

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:	August 2015
ASSESSOR:	Sam Peacock

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1. APPLICATION DETAILS AND SUMMARY OF THE ASSESSMENT OUTCOME			
Name: Daybrook Fisheries INC / Omega Protein Inc			
Address:			
Country: USA		Zip:	
Tel. No.		Fax. No.	
Email address:		Applicant Code	
Key Contact:		Title:	
Certification Body Details			
Name of Certification Body:		Global Trust Certification Ltd.	
Assessor Name	Peer Reviewer	Assessment Days	Initial/Surveillance/ Re-certification
Sam Peacock	Deirdre Hoare	1	Surveillance
Assessment Period	August 2015		
Scope Details			
1. Scope of Assessment		IFFO Global Standard for Responsible Supply – Issue 1	
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		High	
6. Sub Components of Low Compliance		None	
7. Information deficiency		None	
8. Peer Review Evaluation			
9. Recommendation		Maintain approval	

2. QUALITY OF INFORMATION
Good; primarily government websites and reports.
3. COMPLIANCE LEVEL ACHIEVED
High
Recommendation
Maintain approval
4. GUIDANCE FOR ONSITE ASSESSMENT
None
Based on HIGH compliance findings
Based on MEDIUM compliance findings
Based on LOW compliance findings
5. ASSESSMENT DETERMINATION
The Gulf menhaden fishery continues to score high compliance in every section. Management measures are applied at the state level, but coordinated by the Gulf States Marine Fisheries Commission (GSMFC), which also collates data and produces management recommendations. The main change since the previous surveillance assessment is the implementation of a new revision of the FMP in March 2015. The new FMP includes a detailed analysis of all aspects of the fishery, from the nature of the stock itself, to indirect impacts on habitats and the ecosystem, to the socio-economic structure of the menhaden industry. The content of the FMP further reinforces the extent to which the fishery currently meets the requirements of the IFFO RS scheme, and will be considered in detail in the re-assessment next year.
HIGH Compliance
MEDIUM Compliance
LOW Compliance

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	A1				
Fisheries management should be concerned with the whole stock unit	A2				
Management actions should be scientifically based	A3				
Research in support of fisheries conservation and management should exist		B1			
Best scientific evidence available should be taken into account when designing conservation and management measures		B2			
The precautionary approach is applied in the formulation of management plans			C1		
The level of fishing permitted should be set according to management advice given by research organisations				D1	
Where excess fishing capacity exist, mechanisms should be in established to reduced capacity				D2	
Management measures should ensure that fishing gear and fishing practices do not have a significant impact on non-target species and the physical environment				D3	
A framework for sanctions of violation of laws and regulations should be efficiently exists					E1
A management system for fisheries control and enforcement should be established					E2

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

A1. 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.

LOW	An administrative framework that ensures an efficient management of the fishery for its conservation is not established.
MEDIUM	An administrative framework that ensures an efficient management of the fishery for its conservation is somehow established, but there is evidence of not being efficient to ensure the conservation of the stock.
HIGH	A legal and administrative framework that ensures an efficient management of the fishery for its conservation is established and works efficiently toward the conservation of the stock.

Determination: There are effective legal and administrative frameworks in place at the state, regional and federal levels. There have been no substantial changes since the previous surveillance assessment, and so a high compliance rating remains appropriate.

H

The Gulf menhaden stock is distributed both in the state waters within 3nm of shore and the federal waters further out, but as the large majority of fishing occurs in state waters the management of the fishery is largely the responsibility of state authorities. The five Gulf states which engage, to varying extents, in the menhaden fishery are Florida, Alabama, Mississippi, Louisiana, and Texas. Each state has an administrative governmental body tasked with the management of commercial and recreational fisheries. Inter-state management of the stock is coordinated by the Gulf States Marine Fisheries Commission (GSMFC). The GSMFC makes recommendations to the state governments based on the results of scientific studies carried out by state, federal and academic agencies. It is also responsible, within the Gulf region, for the Interjurisdictional Fisheries (IJF) Program, which is designed to develop management plans for transboundary stocks such as Gulf menhaden.

