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**Global Standard for  
Responsible Supply  
of Marine Ingredients**  
Fishery Assessment  
Methodology and  
Template Report V2.0



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of Marine Ingredients



<b>Fishery Under Assessment</b>	<b>South Africa – Multi-species Experimental Pelagic trawl (mesopelagics)</b>
<b>Date</b>	<b>December 2019</b>
<b>Assessor</b>	<b>Jim Daly</b>

Application details and summary of the assessment outcome				
<b>Name: Pioneer Fishing</b>				
<b>Address:</b>				
<b>Country: South Africa</b>		<b>Zip:</b>		
<b>Tel. No.:</b>		<b>Fax. No.:</b>		
<b>Email address:</b>		<b>Applicant Code</b>		
<b>Key Contact:</b>		<b>Title:</b>		
Certification Body Details				
<b>Name of Certification Body:</b>		<b>SAI Global</b>		
<b>Assessor Name</b>	<b>Peer Reviewer</b>	<b>Assessment Days</b>	<b>Initial/Surveillance /Re-approval</b>	<b>Whole fish/ By-product</b>
Jim Daly	Vito Romito	3	Surveillance 2	Whole fish
<b>Assessment Period</b>	2018-2019			

Scope Details	
<b>Management Authority (Country/State)</b>	Department of Agriculture, Forestry and Fisheries (DAFF) South Africa
<b>Main Species</b>	Lantern fish <i>Lampanyctodes hectoris</i> , Light fish <i>Maurollicus walvisensis</i>
<b>Fishery Location</b>	South Africa EEZ FAO 47,51
<b>Gear Type(s)</b>	Experimental Pelagic Trawl (Mesopelagics)
Outcome of Assessment	
<b>Overall Outcome</b>	PASS
<b>Clauses Failed</b>	NONE
<b>Peer Review Evaluation</b>	APPROVE
<b>Recommendation</b>	PASS

## Assessment Determination

If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in CITES appendices, it cannot be approved for use as IFFO RS raw material. Lantern Fish *Lampanyctodes hectoris* (not listed) and Light Fish *Maurolicus walvisensis* (Global stocks of Least Concern) do not appear as Endangered or Critically Endangered on IUCN's Red List, nor do they appear in current CITES appendices; therefore, both species are eligible for approval for use as IFFO RS raw material.

Pioneer Fishing (West Coast) (Pty) Ltd and Oceana Brands Ltd experimented with a mesopelagic trawl (2010- 2011) and were successful at targeting Lantern and Light fish with minimal bycatch. In less than a year, they landed just under 8,000t of mesopelagic species, processed into high quality, export-grade fishmeal and fish oil. Pioneer Fishing are currently the only stakeholder in this fishery. A total of 5,830t Lantern fish were landed in 2018 (pers. Comm Janet Coetzee DAFF Nov 2019).

From 2010 the exploitation rate of these species against a combined Precautionary Upper Catch Limit (PUCL) of 50,000t has ranged from 0.02-0.09. Landings in 2018 represented an exploitation rate of 0.66% of available combined biomass (**Table 1**). PUCL's for these mesopelagic species were first recommended in 2012 by the South African Government's Small Pelagic Scientific Working Group (SPSWG). There is strong evidence that the commercial fishery is not putting these species at the risk of over-exploitation.

A Category B risk-based assessment was undertaken for Lantern Fish as the species is not subject to a specific research and management regime enough to pass all Category A clauses. Available estimates of current and long-term annual biomass (acoustic estimates, series from 2006-2018) were used. A Category D assessment was undertaken for Light Fish as this species is currently a by-catch component in the targeted fishery for Lantern Fish (2018 data, Stakeholder and DAFF data).

