overlap with the fishery. There are year-round residents to rivers and estuary systems, and for those individuals that leave, they often return within the orders of months, which indicates that they likely do	Ramsden, S., Cotton, C.F., Curran, M.C. 2017. Using acoustic telemetry to assess patterns in the seasonal residency of the Atlantic stingray <i>Dasyatis sabina</i> . Environmental biology of fishes, 100, pp.89-98.

Susceptibility (Atlantic stingray)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
						not travel very far. These migrations do not significantly change the overlap with the fishery (i.e. butterfly nets)	
Schooling, aggregation, and other behavior's: This attribute encompasses behavioral responses of both individual fish and the stock in response to fishing. Individual responses may include, for example, herding or gear avoidance behavior that would affect catchability. An example of a population-level response is a reduction in the area of stock distribution with reduction in population size, potentially leading to increases in catchability (MacCall 1990).	Behavioral responses decrease catchability of the gear.	Behavioral responses do not substantially affect the catchability of the gear.	Behavioral responses increase the catchability of the gear (i.e., hyper-stability of CPUE with schooling behavior).	2	1	This species does not display schooling behavior. This behavior neither increases nor decreases their catchability.	Ramsden, S., Cotton, C.F., Curran, M.C. 2017. Using acoustic telemetry to assess patterns in the seasonal residency of the Atlantic stingray <i>Dasyatis sabina</i> . Environmental biology of fishes, 100, pp.89-98.
Morphology affecting capture: This attribute pertains to the ability of the fishing gear to capture fish based on their morphological characteristics (e.g., body shape, spiny versus soft rayed fins). Because gear selectivity varies with size and age, this measure should be based on the age or size classes most representative of the entire stock.	Species shows low selectivity to the fishing gear.	Species show moderate selectivity of the fishing gear.	Species show high selectivity to the fishing gear.	2	3	This species is being assessed due to its interaction with the butterfly net fishing gear. This species is a dorsoventrally flattened species to make its benthic lifestyle advantageous. The butterfly net gear fishes the water column during tidal exchanges. This morphology and lifestyle leads to low encounterability with the fishing gear. However, their morphology does not lead to any significant change in the selectivity of the gear.	Last, <i>et al.</i> , Editors, 2016. Rays of the World. CSIRO publishing.
Survival after capture and release: Fish survival after capture and release varies by species, region, and gear type or even market conditions, and thus can affect the susceptibility of the stock. When data are lacking, the VEWG suggest using NMFS' National Bycatch Report to estimate bycatch mortality (see the following for Alaska Region http://www.nmfs.noaa.gov/by_catch/BREP2011/Factsheets/NBRfactsheet_AK.pdf). The report provides comprehensive estimates of bycatch of fish, marine	Probability of survival >67%	Probability of survival between 33% and 67%	Probability of survival <33%	N/A	5		

Susceptibility (Atlantic stingray)	Low (1)	Moderate (2)	High (3)	Attribute Score	Data Quality Score	Comment	Reference
mammals, and non-marine mammal protected resources in major US commercial fisheries and should allow users to develop a proxy based on similar fisheries.							
Desirability/value of the fishery: This attribute assumes that highly valued fish stocks are more susceptible to overfishing or becoming overfished by recreational or commercial fishermen due to increased effort. To identify the value of the fish, the authors suggest using the price per pound or annual landing value for commercial stocks (using the higher of the two values) or the retention rates for recreational fisheries (Table 3). Commercial landings and recreational retention rates can be found at: www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html and www.st.nmfs.noaa.gov/st1/recreational/queries/index.html	Stock is not highly valued or desired by the fishery	Stock is moderately valued or desired by the fishery	Stock is highly valued or desired by the fishery	3	2	According to NOAA fisheries, this species has not been commercially landed in the GOM within the last 5 years. This species has low to non-existent value by the fishery to land. Therefore, it earns the score of 3.	www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html
Fishery impact on habitat: A fishery may have an indirect effect on a species via adverse impacts on habitat. Defining these effects is the focus of environmental impact statements or essential fish habitat evaluations that have been conducted by NMFS, and this work can be used to evaluate this attribute. Thus, the impacts on habitat may be categorized with respect to whether adverse impacts on habitat are minimal, temporary, or mitigated.	Adverse effects absent, minimal or temporary	Adverse effects more than minimal or temporary, but are mitigated	Adverse effects more than minimal or temporary and are not mitigated	3	1	As stated, this species is being assessed due to its interaction with the butterfly net fishing gear. The butterfly nets are fixed to a vessel or dock and fishes the water column as the tide changes over the tidal exchange in rivers and estuaries. There is no contact with the habitat for this species and thus the effects are minimal or absent.	LDWF. 2016. Louisiana Shrimp Fishery Management Plan. Louisiana Department of Wildlife and Fisheries Office of Fisheries. https://www.wlf.louisiana.gov/assets/Resources/Publications/Marine_Fishery_Management_Plans/2016_Shrimp_Fishery_Management_Plan.pdf