The primary management authorities in relation to Gulf menhaden at the state level are the Florida Fish and Wildlife Conservation Commission; the Department of Conservation and Natural Resources (Alabama); the Department of Marine Resources (Mississippi); the Department of Wildlife and Fisheries (Louisiana) and the Texas Parks and Wildlife Department. Each state authority is legally empowered to introduce and enforce fisheries management regulations, either through the State administrative code, statutes, or specific legal instruments.

For more detail on fisheries management in each state, please refer to the May 2013 re-assessment (R1).

R1

LEVEL OF COMPLIANCE	
<i>A2. 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.</i>	
LOW	Fisheries management is not concerned with the whole stock unit over its entire area of distribution and do not take into account any of the matters listed in 'A1'.
MEDIUM	Fisheries management is concerned with matters listed in 'A1' but not entirely. Fisheries, in relation to 'A1' statement, should improve to ensure the long term conservation of the marine resource.
HIGH	Fisheries management should be concerned with the whole stock unit over its entire area of distribution and take into account: <ul style="list-style-type: none"> All fishery removals The biology of the species

Determination: As at the time of the 2013 re-assessment and 2014 surveillance, the management stock unit matches the best scientific understanding of the biological stock, and all fishery removals and the biology of the species are taken into account. H

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. The 2015 revision of the FMP confirms that this is still the case.

Stock assessments and the FMP include a "Life History" section which considers a wide range of biological characteristics. Stock assessments also utilise fishery landings, plus bait and recreational landings.

For more detail on the stock unit, including a map of the geographical distribution of Gulf menhaden, please refer to the May 2013 re-assessment (R1).

R1

LEVEL OF COMPLIANCE	
<i>A3. Management actions should be based on long-term conservation objectives</i>	
LOW	Management actions are not based on long term management objectives.
MEDIUM	Management actions are based on long term management objectives. However the actions are not scientifically formulated.
HIGH	Management actions are based on long term management objectives, and actions are science based.

Determination: Since the previous surveillance assessment, the GSMFC has published a new version of the Gulf Menhaden regional Fishery Management Plan. This includes long term objectives for the sustainable management of the fishery, and so a high compliance rating remains appropriate. H

At the time of the 2013 re-assessment (and the 2014 surveillance), the Gulf Menhaden fishery was managed according to a regional Fishery Management Plan (FMP) published in 2002. In March 2015 a revised version of the FMP was published and put into action. The stated overarching goal of the new FMP is "to provide a management strategy for Gulf menhaden that estimates an annual maximum harvest while allowing protection of the stock from overfishing on a continuing basis". The FMP also includes two 'Management Objectives', which are to conduct a comprehensive stock assessment every five years, and to establish standardised ageing programmes for Gulf menhaden by 2015. There are also 'Population Dynamics Objectives' and 'Environment Objectives'.

The FMP sets out Gulf-wide recommended reference points of $F_{target} = 663,585t$ and $F_{lim} = 680,765t$, based on $F_{35\%}$ fecundity SSB and $F_{30\%}$ fecundity SSB respectively. It also recommends that if total fishing mortality

exceeds F_{target} two years in a row, the stock assessment should be brought forward.

R1

B. STOCK ASSESSMENT PROCEDURES AND MANAGEMENT ADVICE

LEVEL OF COMPLIANCE

B1. Research in support of fisheries conservation and management should exist.

LOW	Research to support the conservation and management of the stock, non-target species and physical environment does not exist
MEDIUM	Research to support the conservation and the management of the stock, non-target species and physical environment exists, however research programmes could be significantly improved to decrease scientific advice uncertainty.
HIGH	Research to support the conservation and the management of the stock, non-target species and physical environment exist, and existent research is considered most adequate for the long term conservation of the target, non-target and physical environment