The SAI Global assessment team recommends verification of original target strength estimates necessary to scale acoustic estimates to fish density. As this has not been undertaken since 2006 current acoustic estimates of abundance are treated as relative. Biological Reference Points (or proxies) should be determined for each mesopelagic species separately in order to avoid TAC's that could lead to overfishing of one stock when its stock is lower than the other. Currently PUCL's are calculated for Lantern fish and Light fish combined.

The main potential ETP impact of the pelagic fishery is indirect, via the removal of prey species for the African Penguin (*Spheniscus demersus*). St Croix and Bird Island near Port Elizabeth (South Coast) and Robben and Dassen Islands (on the West Coast) are home to the world's largest colony, categorised as Endangered by the IUCN Red List. SPSWG agreed (2016) to continue an experiment into the potential impacts of this fishery on breeding success of the African Penguin for a further three years and to conduct comprehensive analyses of available data by the end of 2019 with a view to making future recommendations.

The assessment team recommends maintaining the approval of Lantern (Category B) and Light fish (Category D) as whole fish material for the production of fishmeal and fish oil under the current IIFO RS Standard v 2.0.

### Peer Review Comments

Pioneer Fishing are currently the only stakeholder in this fishery. A total of 5,830t Lantern fish were landed in 2018. Historically the exploitation rate of these species against a combined Precautionary Upper Catch Limit (PUCL) of 50,000t has ranged from 0.02-0.09 (2006-2018 data). Landings in 2018 represented an exploitation rate of 0.66% of available combined biomass. There is strong evidence that the commercial fishery is not putting these species at the risk of over-exploitation. Bycatch, habitat and ecosystem effects of this fishery appear to be limited. The peer reviewer agrees with maintaining the approval of Lantern (Category B) and Light fish (Category D) as whole fish material for the production of fishmeal and fish oil under the current IIFO RS Standard v 2.0.

### Notes for On-site Auditor

Note: This table should be completed for whole fish assessments only.

## General Results

General Clause	Outcome (Pass/Fail)
M1 - Management Framework	PASS
M2 - Surveillance, Control and Enforcement	PASS
F1 - Impacts on ETP Species	PASS
F2 - Impacts on Habitats	PASS
F3 - Ecosystem Impacts	PASS

## Species-Specific Results

Category	Species	% landings	Outcome (Pass/Fail)
Category B	Lantern fish <i>Lampanyctodes hectoris</i>	99	PASS
Category D	Light Fish <i>Maurollicus walvisensis</i>	1	PASS

[List all Category A and B species. List approximate total %age of landings which are Category C and D species; these do not need to be individually named here]

## HOW TO COMPLETE THIS ASSESSMENT REPORT

This assessment template uses a modular approach to assessing fisheries against the IFFO RS standard.

### Whole Fish

The process for completing the template for a **whole fish** assessment is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table, to determine which categories of species are present in the fishery.
2. ALL ASSESSMENTS: Complete clauses M1, M2, M3: Management.
3. IF THERE ARE CATEGORY A SPECIES IN THE FISHERY: Complete clauses A1, A2, A3, A4 for **each** Category A species.

4. IF THERE ARE CATEGORY B SPECIES IN THE FISHERY: Complete the Section B risk assessment for **each** Category B species.
5. IF THERE ARE CATEGORY C SPECIES IN THE FISHERY: Complete clause C1 for **each** Category C species.
6. IF THERE ARE CATEGORY D SPECIES IN THE FISHERY: Complete Section D.
7. ALL ASSESSMENTS: Complete clauses F1, F2, F3: Further Impacts.

A fishery must score a pass in **all applicable clauses** before approval may be recommended. To achieve a pass in a clause, the fishery/species must meet **all** of the minimum requirements.

## By-products

The process for completing the template for **by-product raw material** is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table with the names of the by-product species and stocks under assessment. The '% landings' column can be left empty; all by-products are considered as Category C and D.
2. IF THERE ARE CATEGORY C BYPRODUCTS UNDER ASSESSMENT: Complete clause C1 for **each** Category C by-product.
3. IF THERE ARE CATEGORY D BYPRODUCTS UNDER ASSESSMENT: Complete Section D.
4. ALL OTHER SECTIONS CAN BE DELETED. Clauses M1 - M3, F1 - F3, and Sections A and B do not need to be completed for a by-product assessment.

