



FISHERY ASSESSMENT REPORT

IFFO GLOBAL STANDARD FOR RESPONSIBLE SUPPLY OF FISHMEAL AND FISH OIL



FISHERY:	Gulf Menhaden (<i>Brevoortia patronus</i>)
LOCATION:	Gulf of Mexico, USA
DATE OF REPORT:	23rd May 2013
ASSESSOR:	Sam Peacock

Global Trust Certification Ltd, Quay Side Business Centre, Dundalk, Co. Louth, Ireland Tel: 042 932 0912 Fax 042 938 6864

Issue No; 2; Issue Date; Nov 09

Report Ref: Gulf Menhaden Re Approval 2013

CCM Code:

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1. Application Details and Summary of the Assessment Outcome			
Name:			
Address:			
Country:	USA	Zip:	
Tel. No.		Fax. No.	
Email address:		Applicant Code	
Key Contact:		Title:	
Certification Body Details			
Name of Certification Body:			
Assessor Name:	Peer Reviewer:	Assessment Days:	Initial/Surveillance/Re-certification:
Sam Peacock	Mike Platt	10	Re-assessment
Assessment Period	May 2013		
Scope Details			
1. Scope of Assessment:	IFFO Global Standard for Responsible Supply		
2. Fishery	Gulf Menhaden (<i>Brevoortia patronus</i>)		
3. Fishery Location	Gulf of Mexico, USA		
4. Fishery Method	Purse seine		
Outcome of Assessment			
5. Overall Fishery Compliance Rating	Medium/high		
6. Sub Components of Low Compliance	None		
7. Information deficiency	None		
8. Peer Review Evaluation	Agree to reapprove this fishery as a raw material for the IFFO RS standard		
9. Recommendation	Re-Approve fishery		

2. Quality of Information
Good, primarily federal and state government websites

3. Compliance Level Achieved
Medium/high
Recommendation
Approve fishery

4. Guidance for On-site Assessment
Based on High Compliance Findings
To confirm that the technical measures to protect the fishery are still in place and being enforced by the Gulf States
Based on Medium Compliance Findings
Key Stakeholders of the Fishery

5. Assessment Determination
<p>Gulf menhaden is managed as five semi-independent fisheries by the five Gulf states, although the large majority of landings are from the Louisiana fishery. The legal, administrative, enforcement and sanctioning backbone of fisheries management is robust throughout the US, both at federal and state levels. Inter-state management is coordinated by the GSMFC, which bases its advice on in-depth stock assessments. These in turn are conducted using a broad range of fishery dependent and independent data sources. The stock is not managed using a quota system, but rather by a series of temporal and spatial technical measures which have been demonstrated to be effective at restricting fishing to a sustainable level.</p> <p>The fishery has been awarded one medium compliance rating, because although the precautionary approach is considered in the over-arching management plans and legal instruments, there are some sources of uncertainty described in the most recent stock assessment.</p>
HIGH COMPLIANCE
A1, A2, A3, B1, B2, D1, D2, E1, E2
MEDIUM COMPLIANCE
C1

Background

Menhaden are a small, schooling, pelagic species of obligate filter-feeding omnivores. Gulf menhaden (*Brevoortia patronus*) primarily occupy inshore waters in summer, but move into deeper waters from October onwards. The fish feed in dense schools, filtering phytoplankton, but probably also feed at the bottom. They are believed to be winter spawners.

Menhaden fisheries are amongst the oldest fisheries in the United States. Historical records show that menhaden were harvested along the Atlantic coast for fertilizer in the 1700’s and for oil as early as the mid 1800’s. The fishery in the Gulf of Mexico, as distinct from the fishery for Atlantic menhaden, has been continuous since around 1945; although earlier efforts in the early 1900s were made, there were no significant landings until after World War II. Although there is some disagreement as to whether or not menhaden is suitable for human consumption, there is no substantial use of the fish in this way and the commercial fishery is almost exclusively for reduction and bait purposes.

The majority of commercial fishing for Gulf menhaden is carried out in Louisiana (91% by weight based on the average 2008-11 inclusive), with smaller contributions from Mississippi (5.6%), Texas (2.5%), Alabama (<1%) and Florida (<1%); there is no substantial commercial fishery in federal waters. Where relevant this assessment considers the management measures and procedures in all

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five states, but where there is variation between States the scoring is weighted towards the situation in the Louisiana fishery.

R: 4, 23, 24

SUMMARY OF LEVEL OF COMPLIANCE					
	The Management Framework and Procedures	Stock assessment procedures and management advice	Precautionary approach	Management measures	Implementation
legal and administrative basis	High Compliance	Low Compliance	Low Compliance	Low Compliance	Low Compliance
Fisheries management should be concerned with the whole stock unit	High Compliance	Low Compliance	Low Compliance	Low Compliance	Low Compliance
Management actions should be scientifically based	High Compliance	Low Compliance	Low Compliance	Low Compliance	Low Compliance
Research in support of fisheries conservation and management should exist	Low Compliance	High Compliance	Low Compliance	Low Compliance	Low Compliance
Best scientific evidence available should be taken into account when designing conservation and management measures	Low Compliance	High Compliance	Low Compliance	Low Compliance	Low Compliance
The precautionary approach is applied in the formulation of management plans	Low Compliance	Low Compliance	Medium Compliance	Low Compliance	Low Compliance
The level of fishing permitted should be set according to management advice given by research organisations	Low Compliance	Low Compliance	Low Compliance	High Compliance	Low Compliance
Where excess fishing capacity exist, mechanisms should be in established to reduced capacity	Low Compliance	Low Compliance	Low Compliance	High Compliance	Low Compliance
Management measures should ensure that fishing gear and fishing practices do not have a significant impact on non-target species and the physical environment	Low Compliance	Low Compliance	Low Compliance	High Compliance	Low Compliance
A management system for fisheries control and enforcement should be established	Low Compliance	Low Compliance	Low Compliance	Low Compliance	High Compliance
A framework for sanctions of violation of laws and regulations should be efficiently exists	Low Compliance	Low Compliance	Low Compliance	Low Compliance	High Compliance

KEY: Low Compliance Medium Compliance High Compliance:

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6. Rationale of the Assessment Outcome

a. The Management Framework and Procedure

LEVEL OF COMPLIANCE	a.i. The management of the fishery must include a legal and administrative basis for the implementation of measures and controls to support the conservation of the fishery.	References	Rating	
LOW	<p><i>Determination: There is an effective legal and administrative basis for the management of Gulf menhaden in each of the five states prosecuting fisheries on the stock. Inter-state cooperation is managed by the GSMFC, which coordinates science, stock assessment and FMP development. There is no significant commercial fishery in federal waters.</i></p> <p><i>Overview</i></p> <p>Gulf Menhaden is located in both state- and federally-managed waters, but as significant commercial fisheries only occur in state jurisdictions the majority of direct fishery management measures are developed and implemented by state governments. The five Gulf states are Florida (whose primary administrative body is the Florida Fish and Wildlife Conservation Commission); Alabama (Department of Conservation and Natural Resources); Mississippi (Mississippi Department of Marine Resources); Louisiana (Louisiana Department of Wildlife and Fisheries); and Texas (Texas Parks and Wildlife Department). The activities of federal organisations can affect the stock indirectly, for example through preserving water quality and reducing pollution, but as there is no significant fishery in the EEZ there is no direct management of the stock at the federal level. The fishery management council responsible for the Gulf region, the Gulf of Mexico Fishery Management Council (GMFMC) has no management plan in place and as of the 2002 FMP was not intending to develop one.</p> <p><i>Inter-state coordination</i></p> <p>Management of the Gulf menhaden stock is coordinated by the Gulf States Marine Fisheries Commission (GSMFC). The GSMFC was established by an act of congress in 1949 with the objective of promoting sustainable</p>	4, 6 - 8	HIGH	
MEDIUM				
HIGH				

	<p>utilisation of fishery resources throughout the Gulf of Mexico seaboard. The Commission is composed of three members from each of the five Gulf States, including the head of the marine resource agency, a member of the legislature, and a citizen with knowledge of marine fisheries. The Commission makes recommendations to the governments of the Gulf States based on scientific studies carried out by state, federal and academic agencies. It is also responsible for the Interjurisdictional Fisheries (IJF) Program, which is designed to develop management plans for transboundary stocks such as the Gulf menhaden. The GSMFC was responsible for creating and publishing the 2002 regional FMP for Gulf menhaden.</p> <p><i>Louisiana</i></p> <p>The Louisiana legislature has sole authority to establish management programs and policies; however, the legislature has delegated certain authority and responsibility to the Department of Wildlife and Fisheries (LDWF). The LDWF Assistant Secretary is in charge of the Office of Fisheries. In this office the Marine Fisheries Division is responsible for the administration and operation of fisheries research and regulatory programs. The Enforcement Division is responsible for enforcing all marine fishery statutes and regulations. Additionally, the Louisiana Wildlife and Fisheries Commission (LWFC) is a seven-member policy-making and budgetary-control board with no administrative functions appointed by the governor. Title 56 of the Louisiana Revised Statutes contains rules and regulations that govern marine fisheries in the state.</p> <p><i>Mississippi</i></p> <p>Authority to promulgate fisheries regulations and policies is vested in the Mississippi Commission on Marine Resources (MCMR). Within the MCMR, the Mississippi Department of Marine Resources (MDMR) administers coastal fisheries and habitat protection programs, including Mississippi’s federally-approved Coastal Zone Management Plan. The legal basis for the activities of these governmental bodies is provided in Title 49 of the Mississippi Code of 1972.</p>		
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	<p><i>Texas</i></p> <p>The Texas Parks and Wildlife Department (TPWD) is charged with management of the coastal fishery resources and enforcement of legislative and regulatory procedures under the policy direction of the Texas Parks and Wildlife Commission (TPWC). The commission consists of nine members appointed by the governor for six-year terms. The commission selects the TPWD Executive Director who serves as the chief administrative officer of the department. A Director of the Coastal Fisheries Division and a Director of the Law Enforcement Division are named by the TPWD Executive Director. The Texas Parks and Wildlife Code establishes the powers and responsibilities of the TPWD and TPWC, and any regulations adopted by the TPWC are included in the Texas State-wide Hunting and Fishing Proclamations.</p> <p><i>Florida</i></p> <p>Florida menhaden fisheries are managed by the Florida Fish and Wildlife Conservation Commission (FWC). Within the FWC, the Florida Marine Research Institute (FMRI) is responsible for research; the Division of Law Enforcement is responsible for enforcement of all marine, resource related laws, and all rules and regulations of the department; and the Division of Marine Fisheries recommends management policies and administers various saltwater fisheries programs. The legal basis for the FWC and any regulations it introduces is codified in the Florida Administrative Code.</p> <p><i>Alabama</i></p> <p>Management authority of fishery resources in Alabama is held by the Commissioner of the Department of Conservation and Natural Resources (ADCNR). Within the ADCNR, the Marine Resources Division (AMRD) has responsibility for enforcing state laws and regulations, conducting marine biological research, and serving as the administrative arm of the commissioner with respect to marine resources. The AMRD recommends regulations to the commissioner. The legal basis for fishery management is codified in Title 9 of the Code of Alabama.</p>		
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		a.ii. Fisheries management should be concerned with the whole stock unit over its entire area of distribution and take into account fishery removals and the biology of the species	References	Rating
LOW		<p><i>Determination: The management unit for Gulf menhaden at the highest level matches the best available science. Although specific technical measures and other aspects of management vary between states, stock-wide management is effectively coordinated by the GSMFC. Stock assessments and the FMP cover all fishery removals and the biology of the species.</i></p> <p>Gulf menhaden is subject to separate management regimes in each of the five Gulf States. However, stock assessments and FMPs treat the stock as a single unit across the entire Gulf region, an approach which filters down to state level via the GSMFC. The results of two independent studies, carried out in 2006 and 2010, support the hypothesis that menhaden in the Gulf constitute a single biological stock. The studies found no evidence for independent populations. Instead, stock structure in gulf menhaden is more accurately described by an isolation-by-distance model, in which measurable genetic structure is shown to be largely a function of the upper limits on dispersal of individuals within a stock. In this model, genetic distance among samples is expected to increase linearly with geographic distance. Thus although there may be considerable genetic diversity between geographical locations, Gulf menhaden is a single biological stock. The current management definition reflects the best available science. The geographical range of the Gulf menhaden population is shown in figure A2(i).</p> <p>The most recent stock assessment (R4), carried out in 2011 by NOAA’s Southeast Fisheries Science Center (SFSC) across the entire stock, includes a “Life History” section which considers stock definition and genetics, feeding habits, ageing, growth, reproduction, natural mortality, and a number of environmental factors. The assessment also includes full consideration of the habitats preferred and required by the species.</p> <p>The stock assessment utilises the fishery landings and effort data series which are available for the entire Gulf region and cover every year from around 1950 onwards. The SFSC have carried out studies to ensure the</p>	4, 5, 16	HIGH
MEDIUM				