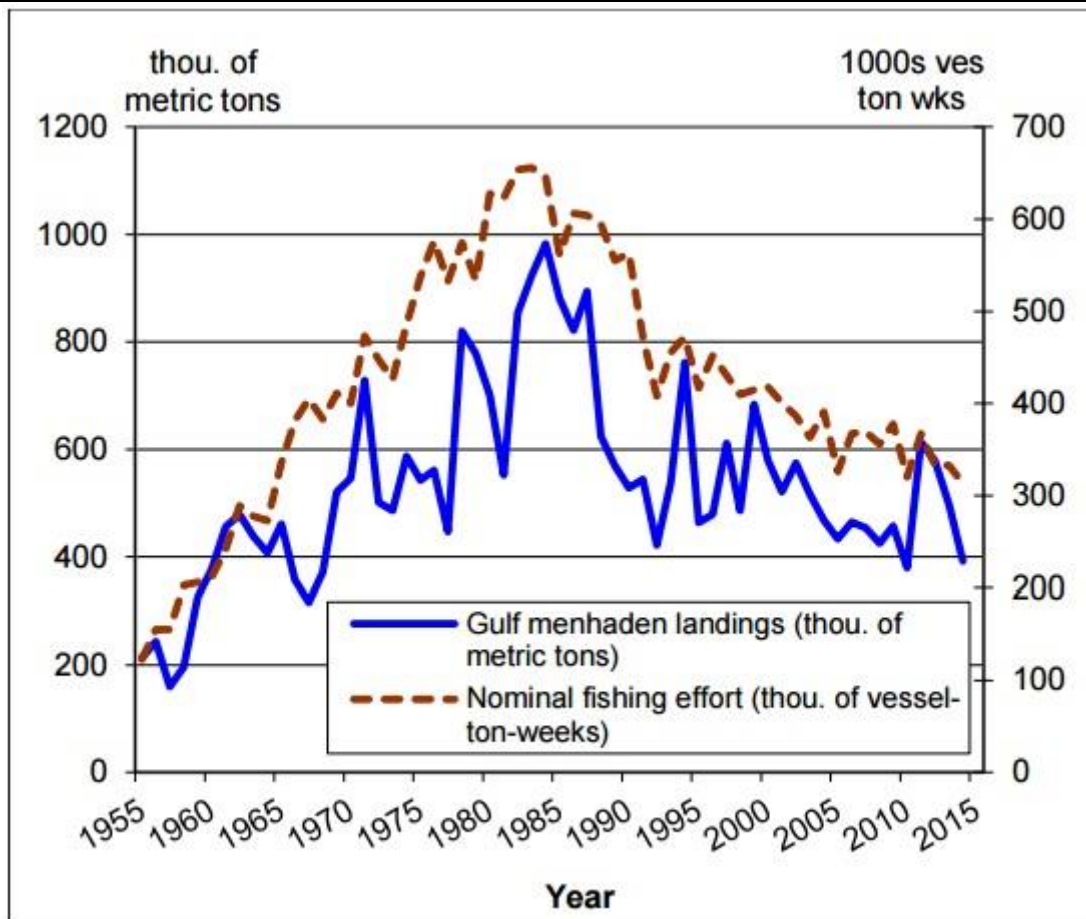
Determination: There do not appear to have been any substantial changes in the way data are collected in the Gulf menhaden fishery by state and federal authorities. The revised FMP includes a number of objectives seeking to improve data collection and stock assessment further.

Gulf menhaden stock assessments are supported by a range of fishery-dependent and fishery-independent data. Total landings are available for every year since 1955, and NMFS port samplers have had access to the catch at each processing plant for biostatistical purposes since 1964. Random sampling produces estimates of length, weight and age of the catch. 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.

Each of the states engaged in the Gulf menhaden fishery has its own sampling protocols for collecting fishery-independent data. Fishery-independent data are acquired from Mississippi, Louisiana, and Texas using bag seines, beam plankton nets, and otter trawls. These data from 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. 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).

The 2015 revision of the Gulf menhaden FMP includes a number of recommendations for improving fishery-dependent and fishery-independent data collection, as well as research into the role of menhaden as a prey species, essential habitats, and other potential indirect impacts of the fishery. The 2016 re-assessment will consider these recommendations, and progress made towards meeting them, in detail.

For more detail on the research conducted in support of fishery management, please refer to the May 2013 re-assessment (R1).



Gulf menhaden landings and nominal fishing effort, 1995-2013. From the 2015 NOAA forecast (R2).