By-product approval is awarded on a species-by-species basis. Each by-product species scoring a pass under the appropriate section may be approved against the IFFO RS Standard.

## SPECIES CATEGORISATION

The following table should be completed as fully as the available information permits. Any species representing more than 0.1% of the annual catch should be listed, along with an estimate of the proportion of the catch each species represents. The species should then be divided into Type 1 and Type 2 as follows:

- **Type 1 Species** can be considered the 'target' or 'main' species in the fishery. They make up the bulk of annual landings and are subjected to a detailed assessment.
- **Type 2 Species** can be considered the 'bycatch' or 'minor' species in the fishery. They make up a small proportion of the annual landings and are subjected to relatively high-level assessment.

**Type 1 Species must represent 95% of the total annual catch. Type 2 Species may represent a maximum of 5% of the annual catch (see Appendix B).**

Species which make up less than 0.1% of landings do not need to be listed (NOTE: ETP species are considered separately). The table should be extended if more space is needed. Discarded species should be included when known.

The 'stock' column should be used to differentiate when there are multiple biological or management stocks of one species captured by the fishery. The 'management' column should be used to indicate whether there is an adequate management regime specifically aimed at the individual species/stock. In some cases, it will be immediately clear whether there is a species-specific management regime in place (for example, if there is an annual TAC). In less clear circumstances, the rule of thumb should be that if the species meets the minimum requirements of clauses A1-A4, an adequate species-specific management regime is in place.

NOTE: If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in the CITES appendices, it **cannot** be approved for use as an IFFO RS raw material. This applied to whole fish as well as by-products.

**TYPE 1 SPECIES (Representing 95% of the catch or more)**

**Category A:** Species-specific management regime in place.

**Category B:** No species-specific management regime in place.

**TYPE 2 SPECIES (Representing 5% OF THE CATCH OR LESS)**

**Category C:** Species-specific management regime in place.

**Category D:** No species-specific management regime in place.

*Landings data (Source DAFF and Stakeholder pers. Comm. Nov 2019)*

Common name	Latin name	Stock	% of landings	Management	Category
Hector's Lantern fish	<i>Lampanyctodes hectoris</i>	South Africa EEZ	99	DAFF	B
Light fish	<i>Maurolicus walvisensis</i>	South Africa EEZ	1	DAFF	D

**MANAGEMENT**

The two clauses in this section relate to the general management regime applied to the fishery under assessment. A fishery must meet all the minimum requirements in every clause before it can be recommended for approval.