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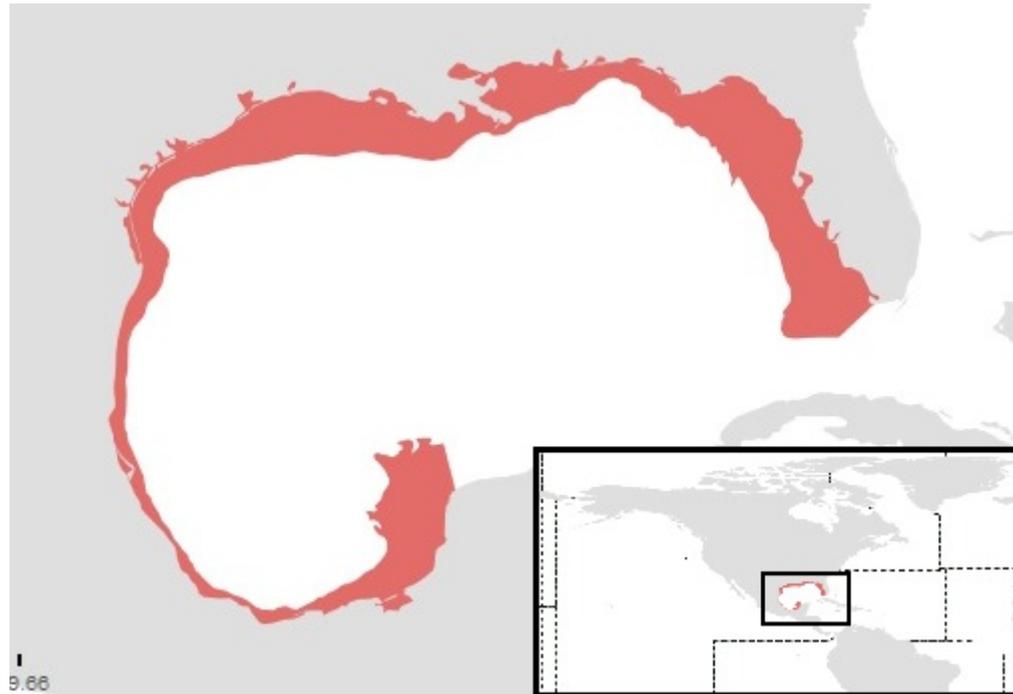
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accuracy of this data and consider it to be reliable. Finally, the stock assessment includes removals in the bait and recreational fisheries in its analysis.



A2(i): Gulf Menhaden distribution in the Gulf of Mexico (red). Adapted from the FAO species information web page (R16).

		a.iii. Management actions should be based on long-term conservation objectives	References	Rating
LOW		<p><i>Determination: Gulf menhaden is managed using both specific long-term objectives (in the form of target fishing mortality and reproductive capability used to determine and react to potential over-exploitation) and a generalised sustainability objective. Although there is no formal management plan agreed between the participating States, the reference points form the basis of the scientific advice, which in turn informs the management of the entire fishery at State level.</i></p> <p>The stated goal of the 2002 Menhaden FMP is “a management strategy for gulf menhaden that allows an annual maximum harvest while protecting the stock from overfishing on a continuing basis.” The 2007 stock assessment set out a number of targets and limit reference points which have been used as management objectives since that time via their utilisation in the SEDAR stock assessments as indicators of fishing pressure. Biomass reference points were defined using a fecundity indicator and expressed as egg production per year. The reference points were defined as follows:</p> <ul style="list-style-type: none"> • $F_{Target} = 0.94$ • $F_{Limit} = 1.46$ • $\Psi_{Target} = 68.68 \times 10^{12}$ eggs/year • $\Psi_{Limit} = 34.34 \times 10^{12}$ eggs/year <p>The paper states that the estimate of F_{Target} corresponds roughly to F55%, and the estimate of F_{Limit} to F45%. In a theoretical study, these values were found consistent with the fishing rate at maximum sustainable yield (FMSY) for stocks similar to gulf menhaden.</p> <p>It is considered that the existing seasonal management of the fishery has proven to be successful for the protection of the menhaden resource. This approach to controlling fishing capture by the use of a restrictive season was created over sixty years ago and was initiated by the fishing industry, but has now been adopted by</p>	6, 25	HIGH
MEDIUM				
HIGH				

	the regulatory authorities of the Gulf States to protect the fishery during its spawning phase.		
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b. Stock Assessment Procedures and Management Advice

LEVEL OF COMPLIANCE	b.i Research in support of fisheries conservation and management should exist.	References	Rating
LOW	<p><i>Determination: Fishery-dependent data are collected from vessel logbooks and portside sampling, and are used to inform fishery management. The stock assessment process also makes use of a robust range of fishery-independent data, gathered from the survey regimes of the five participating states.</i></p> <p><i>Fishery-dependent data</i></p> <p>NMFS port samplers have had access to the catch at each processing plant for biostatistical and stock assessment purpose since 1964, and the menhaden companies report daily vessel unloads to the NMFS on a monthly basis throughout the fishing season. Vessel captains provide a daily log of each vessel’s activities including catch estimates, fishing location, set duration, and weather conditions for each and every set. These logs, or Captain’s Daily Fishing Reports (CDFRs), are verified against each plant’s pump-out records and provided to NMFS on a regular basis for compilation. The NMFS continues to publish monthly menhaden landings in the form of a status memo, which are available on the NOAA’s Fishery Market News.</p> <p>The NMFS Beaufort laboratory oversees a dockside biological sampling program conducted over the range of the fishery, both temporally and geographically. Port agents randomly select vessels and at dockside retrieve a bucket of fish from the top of the vessel’s fish hold. The sample is assumed to represent fish from the last purse-seine set of the day, not the entire boat load or trip. The agent ascertains from the crew the location and</p>	2, 4, 9, 25	HIGH
MEDIUM			
HIGH			