R1, R2

LEVEL OF COMPLIANCE

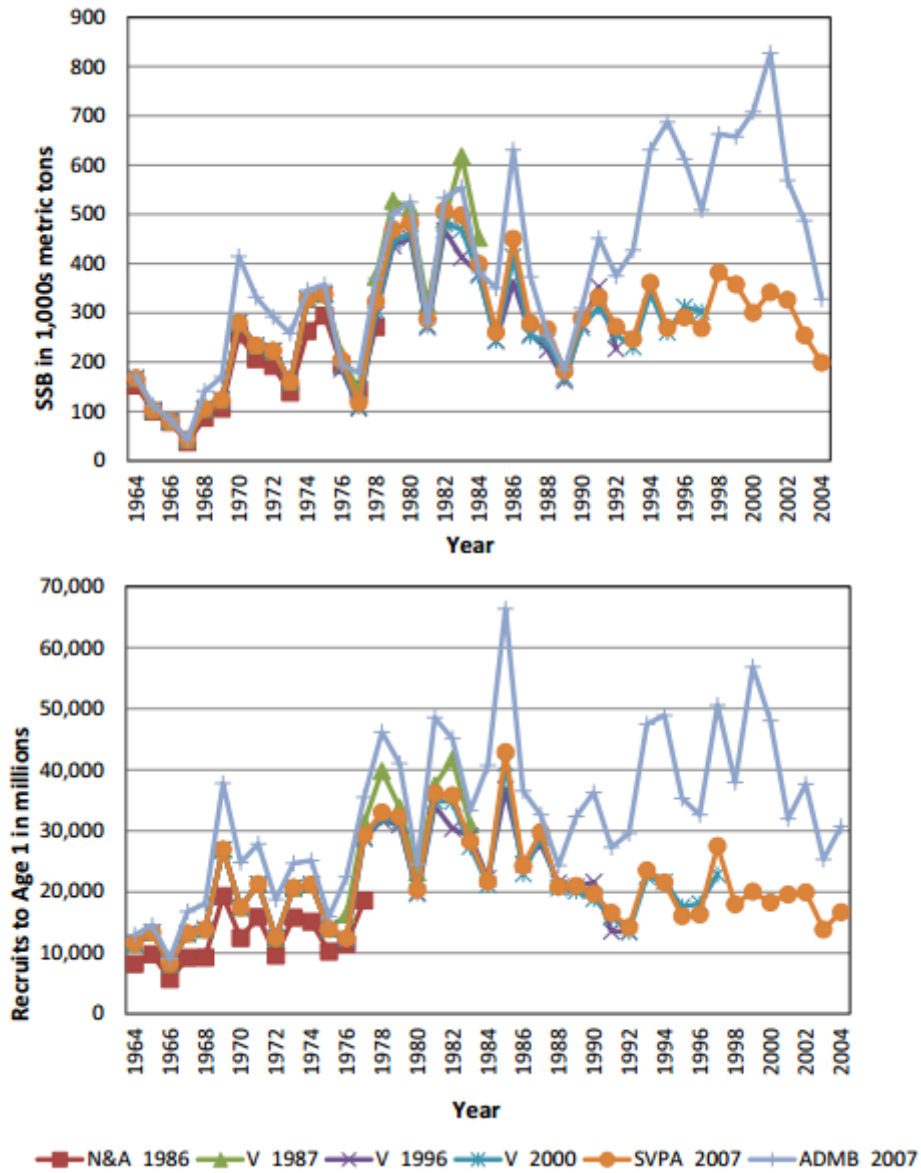
B2. Best scientific evidence available should be taken into account when designing conservation and management measures.

LOW	Scientific advice is not taken into account when designing conservation and management measures.
MEDIUM	Scientific advice is taken into account, when designing conservation and management measures. However some areas of discrepancy are identified that could have a significant impact in the long term conservation of the marine environment.
HIGH	Scientific advice is taken into account, when designing conservation and management measures, in a comprehensively manner.

Determination: *The most recent stock assessment remains the 2013 SEDAR assessment, upon which the new FMP was based. There continues to be no evidence that any substantial scientific recommendations have been ignored. The 2016 re-assessment will ensure that the recommendations made in the new FMP are implemented to an adequate extent.*

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 2013 (R3). 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.



Historical estimates of biomass (top) and recruitment (bottom) of Gulf menhaden from a variety of research papers. From the 2013 SEDAR stock assessment, R3.