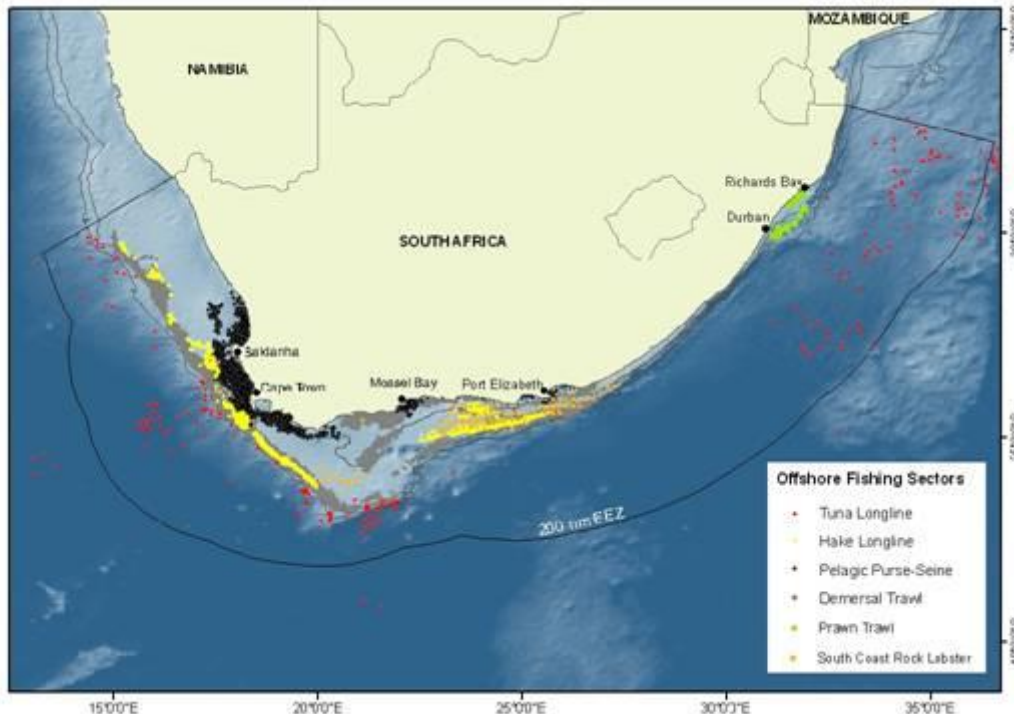
<b>M1 Management Framework – Minimum Requirements</b>		
M1.1	There is an organisation responsible for managing the fishery	PASS
M1.2	There is an organisation responsible for collecting data and assessing the fishery	PASS
M1.3	Fishery management organisations are publically committed to sustainability	PASS
M1.4	Fishery management organisations are legally empowered to take management actions	PASS
M1.5	There is a consultation process through which fishery stakeholders are engaged in decision-making	PASS
M1.6	The decision-making process is transparent, with processes and results publically available	PASS
<b>Clause outcome:</b>		<b>PASS</b>
<b>Evidence</b>		
<b>M1.1:</b>		
Fisheries management in South Africa falls under the jurisdiction of the Department of Agriculture, Forestry and Fisheries (DAFF). Within this Ministry, several Directorates play key roles, including the Chief Directorate of Marine Resources Management (encompassing Directorates of Offshore & High Seas Fisheries, Small-Scale Fisheries, and Inshore Fisheries Management); the Chief Directorate of Fisheries Research and Development (encompassing the Directorates of Research Support, Aquaculture Research, and Resources Research); the Chief Directorate of Monitoring, Control and Surveillance (encompassing the Directorates of Compliance, Fisheries Protection Vessels, and Monitoring and Surveillance); the Chief Directorate of Fisheries Partnerships Management (encompassing both internal stakeholder engagement and international and intergovernmental		

relations); and a number of other Directorates providing general support, monitoring and evaluation functions to the entire Department.

The South African small pelagic fishery is managed using an Operational Management Procedure (Currently OMP-14). Underpinning the management is a core group of DAFF Scientists in the Small Pelagic Scientific Working Group (SPSWG). The principle objectives of the SPSWG are to coordinate annual stock assessments, provide recommendations on Total Allowable Catch (TAC) and revise the current OMP-14 to OMP-17. OMPs are typically updated every 4-5 years. At the time of writing of this report OMP-17 has yet to be published. MARAM have produced draft documents on future management of the small pelagic fisheries using the unpublished OMP-17 document.

Precautionary Upper Catch Limits (PUCL), TAC and TAB (by-catch recommendation) are considered by the DAFF Chief Directorate: Marine Resource Management, considering factors such as legislation, socio-economics, the ecosystem approach to fisheries management (EAFM), and stock advice. Recommendations are then submitted to the decision maker (normally the Minister) in line with Departmental protocols.

After signature by the Minister, quotas are allocated to South African Rights Holders, proportionally, according to their share of rights allocated. A DAFF fisheries manager dedicated to the small pelagic fishery meets with the industry frequently to prepare annual fishing plans and clarify permit conditions.