	<p>date of the last set. From the bucket the agent randomly selects ten fish, which are measured (fork length in mm), weighed (grams), and have scales removed for ageing. This sampling regime permits landings in biomass to be converted to landings in numbers at age. For each port/week caught, biostatistical sampling provides an estimate of mean weight and the age distribution of fish caught.</p> <p><i>Fishery-independent data</i></p> <p>Each state agency has its own sampling protocols which identify juvenile gulf menhaden abundance based on catch per-unit-effort. Fishery-independent data are acquired from Mississippi, Louisiana, and Texas using bag seines, beam plankton nets, and otter trawls. These data are combined to create indices for use in stock assessments. Similar data from Alabama and Florida are also included in the analysis. Juvenile and adult abundance indices are calculated from all these data sources.</p> <p>Additional independent data sources include the SEAMAP trawl survey (size and geographical location, not used in the most recent stock assessment); SEAMAP ichthyoplankton survey (larval location and abundance sampling, not used in the most recent stock assessment).</p> <p><i>Fishery-independent data – Louisiana</i></p> <p>The sampling design for Louisiana data consists of fixed stations selected by coastal study areas to target areas known to have fish/shellfish when the sampling programs started. Seine, trawl and gillnet sampling is conducted. Gulf menhaden size and geographical distribution are recorded. The Louisiana monitoring program does not estimate ages.</p> <p><i>Fishery-independent data – Mississippi</i></p> <p>Mississippi Department of Marine Resources (MDMR) and the Gulf Coast Research Laboratory (GCRL) collects fishery-independent data using trawls, seines, gillnets, and beam plankton nets. The majority of these data series date back to 1974, although the gillnet regime was first carried out in 2005. Menhaden lengths and weights are taken, but ages are not estimated.</p>		
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		<p><i>Fishery-independent data – Texas</i></p> <p>Texas Parks and Wildlife’s fishery-independent data are collected as a stratified cluster sampling design; each bay system and Gulf area serves as non-overlapping strata with a fixed number of samples per month. Gill net and bag seine sample locations are randomly selected. For gulf menhaden, bag seines and monofilament gill nets are used in each of ten Texas estuarine systems. The Texas monitoring program collects size and geographical distribution data, but does not estimate ages.</p>		
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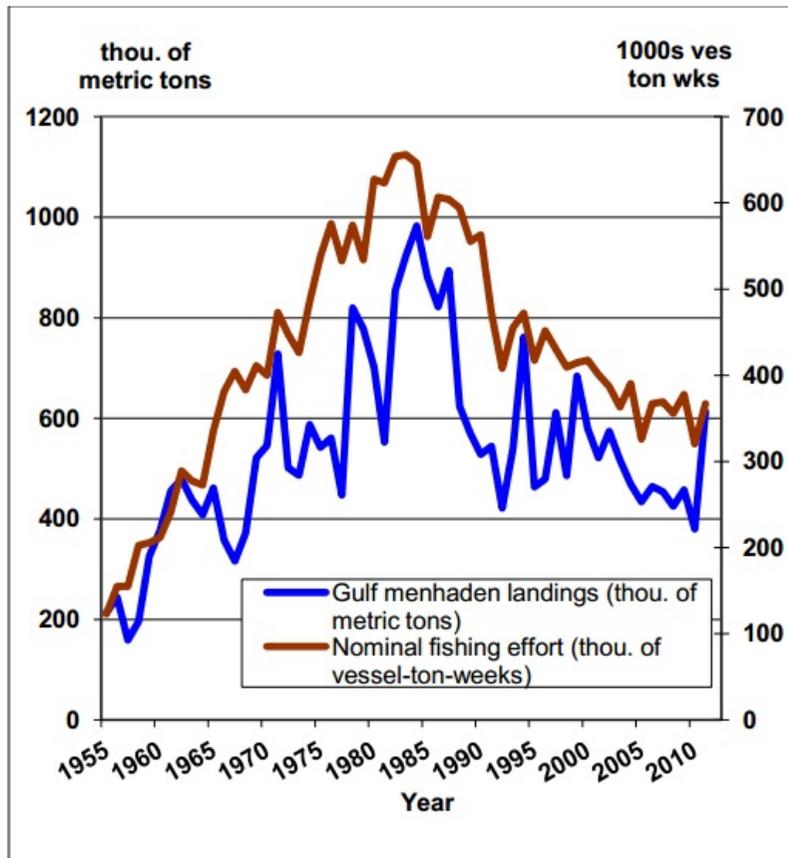
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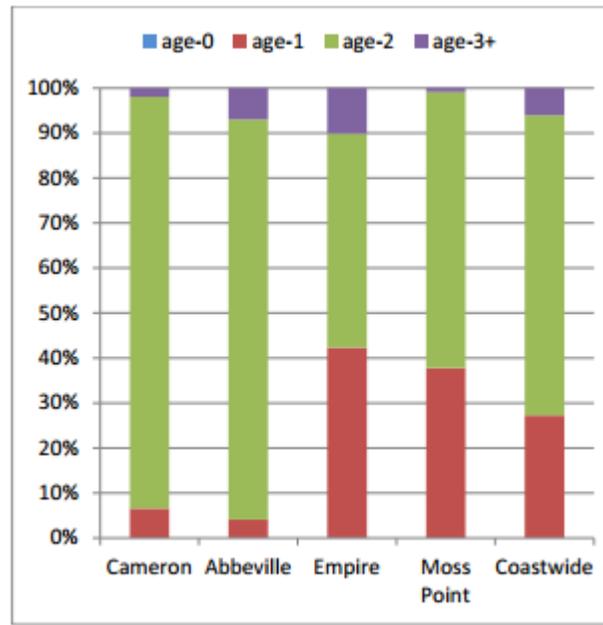
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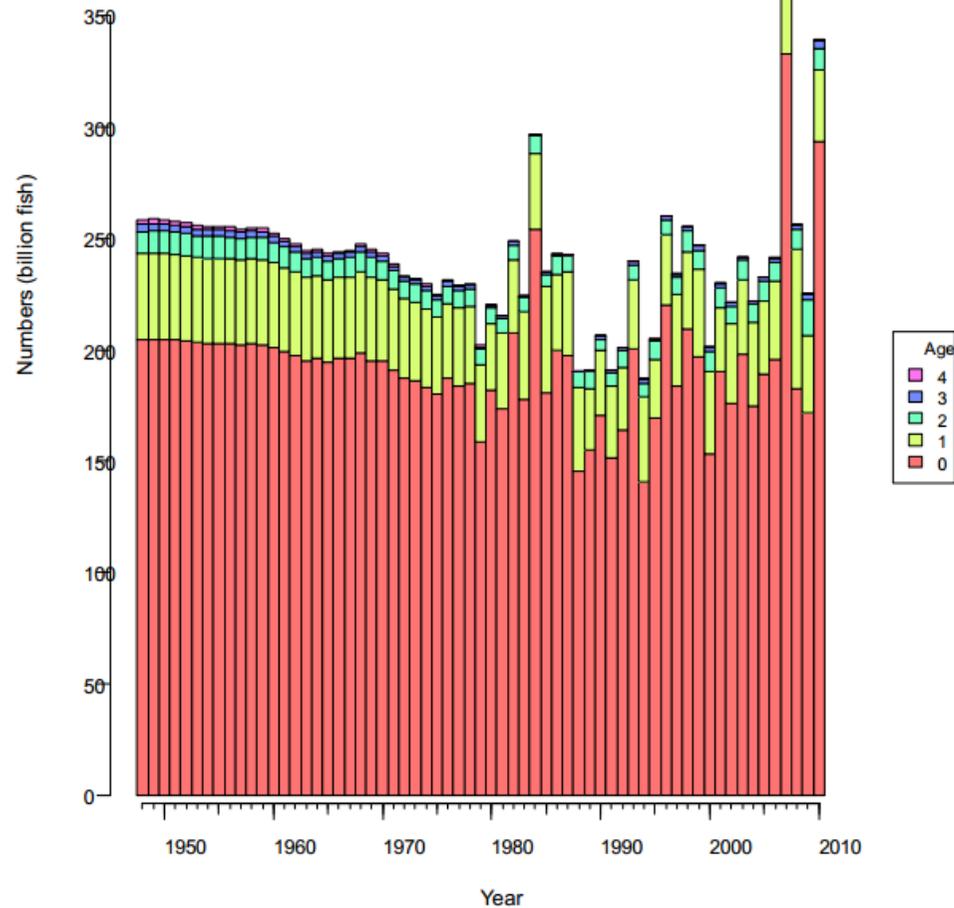