R1, R3

C. THE PRECAUTIONARY APPROACH		
LEVEL OF COMPLIANCE		
<i>C1. The precautionary approach is applied in the formulation of management plans.</i>		
LOW	The precautionary approach is not applied in the formulation of management plans.	
MEDIUM	The precautionary approach is applied, however not all uncertainties are taken into account.	
HIGH	The precautionary approach is applied, taking into account uncertainties relating to the dynamic of fish population (recruitment, mortality, growth and fecundity), and the impact of the fishing activities, such as discards and by-catch of non-target species as well as on the physical environment (Habitats).	
<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. As at the time of the previous surveillance assessment a high compliance rating remains 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. 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 2013 stock assessment highlights some of the same research needs as in 2011, including the need for fishery-independent age estimates and improved species identification procedures, additional fishery-dependent surveys, and improved understanding of stock structure. However, the 2015 FMP includes detailed consideration of a wide range of variables and sets out recommendations for continued improvements in research and stock assessment activities.</p> <p>R1, R3</p>		H
D. MANAGEMENT MEASURES		
LEVEL OF COMPLIANCE		
<i>D1. The level of fishing permitted should be set according to management advice given by research organisations.</i>		
LOW	The level of fishing permitted is not set according to management advice given by research organisations.	
MEDIUM	The level of fishing permitted is higher than management advice given by research organisations. However, the difference is not considered to have a significant impact of the sustainability of the stock	
HIGH	The level of fishing permitted is set according to management advice given by research organisations.	
<p><i>Determination: Although the FMP is developed and published across the entire stock, management measures are applied at the state level. At the time of this assessment, there have been no substantial changes in the approach at the state level, but the 2016 re-assessment will examine the effects of the new FMP in detail.</i></p> <p>In general, state menhaden fisheries are not subject to fishing effort restrictions; Texas is currently the only state which sets a TAC for reduction removals of Gulf menhaden, fixed at 31,500,000lb (14,288t) each year. Once this quantity has been landed, the fishery is closed. All five states manage the fishery with closed areas, restricted fishing seasons, limited licensing and other technical measures.</p> <p>The effectiveness of these measures at maintaining fishing mortality below sustainable levels (and stock biomass at the target reference point) is assessed in the annual SEDAR reports. The results of the most recent assessment are in the table below. F_{MED}, which was used as a limit reference point, was calculated to be 4.88, with $F_{2011} = 2.36$. Likewise, SSB_{MED} was estimated as 22,627, with $SSB_{2011} = 50,464$. Therefore the stock assessment (conducted in 2013, R3) concluded that “generally the current stock status is not overfished and overfishing is not occurring”. The 2015 revision of the FMP similarly reports that the stock is</p>		H

neither overfished nor subject to overfishing, but it is likely that this statement is made in reference to the 2013 stock assessment.

Benchmarks and Terminal Year Values	Base BAM Model Estimates
R_0	99.9
Y at F_{MSY}	infinite
F_{2011}	2.36
F_{MED}	4.88
$F_{40\%}$	4.31
$F_{35\%}$	6.75
$F_{30\%}$	9.73
SSB_{2011}	50,464
$SSB_{MED.thresh}$	22,627
$SSB_{40\%}$	49,833
$SSB_{35\%}$	42,291
$SSB_{30\%}$	34,750

Summary of benchmarks and terminal year (2011) values estimated by the most recent SEDAR stock assessment. Fecundity was used as the metric for SSB (2013, R3).

R1, R3

LEVEL OF COMPLIANCE

D2. Where excess fishing capacity exist, mechanisms should be in established to reduced capacity to allow for the recovery of the stock to sustainable levels.

LOW	Mechanisms to allow for recovery of the stock to sustainable levels are not established.
MEDIUM	Mechanisms to allow for recovery of the stock to sustainable levels are somehow established. However there is no evidence of the efficiency of the methods used.
HIGH	Mechanisms are established to reduce capacity to allow for the recovery of the stock to sustainable levels and there are evidences of recovery.

Determination: There have been no significant changes to capacity management in the USA since the previous assessment. Managers continue to consider the Gulf menhaden fishery not to be over-capacity.

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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:

- 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

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.