**Figure 1:** FAO Fishery Country Profile: South Africa Offshore Fishing Sectors Pelagic Purse Seine black crosses **R1**

**M1.2:**

DAFF's Directorate of Resources Research undertake research to promote sustainable and optimal management of fisheries resources, and to provide scientific advice in support of resources research. Additional analytical and advisory support is provided by the Marine Resource Assessment and Management Group (MARAM) at the University of Cape Town.

MARAM is primarily funded by DAFF and aims to provide a scientific basis for the assessment and management of renewable marine resources. MARAM group produces OMP's used as the basis for many management decisions in the small pelagic fishery. Supporting management is a core group of DAFF Scientists in the Small Pelagic Scientific Working Group (SPSWG).

**M1.3:**

The operation of DAFF follows six Strategic Goals, each further broken down into Strategic Objectives (SO).

Strategic Goal 4: Sustainable use of natural resources in the sector is further defined as follows:

- ***SO, 4.1 Ensure the conservation, protection, rehabilitation and recovery of depleted and degraded natural resources***
- ***SO, 4.2 Ensure adaptation and mitigation to climate change through effective implementation of prescribed frameworks***

**M1.4:**

The primary legal basis for fisheries management in South Africa is the Marine Living Resources Act (MLRA) 1998, as amended in 2000, 2014 and 2016. The Act states that the Minister and any other component of government exercising the power within the Act should bear in mind a series of overarching objectives, including the need to achieve optimum utilisation and ecologically sustainable development of marine living resources; the need to conserve marine living resources; the need to apply precautionary approaches to fisheries management; the need to protect the ecosystem as a whole, the need to preserve marine biodiversity; and the need to engage stakeholders in the decision-making process.

**M1.5:**

Decision-making processes respond to important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent and adaptive manner. A formal Scientific Working Group, constituted by DAFF and comprising scientists from DAFF, MARAM and members of industry associations, decide on quotas for the fishery after interpreting the outcome of an OMP.

Integral to the management process is the participation of the fishing industry, primarily through the small pelagic industrial body, the South African Pelagic Fishing Industry Association (SAPFIA).

**M1.6:**

A DAFF fisheries manager dedicated to the small pelagic fishery meets with industry to prepare annual fishing plans and clarify permit conditions. Results of acoustic surveys are freely available as published documents on DAFF websites: 'Recommendations of the SPSWG for the sustainable management of small pelagic resources. DAFF regularly publish media statements summarising policy decisions (e.g. TAC's) affecting Right Holders.



SAPFIA's website contains details of TAC's (PUCL's) in force (including mesopelagics) and current OMP in operation (OMP-14). Draft documents on management of the small pelagic fishery for anchovy and sardine (MARAM) have been using OMP-17.