B1(i): Gulf Menhaden total landings and nominal fishing effort, 1955-2011. From the NMFS forecast & review, 2013 (R2).

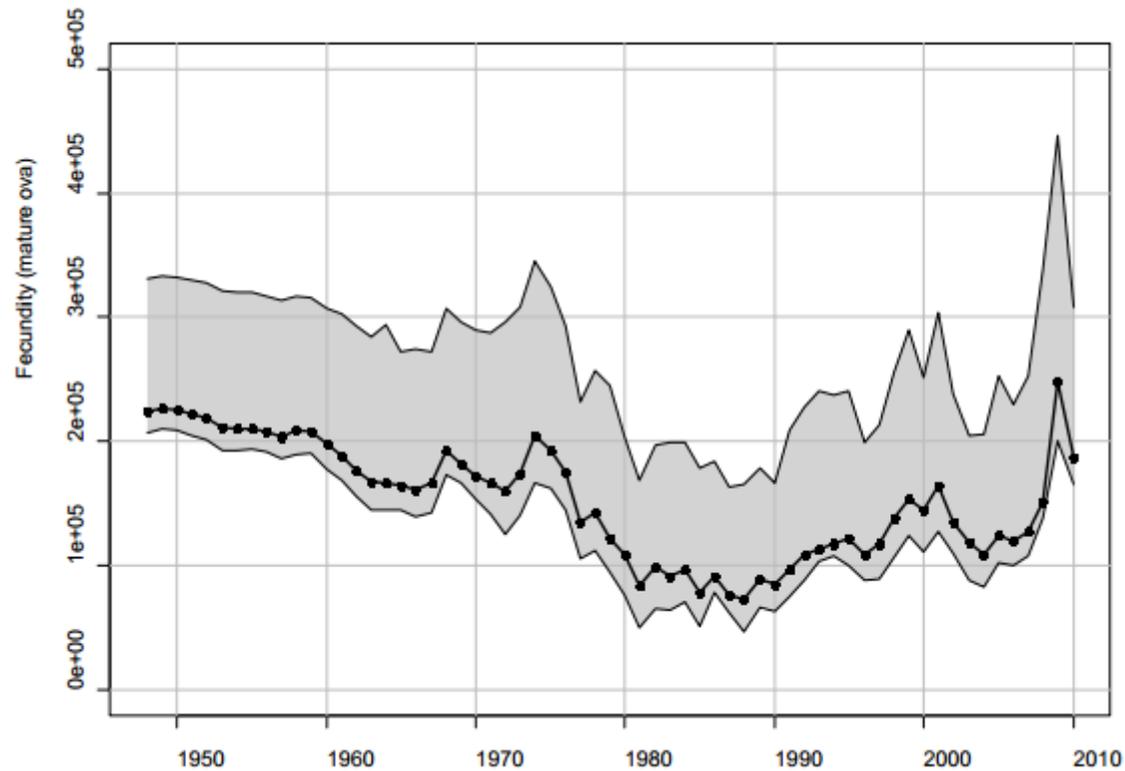


B1(ii): Percent estimated numbers-at-age of gulf menhaden by port in 2012. From the NMFS forecast & review, 2013 (R2).

LEVEL OF COMPLIANCE	b.ii Best scientific evidence available should be taken into account when designing conservation and management measures	References	Rating
LOW	<p><i>Determination: Management of the Gulf menhaden fishery is supported by a periodical stock assessment, the results of which are used to inform the management decisions of each of the five participating states. There is no evidence that any substantial scientific recommendations have been ignored.</i></p>	4, 10, 25	HIGH
MEDIUM			
HIGH			<p>The NMFS conducts assessments for the gulf menhaden stock through the Southeast Data Assessment and Review (SEDAR) process. SEDAR is a cooperative Fishery Management Council process initiated in 2002 to improve the quality and reliability of fishery stock assessments in the South Atlantic, Gulf of Mexico, and US Caribbean. SEDAR is managed by the Caribbean, Gulf of Mexico, and South Atlantic Regional Fishery Management Councils in coordination with NOAA Fisheries and the Atlantic and Gulf States Marine Fisheries Commissions. The most recently available SEDAR stock assessment for Gulf menhaden was published in 2011 (R4). The most recently available peer-reviewed stock assessment was published in 2007 (R25). These stock assessments form the basis for the recommendations of the Menhaden Advisory Committee (MAC), a component of the GSMFC. Management activity in each of the five participating states is guided by these recommendations, the original stock assessments and reports, and the activities of each state’s scientific bodies.</p>



B2 (i): Estimated numbers at age for Gulf menhaden at the start of the fishing year, 1946 – 2011. From the 2011 stock assessment (R4)



B2(ii): Estimated fecundity (billions of eggs) for Gulf menhaden, 1946 – 2011. Shaded area represents the 95% confidence interval. From the 2011 stock assessment (R4).