12.6 Appendix 4 – Assessment Team and Peer Reviewer Bios

12.6.1 Assessment Team Bios

Based on the technical expertise required to carry out this assessment, an Assessment Team was selected as follows.

Team Leader: Dr. Ivan Mateo, Primary Responsibility for Data Deficient Framework (DDF)

Dr. Ivan Mateo has over 20 years' experience working with natural resources population dynamic modeling. His specialization is in fish and crustacean population dynamics, stock assessment, evaluation of management strategies for exploited populations, bioenergetics, ecosystem-based assessment, and ecological statistical analysis. Dr. Mateo received a Ph.D. in Environmental Sciences with Fisheries specialization from the University of Rhode Island. He has studied population dynamics of economically important species as well as candidate species for endangered species listing from many different regions of the world such as the Caribbean, the Northeast US Coast, Gulf of California, and Alaska. He has done research with NMFS Northeast Fisheries Science Center Ecosystem Based Fishery Management on bio-energetic modeling for Atlantic cod. He also has been working as environmental consultant in the Caribbean doing field work and looking at the effects of industrialization on essential fish habitats and for the Environmental Defense Fund developing population dynamics models for data poor stocks in the Gulf of California. Dr. Mateo also worked as National Research Council postdoc research associate at the NOAA National Marine Fisheries Services Ted Stevens Marine Research Institute on population dynamic modeling of Alaska sablefish.

Dr. Mateo will oversee coordinating the other Assessment Team members, participating in the assessment and be responsible for the completion of the assessment in accordance with Certification procedures. Dr. Mateo does not have any conflicts of interest in relation to the fishery under assessment and will be on-site during this assessment.

Team Member: Dr. Jerry Ennis, Primary Responsibility for stock assessment

Following undergraduate and graduate degrees at Memorial University of Newfoundland in the 1960s, Dr. Ennis completed a Ph.D. in marine biology at University of Liverpool in the early 1970s. He retired in 2005 following a 37-year research career with the Science Branch of the Department of Fisheries and Oceans. Dr. Ennis extensively published work has focused primarily on lobster fishery and population biology and on various aspects of larval, juvenile and adult lobster behavior and ecology in Newfoundland waters. Throughout his career, Dr. Ennis was heavily involved in the review and formulation of scientific advice for management of shellfish in Atlantic Canada as well as the advisory/consultative part of managing the Newfoundland lobster fishery.

Dr. Ennis will be the team's expert on Section B: Science & Stock Assessment Activities, and the Precautionary Approach. Jerry does not have any conflicts of interest in relation to the fishery under assessment and will be on-site during this assessment.

Team Member: Mr. Robert J. Allain, Primary Responsibility for fisheries management.

Mr. Allain is a graduate of Saint Mary's University in Halifax, Nova Scotia with undergraduate degrees in Commerce (Business Administration) and Science (Chemistry). In 1977, he joined the then Federal Department of Fisheries and Environment as a Fishery Officer (International Surveillance) and carried out inspections of foreign and domestic fishing vessels within and beyond Canada's EEZ. During his 32-year career with the now Department of Fisheries and Oceans (DFO), Mr. Allain served in a variety of fisheries management, strategic planning and policy positions in Nova Scotia, New Brunswick, Prince Edward Island, Newfoundland and Labrador, and at Departmental Headquarters in Ottawa. He served as a senior executive from 1991 to 2008.