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.	
R1	
LEVEL OF COMPLIANCE	
<i>D3. Management measures should ensure that fishing gear and fishing practices do not have a significant impact on non-target species and the physical environment.</i>	
LOW	There are no management measures to prevent the impact of the fishing methods and fishing practices on non-target species and the physical environment.
MEDIUM	There are management measures to prevent the impact of the fishing methods and fishing practices on non-target species and the physical environment. However it is not science based.
HIGH	There are management measures to prevent the impact of the fishing methods and fishing practices on non-target species and the physical environment. Measures are based on scientific information.
<i>Determination: Technical measures are generally applied by state authorities, but are based largely on the outcomes of the regular stock assessments, which include consideration of ecosystem factors. As there have been no major changes since the previous assessment, a high compliance rating remains appropriate.</i>	
<p>Bycatch in the commercial Gulf menhaden fishery is one of the lowest of all the fisheries in the United States, and most studies related to menhaden indicate a very low level of bycatch. The United Nations Food and Agriculture Organisation has listed purse seine fisheries as one of the three fisheries worldwide with the lowest bycatch. Additionally, purse seine gear is widely recognised to have minimal impact on the physical environment.</p> <p>The federal Endangered Species Act of 1973 (ESA) provides for the conservation of species that are threatened or endangered 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>The majority of states have technical measures in place restricting total bycatch (usually to a maximum of 5% by weight), and implement closed areas where pelagic trawling is prohibited.</p> <p>For more detail on the technical measures in place at state and federal level, please refer to the May 2013 re-assessment (R1).</p>	
R1	

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E. IMPLEMENTATION		
LEVEL OF COMPLIANCE		
<i>E1. There should be a framework for sanctions of violation of Laws and regulations.</i>		
LOW	A framework for sanctions of violation of Laws and regulations do not efficiently exist.	
MEDIUM	A framework for sanctions of violation of Laws and regulations do exist but do not work efficiently.	
HIGH	A framework for sanctions of violation of Laws and regulations exists and is proven to be efficient.	
<p><i>Determination: There have been no substantial changes to the sanctions in place for violations of laws and regulations in the Gulf menhaden fishery since the time of the previous assessment.</i></p> <p>Sanctioning the violation of laws and regulations is the responsibility of the individual states involved in the menhaden fishery. States generally have the authority to impose fines, confiscate landings, gear and vessels, remove fishing permits and/or imprison transgressors. In most cases such powers are written into the State Code or Statutes. For details on the sanctions applicable in each state, please refer to the 2013 re-assessment report (R1).</p> <p>R1</p>		H
LEVEL OF COMPLIANCE		
<i>E2. A management system for fisheries control and enforcement should be established.</i>		
LOW	A management system for fisheries control and enforcement is not established.	
MEDIUM	A management system for fisheries control and enforcement is established but do not work efficiently.	
HIGH	A management system for fisheries control and enforcement is established and work efficiently.	
<p><i>Determination: Fisheries control and enforcement is the responsibility of the individual states, each of which continues to have an effective regime in place.</i></p> <p>Enforcement of fishing regulations is the responsibility of the individual states engaged in the menhaden fishery. Each state has an effective control and enforcement body in place, these are:</p> <ul style="list-style-type: none"> • Louisiana – Enforcement Division of the Department of Wildlife and Fisheries • Mississippi – Marine Patrol of the Mississippi Department of Marine Resources • Texas – Marine Enforcement Section of the Texas Parks and Wildlife Department • Florida – Division of Law Enforcement of the Florida Fish and Wildlife Conservation Commission • Alabama – Marine Police Division of the Alabama Marine Resources Division <p>For more information on each of the enforcement authorities, please refer to the 2013 re-assessment (R1)</p> <p>R1</p>		H

7. KEY STAKEHOLDERS

8. REFERENCES

R1 – IFFO RS re-assessment, Gulf Menhaden, May 2013: <http://www.iffonet/files/iffoweb/approved-raw-materials/whole-fish/usa-gulf-menhaden-re-assessment-june-2013.pdf>

R2 – NOAA forecast for the 2015 Gulf & Atlantic menhaden purse-seine fisheries and review of the 2014 fishing season: https://www.st.nmfs.noaa.gov/Assets/commercial/market-news/Forecast%202015_Final.pdf

R3 – 2013 Gulf menhaden stock assessment:
http://www.sefsc.noaa.gov/sedar/download/S32A_GoM_Menhaden_SAR_Final_9.26.2013.pdf?id=DOCUMENT

R4 – Gulf Menhaden regional Fishery Management Plan, March 2015 revision:
<http://www.gsmfc.org/publications/GSMFC%20Number%20240.pdf>