c. The Precautionary Approach

LEVEL OF COMPLIANCE	c.i The precautionary approach is applied in the formulation of management plans.	References	Rating
LOW	<p><i>Determination: The precautionary approach is recognised and implemented in the US federal fishery management approach, and also to varying extents within individual state systems. The most recent stock assessment raises a number of concerns over potential sources of uncertainty, leading the assessment team to consider a medium compliance rating to be appropriate.</i></p> <p>At the federal level, the Magnuson Fishery Conservation and Management Act (MFCMA) has guided marine fishery management in the United States since 1976. Although the MFCMA does not mention the precautionary principle specifically, it contains provisions which bear directly on the approach. For example, National Standard 1 of the MFCMA mandates both the prevention of overfishing and the achievement of optimum yield. The 602 Guidelines, published in 1989 as the NOAA’s official interpretation of National Standard 1, require each fishery management plan (FMP) to specify an "objective and measurable definition of overfishing" incorporating "appropriate consideration of risk" and a delineation of "management measures necessary to prevent overfishing." The extent to which similar objectives are codified in the management approaches of the individual states varies, although there is no evidence that a lack of information has been used to justify delaying the implementation of sustainable management measures.</p> <p>The most recent Gulf menhaden stock assessment lists additional research needs, highlighting sources of significant levels of uncertainty in the current assessment. These include the need for fishery-independent age estimates, development of an adult monitoring survey, standardising juvenile index sampling, updating estimates of maturity and fecundity, and better understanding of the role of Gulf menhaden within the ecosystem.</p>	4, 25, 27	MEDIUM
MEDIUM			
HIGH			

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d. Management Measures

LEVEL OF COMPLIANCE	d.i The level of fishing permitted should be set according to management advice given by research organisations.	References	Rating
LOW	<p><i>Determination: The Gulf menhaden stock is not managed using a quota-based system, but rather by technical measures such as closed seasons, areas, and limited entry. These mechanisms have been demonstrated in annual stock assessments to be effective at keeping fishing pressure below the defined target reference point, and the stock is not considered to be overfished.</i></p>	4	HIGH
MEDIUM			
HIGH			

Benchmarks and Terminal Year Values	Base BAM Model Estimates
R_0	206.5
Y at F_{MSY}	825,822 mt
Limit: F_{MSY}	1.46
Target options: 65% F_{MSY}	0.95
75% F_{MSY}	1.10
85% F_{MSY}	1.24
F_{2010}	0.26
$F_{2008-2010}/F_{MSY}$ (geometric mean)	0.24
$F_{40\%}$	1.04
$F_{30\%}$	1.54
$F_{25\%}$	1.90
Target: SSB_{MSY}	55779
Limit: $0.5 * SSB_{MSY}$	27889
SSB_{2010}	187041
SSB_{2010}/SSB_{MSY}	3.35

D1(i): Summary of benchmarks and terminal year (2010) values estimated by the most recent SEDAR stock assessment. Fecundity was used as the metric for SSB. (2011, R4)

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LEVEL OF COMPLIANCE	d.ii Where excess fishing capacity exist, mechanisms should be in established to reduced capacity to allow for the recovery of the stock to sustainable levels.	References	Rating
LOW	<p><i>Determination: Fishing capacity in US fisheries is monitored and reported upon by the NMFS, which as a range of management measures and direct approaches available to tackle excess capacity when it is found. The Gulf menhaden fishery is not currently considered by managers to be over-capacity.</i></p>	11	HIGH
MEDIUM			
HIGH			<p>In August 2004 the NMFS published the United States National Plan of Action for the Management of Fishing Capacity. The main pledges by NMFS set out within were as follows:</p> <ul style="list-style-type: none"> • Establish and, when necessary and appropriate, revise the medium and long-term national capacity reduction targets • Prepare regular assessments of overcapacity in federally managed fisheries • Work with the regional fisheries Councils to reduce overcapacity in fisheries under their jurisdiction • Convene a national meeting in 2005 that addresses, among other things, the capacity issue, where NOAA Fisheries and its constituents can review progress and focus on future priorities • Help the Councils develop/ prioritize goals for capacity reduction in specific fisheries <p>Management measures which have an effect on fishing capacity which have been implemented in the USA include limited entry, exclusive quota programs, individual transferrable quotas, community development quotas and fishing cooperatives. A final effective approach which has been taken in some fisheries is the implementation of buyout schemes.</p> <p>Throughout the 1990's the Gulf menhaden fishery underwent a period of consolidation, and is not currently considered to be operating with excess fishing capacity.</p>

LEVEL OF COMPLIANCE	d.iii Management measures should ensure that fishing gear and fishing practices do not have a significant impact on non-target species and the physical environment.	References	Rating
LOW	<p><i>Determination: The application and implementation of specific technical measures is the responsibility of the individual States and so varies somewhat throughout the fishery. However, in general the implementation of management measures mitigating the effects of the fishery on non-target species appears satisfactory to the assessment team.</i></p> <p>Non-target species</p> <p>Individual states regulate incidental bycatch in the menhaden fisheries. Bycatch in the commercial gulf menhaden fishery is one of the lowest of all the commercial fisheries in the United States, and most of the studies related to menhaden indicate a very low level of bycatch. Studies conducted in the Gulf of Mexico found similar low levels of bycatch which is supported by routine monitoring by state agencies. The United Nations Food and Agriculture Organization has listed purse seine fisheries as one of the three fisheries worldwide with lowest bycatch.</p> <p>PET species</p> <p>The federal Endangered Species Act of 1973 (ESA) provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. The ESA requires NMFS to designate critical habitat and to develop and implement recovery plans for 94 threatened and endangered aquatic species.</p> <p>Individual states may have additional restrictions on which species are permitted (see below).</p> <p>Ecosystems</p> <p>Gulf menhaden represent a pivotal mid-trophic level link between primary production and higher level piscivores. Some of the technical measures applied by individual states, such as closed areas, are aimed at limiting the indirect impact of fishery removals on the broader ecosystem. Calculations estimating stock</p>	4, 17, 23, 26	HIGH
MEDIUM			
HIGH			