Currently, he is the president of the consulting firm OceanIQ Management Services in Dieppe, New Brunswick. He is a Marine Stewardship Council-certified P3 assessor who has participated in approximately 40 assessments and surveillance audits in Canada and the US in respect of demersal, pelagic, invertebrate and crustacean fisheries. Mr. Allain is also fully conversant with the Alaska Responsible Fisheries Management (AK RFM) model through his participation as a technical expert to the Fisheries Standard Committee that developed the certification scheme. Mr. Allain will be the team's expert on Sections A (The Fisheries Management System), D (Management Measures), and E (Implementation, Monitoring and Control) of the relevant Standard. He does not have any conflicts of interest in relation to the fishery under assessment and will be on-site during this assessment.

Team Member: Mr. Matthew Jew, Primary Responsibility for fisheries impacts to the ecosystem

Mr. Matthew Jew has over 10 years' experience in the field of marine research and over 6 years in the field of fisheries science. Mr. Jew earned his M.S. in Marine Science from Moss Landing Marine Laboratories (California State University, Monterey Bay). He has worked at Moss Landing Marine Laboratories as Principle Investigator on numerous projects studying the trophic ecology of a wide range of species, species differentiation based on taxonomic classification and morphological characteristics, and statistical modelling. The primary focus of his work has been on ecosystem structure as it relates to the effects commercial fisheries. Mr. Jew has done research with NOAA Northwest Fisheries Science Center's West Coast Groundfish Bottom Trawl Survey studying life history and population dynamics of economically important fishes. He has done work monitoring broad-scale ecosystem productivity from an ecosystem-based management approach. Mr. Jew will be the team's expert on Section D: Serious Impacts of the Fishery on the Ecosystem of the relevant Standard. He does not have any conflicts of interest in relation to the fishery under assessment and will be on-site during this assessment.

12.6.2 Peer Reviewer Bios

Based on the technical expertise required to carry out this assessment, a team of external Peer Reviewers was selected as follows.

Dr. Robert Leaf

Dr. Robert Leaf is an Assistant Professor at the Gulf Coast Research Lab, University of Southern Mississippi. His research interests include population dynamics of fishes and invertebrates with an emphasis on the environmental drivers influencing stock dynamics. Dr. Leaf has 20 years of experience working in the field of natural resource management of fin and shellfish. He specializes in the evaluation of management strategies of harvested species and the identification of environmental drivers that impact their population dynamics. Dr. Leaf received his Master's Degree in Marine Science at Moss Landing Marine Laboratories and his Ph.D. in Fisheries and Wildlife Sciences from Virginia Polytechnic and State Institute. His last professional post was as a postdoctorate under Dr. Kevin Friedland at the Northeast Fishery Science Center's Narragansett Laboratory. There, he worked on understanding the impact of environmental conditions on fish stock productivity and recruitment. He has worked in the Gulf of Mexico for the last three years working on fish stock assessment of commercially and recreationally important species in that area. Dr. Leaf is a member of the Gulf of Mexico Fishery Management Council's Red Drum working group and NOAA's Marine Fisheries and Climate Taskforce. He currently supervises four masters level students working on various state and federally managed fish stocks.

Dr. Wesley Toller

Dr. Wes Toller has an extensive background in fisheries management and habitat conservation. As owner and operator of his own consulting business since 2010, Dr. Toller has worked closely with a number of leading certification schemes including the Marine Stewardship Council (MSC) and Aquaculture Stewardship Council (ASC) to develop and improve processes for auditing and accreditation of sustainability standards. He previously worked as a program manager with Accreditation Services International (ASI) where he helped establish the company's

nascent MSC Program. Dr. Toller has an in-depth knowledge of ISO requirements and international best practices that pertain to eco-labelling. He has a detail-oriented work style and wide-ranging interests. He has experience in many subject areas within the field of sustainability, and a specialist in sustainable use of fishery resources in the field of fisheries management and marine science. Dr. Toller received his doctorate in biological sciences from the University of Southern California. He currently resides in Seattle.