	<p>biomass targets and reference points also include consideration of ecosystem factors.</p> <p>Physical environment</p> <p>Habitat effects are generally low for purse seines, although occasional contact is known to occur and, in these cases, can cause damage to fragile ecosystems (e.g. corals), particularly when targeting benthopelagic schooling species. The risk of ghostfishing by lost gear is also very low for purse seines.</p> <p><i>Individual state technical measures - Louisiana</i></p> <p>Bycatch - anyone legally taking menhaden shall not have in their possession more than 5% by weight, of any species of fish other than menhaden and herring-like species.</p> <p>Closed areas - harvesting menhaden is restricted to waters seaward of an inside-outside line described in state legislation; all other inside waters and passes are permanently closed to menhaden fishing. Additional areas are designated closed zones. These waters are closed to the taking of fish with saltwater netting, trawls, and seines from May 1 to September 15.</p> <p><i>Individual state technical measures - Mississippi</i></p> <p>Bycatch – illegal for any purse seine vessel to catch in excess of 5% by weight in any single set of the net or to possess in excess of 10% by weight of the total catch of any of the following species: spotted seatrout, bluefish, Spanish mackerel, king mackerel, dolphinfish, pompano, cobia, or jack crevalle. Also illegal for any vessel to have any quantity of red drum on board.</p> <p>Closed areas - purse-seine fishing is prohibited within one mile of the shoreline of Hancock and Harrison counties and the adjacent barrier islands. Jackson County has no restrictions relative to the shoreline other than around the barrier islands. Commercial fishing (including purse seining for menhaden) is prohibited north of the CSX bridge in the Pascagoula River system.</p>		
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	<p><i>Individual state technical measures - Texas</i></p> <p>Bycatch - purse seines used in taking menhaden may not be used to harvest any other edible products for sale, barter, or exchange. Purse-seine catches may not contain more than 5% by volume of other edible products.</p> <p>Closed areas - purse seines for taking menhaden may not be used in any bay, river, pass or tributary, nor within one mile of any barrier, jetty, island or pass, nor within 1/2 mile offshore in the Gulf of Mexico.</p> <p><i>Individual state technical measures - Florida</i></p> <p>Bycatch – no bycatch restrictions</p> <p>In 1995, Florida banned all gill/entangling nets, and any nets greater than 500 square feet in state waters; thus, purse-seine reduction vessels are virtually excluded from Florida waters.</p> <p><i>Individual state technical measures - Alabama</i></p> <p>Bycatch - menhaden purse-seine boats may not possess more than 5% by number of species (excluding game fish) other than menhaden, herrings, and anchovies.</p> <p>Closed areas - reduction fishing is restricted to Mississippi Sound and the Gulf of Mexico west of roughly Point aux Pines, Bayou La Batre, and Isle aux Herbes (Coffee Island). There is also no purse fishing allowed within a radius of one mile from the western point of Dauphin Island.</p>		
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e. Implementation

LEVEL OF COMPLIANCE	e.i There should be a framework for sanctions of violation of Laws and regulations.	References	Rating
LOW	<i>Determination: Each of the five States engaged in the Gulf menhaden fishery has a robust legal framework of sanctions for violations of fishery laws and regulations.</i>	17-22	HIGH
MEDIUM	Sanctioning the violation of laws and regulations is the responsibility of the individual states involved in the menhaden fishery.		
HIGH	<p><i>Louisiana</i></p> <p>Sanctions for violations of laws and regulations are set out in Title 56 of the Louisiana Revised Statutes. Violations are classified from Class 1 to Class 8, with Class 8 being the most serious. Punishments include:</p> <ul style="list-style-type: none"> • Class 1 - <i>For the first offense, a fine of US\$50 or imprisonment for not more than fifteen days, or both. For the second offense, a fine of not less than US\$75 nor more than US\$250 or imprisonment for not less than thirty days nor more than sixty days, or both. For the third offense and all subsequent offenses, a fine of not less than US\$200 nor more than US\$550 dollars and imprisonment for not less than thirty days nor more than ninety days.</i> • Class 8 - <i>For each offense, the fine shall not be less than US\$5,000 nor more than US\$7,000 and the violator may be imprisoned in jail for not less than sixty days nor more than six months.</i> <p>More general powers of the legislature include the seizure of assets related to the transgression, and revocation of fishing licences.</p> <p><i>Mississippi</i></p> <p>Violation of any provision of the saltwater fishing regulations is classified as a misdemeanour, and upon conviction is punishable by a fine of up to US\$500. Each day of a continuing violation constitutes a</p>		

	<p>separate violation. Violations of more than 1 section or subsection of the regulations or parts thereof are considered separate offenses and punished as such. Any person or vessel convicted of a 2nd or subsequent violation of any provisions of these regulations is considered guilty of a misdemeanor and upon conviction can be punished by a fine of up to US\$10,000.</p> <p><i>Texas</i></p> <p>When a Texas Game Warden encounters a violation of hunting and fishing regulations, there will be a criminal complaint filed in either a justice court or a county court. Fines for such violations are assessed by the presiding judge hearing the case. 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 will be 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 US\$500 or more than US\$4,000; punishment in jail not to exceed one year; or both fine and confinement.</p> <p><i>Florida</i></p> <p>The 2012 Florida Statutes, Title XXVIII, Chapter 379, Section 407 states:</p> <p><i>“(1) BASE PENALTIES.—Unless otherwise provided by law, any person, firm, or corporation who violates any provision of this chapter, or any rule of the Fish and Wildlife Conservation Commission relating to the conservation of marine resources, shall be punished:</i></p> <ul style="list-style-type: none"> <i>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.</i> <i>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</i> 	
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		<p><i>imprisonment.”</i></p> <p>Additional, more severe penalties are laid out for repeat violations, major violations, and specific violations such as possession of protected species, undersize fish, or fishing in protected areas.</p> <p><i>Alabama</i></p> <p>Title 9, Section 11 of the 2009 Alabama Code Section 9-11-156 describes “Penalties for violations of provisions of article”, as follows:</p> <p><i>“Any person, firm, copartnership, association or corporation violating any of the provisions of this article or rules and regulations based thereon shall be guilty of a Class A misdemeanor and, upon conviction for the first offense, shall be punished by a fine of not more than \$2,000.00 and/or sentenced to imprisonment for not more than one year; upon conviction for the second or any subsequent offense, the punishment shall be by a fine of not less than \$500.00 nor more than \$2,000.00, and/or by imprisonment for not less than one month nor more than one year. In addition thereto, all commercial fishing gear, boats, motors, implements, instruments, appliances or things of whatsoever nature used in connection with the commission of such misdemeanor, if the owner is unknown, shall be seized and confiscated and shall become the property of the Division of Wildlife and Freshwater Fisheries of the Department of Conservation and Natural Resources and shall be disposed of as ordered by the Commissioner of Conservation and Natural Resources. Such fishing gear, boats, motors, implements, instruments, appliances or things of whatsoever nature used in connection with the commission of such misdemeanor, if the owner is known, shall be seized and confiscated and shall be disposed of as ordered by the court having jurisdiction thereof.”</i></p>		
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LEVEL OF COMPLIANCE	e.ii A management system for fisheries control and enforcement should be established.	References	Rating
LOW	<p><i>Determination: There are well funded, fully staffed management systems in place in each of the five States which prosecute the Gulf menhaden fishery.</i></p> <p>Enforcement of fishing regulations is the responsibility of the individual states engaged in the menhaden fishery.</p> <p><i>Louisiana</i></p> <p>Fisheries enforcement in Louisiana is the responsibility of the Enforcement Division of the Department of Wildlife and Fisheries. The Mission of the Enforcement Division is to establish and maintain compliance through the execution and enforcement of laws, rules and regulations of the state relative to the management, conservation and protection of renewable natural wildlife and fisheries resources and relative to providing public safety on the state's waterways and lands for the continued use and enjoyment by current and future generations.</p> <p>Beyond the traditional role of ensuring compliance with licensing and harvesting regulations, the Enforcement Division also conducts search and rescue missions, enforces boating safety laws, investigates boating and hunting accidents and provides boater education classes for thousands of citizens each year.</p> <p><i>Mississippi</i></p> <p>Saltwater fisheries enforcement in Mississippi is the responsibility of the Marine Patrol of the Mississippi Department of Marine Resources. The Marine Patrol provides marine enforcement of federal and state laws and the ordinances of the Commission on Marine Resources for the protection, propagation, preservation and conservation of Mississippi's seafood, aquatic life and associated coastal wetland habitats. Marine Patrol also carries out the enforcement of state and federal laws pertaining to boating safety and provides emergency assistance to marine boaters.</p>	12-15	HIGH
MEDIUM			
HIGH			

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	<p><i>Texas</i></p> <p>Commercial fisheries enforcement in Texas is the responsibility of the Marine Enforcement Section of the Texas Parks and Wildlife Department. Texas game wardens have authority granted under the Texas Water Safety Act to provide law enforcement, boating safety and education, and resource protection for all of the public waters of the state and the Gulf of Mexico out to nine nautical miles. All Texas game wardens are certified Marine Safety Enforcement Officers. The enforcement of regulations regarding the commercial fishing and shrimping industries, oyster reef and harvest management, invasive species, protection of environmentally sensitive areas, recreational sport hunting and fishing activities, and the protection of water quality are all the responsibility of the Marine Enforcement Section. TPWD assists in the enforcement of federal regulations, working hand in hand with the National Marine Fisheries, U.S. Coast Guard, and other federal resource protection agencies.</p> <p><i>Florida</i></p> <p>Fisheries enforcement in Florida is the responsibility of the Division of Law Enforcement within the Florida Fish and Wildlife Conservation Commission. The Division’s four core missions are resource protection, environmental protection, boating and waterways, and public safety. The Division of Law Enforcement represents a large part of the FWC's personnel, with over 1,000 employees, over 800 of whom are sworn officers. In 2012, under direction of the Florida Legislature and Governor Scott, the FWC Division of Law Enforcement was combined with the Department of Environmental Protection’s Division of Law Enforcement and parts of the Department of Agriculture and Consumer Services’ Office of Agricultural Law Enforcement, including the officers assigned to patrol state forests and the investigator responsible for commercial aquaculture violations.</p> <p><i>Alabama</i></p> <p>Marine fisheries enforcement in Alabama is the responsibility of the Marine Police Division of the Alabama Marine Resources Division.</p>		
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References

- 1 - NMFS Gulf Menhaden 2012 forecast & 2011 review (March 2012):
http://www.st.nmfs.noaa.gov/st1/market_news/menhaden_forecast_2012.pdf
- 2 - NMFS Gulf Menhaden 2013 forecast & 2012 review (March 2013):
http://www.st.nmfs.noaa.gov/Assets/commercial/market-news/Menhaden_Forecast_Report-2013.pdf
- 3 - SEDAR Gulf Menhaden stock assessment, May 2010:
http://www.sefsc.noaa.gov/sedar/download/SEDAR20-ASMFC_Menhaden_SAR.pdf?id=DOCUMENT
- 4 - SEDAR Gulf Menhaden stock assessment, December 2011:
http://www.cio.noaa.gov/services_programs/prplans/pdfs/Final%20Work%20Product%20SEDAR27%20Menhaden.pdf
- 5 - GSMFC Menhaden Factsheet: <http://menhaden.gsmfc.org/2010%20FAQ.shtm>
- 6 - Gulf Menhaden FMP, 2002 edition: <http://menhaden.gsmfc.org/pdf/Menhaden%20FMP.pdf>
- 7 – GSMFC, ‘about’: <http://menhaden.gsmfc.org/2010%20About%20Us.shtm>
- 8 – Florida Menhaden info: <http://myfwc.com/media/195461/menhaden.pdf>
- 9 – Gulf Menhaden data collection ‘about’:
<http://menhaden.gsmfc.org/2010%20Data%20Collection.shtm>
- 10 – SEDAR ‘about’: <http://www.sefsc.noaa.gov/sedar/>
- 11 – US national plan of action for the management of fishing capacity:
<http://www.nmfs.noaa.gov/op/pds/documents/01/113/01-113-01.pdf>
- 12 – Louisiana Enforcement Division ‘about’:
<http://www.wlf.louisiana.gov/enforcement/enforcement-mission-statement>
- 13 – Mississippi Marine Patrol, ‘about’: <http://www.dmr.state.ms.us/marine-patrol>
- 14 – Texas Marine Enforcement Section vessel assets:
http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_bk_l2000_1168.pdf
- 15 – Florida Division of Law Enforcement ‘about’: <http://myfwc.com/law/>
- 16 – FAO species information web page, Gulf Menhaden:
<http://www.fao.org/fishery/species/2899/en>
- 17 – Guide to commercial fishing in Texas:
http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_bk_v3400_0074.pdf

18 – Louisiana 2013 commercial fishing regulations:

[http://www.wlf.louisiana.gov/sites/default/files/pdf/publication/31745-commercial-fishing-regulations/2013 commercial fishing low-res.pdf](http://www.wlf.louisiana.gov/sites/default/files/pdf/publication/31745-commercial-fishing-regulations/2013%20commercial%20fishing%20low-res.pdf)

19 – Louisiana Revised Statutes, Title 56: <http://www.legis.state.la.us/lss/lss.asp?folder=130>

20 – Mississippi fishing regulations digest: [http://www.ms-sportsman.com/downloads/mississippi fishing regulations.pdf](http://www.ms-sportsman.com/downloads/mississippi_fishing_regulations.pdf)

21 – Florida statutes, fish and wildlife conservation, 379,407:

<http://www.flsenate.gov/Laws/Statutes/2012/379.407>

22 – Alabama Code 2009, Section 9-11-156:

<http://law.justia.com/codes/alabama/2009/Title9/Chapter11/9-11-156.html>

23 – GSMFC menhaden facts: <http://menhaden.gsmfc.org/2010%20FAQ.shtm>

24 – Fishbase species page, Gulf menhaden: <http://www.fishbase.org/summary/Brevoortia-patronus.html>

25 – Gulf menhaden stock assessment 2007 (peer reviewed):

http://menhaden.gsmfc.org/FishRes_Vaughan_etal_2007-GM.pdf

26 – NMFS endangered species overview: <http://www.nmfs.noaa.gov/pr/species/esa/>

27 – The precautionary principle in US groundfish fisheries:

<http://www.afsc.noaa.gov/refm/stocks/grant/precaut.html>