**R1-R8**

**References p24**

*Standard clauses 1.3.1.1, 1.3.1.2*

<b>M2</b>	<b>Surveillance, Control and Enforcement - Minimum Requirements</b>	
M2.1	There is an organisation responsible for monitoring compliance with fishery laws and regulations	PASS
M2.2	There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken	PASS
M2.3	There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing	PASS
M2.4	Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS.	PASS
<b>Clause outcome:</b>		<b>PASS</b>
<b>Evidence</b>		
<b>M2.1:</b>		
<p>Monitoring, control and surveillance is the responsibility of DAFF Chief Directorate Monitoring, Control &amp; Surveillance (MCS) supplemented by Police, Navy and Customs. The area of responsibility stretches from Port Nolloth on the West Coast to Punto D'Oro on the East Coast approximately 3,200km (<b>Figure 1</b>).</p> <p>Fishery Control Officers (FCO's) are informed of a vessel's intentions of sailing to and from fishing grounds at all times. FCO's verify if Vessel Monitoring System (VMS) is reporting to DAFF. All catches are inspected and weighed at off-loading points (designated ports) by monitors and/or FCO's to ensure that Rights Holders remain within their quotas, that bycatch species do not exceed conservation limits and that no other gear restrictions have been exceeded. All serious and repeated offences and over-catching are documented and submitted to the authorities for processing and prosecution.</p> <p>Fisheries Observers accompany fishing vessels to sea on request (Small Pelagic permit condition). The task of observers is data collection (catch of target and non-target species, and interactions with ETP species) and not compliance monitoring. Skippers return logbooks of each trip, detailing fishing effort and catches and are obliged to report on numbers of sea-bird fatalities and interactions with other ETP species. Observers may confirm if this obligation is being addressed.</p>		
<b>M2.2:</b>		
<p>A valid fishing license and safety registration certificate issued by the South African Maritime Safety Authority (SAMSA) is required before a fishing permit is issued. The permit holder is further obliged at all times to have available true certified copies of these documents on board the vessel. In-port-</p>		

transhipments are allowed only under a strict set of conditions including the application for and issuance of a valid transhipment permit.

Chapter 6 of Act (1998) sets out law enforcement legislation. This includes empowering FCO's to enter and search any vessel or premises, and seize any property considered to be used in or related to an offence.

Section 28 of the MLRA makes provision for sanctions in the event that the holder of a right, licence or permit:

- Has furnished information in the application for that right, licence or permit, or has submitted any other information required in terms of this Act, which is not true or complete.
- Contravenes or fails to comply with a condition imposed in the right, licence or permit.
- Contravenes or fails to comply with a provision of the Act.
- Is convicted of an offence in terms of the Act.
- Fails to effectively utilise that right, licence or permit.

Chapter 7 of the Act sets out the judicial components of fisheries management, including penalties for non-compliance. Breaches of Regulations are punishable by a fine of up to 2, 000, 000 Rand or imprisonment of up to five years. Contravention of international conservation or management measures or conditions imposed by a high seas fishing permit or licence is punishable by a fine of up to 3, 000, 000 Rand. About 70% of cases brought by DAFF are successful; as part of its work, DAFF officials provide training to the judiciary and prosecuting counsel about fisheries legislation and regulation.

During the 2017-2018 fishing season three foreign flagged vessels were prosecuted for exceeding declared species weight (Blue shark *Prionace glauca*) and for illegal possession of shark fins (various sp.). Fines were levied where convictions were achieved. No infringements were detected in the mesopelagic fishery within the assessment area.

### **M2.3:**

South Africa ratified the FAO Agreement on Port State Measures (PSM's) to Prevent, Deter and Eliminate IUU Fishing in 2014. Transhipment-at-sea is prohibited for all authorised vessels in the South African fleet. In-port-transhipments are allowed for this fleet subject to a strict set of conditions, including the issuance of a valid transhipment permit; 72 hours pre-notification (foreign flagged vessels only) and the nomination of a designated port for transhipment.

Numbers of infringements and penalties issued (South African and Foreign flagged vessels) in each fishery are available on written request from DAFF MCS Chief Directorate. Non-compliances detected range from entering South Africa EEZ with gear on board without a valid EEZ permit, to failure to have a valid EEZ permit available for inspection.

There is no substantial evidence of widespread non-compliance in the mesopelagic fishery, and no substantial evidence of IUU fishing. DAFF have a zero tolerance to IUU; internal audits are undertaken to ensure compliance.

**M 2.4:**

South Africa is in the process of improving its Vessel Monitoring Systems (VMS), which should bring about a more stringent monitoring and surveillance regime by applying the most advanced VMS technologies. VMS operated by DAFF is mandatory for all South African flagged vessels and has been in operation since 1998. Currently a total of 22 commercial fisheries, Marine Protected Areas (MPA's) and MSC Certified Fisheries are managed by the VMS Department, in addition to its RFMO Obligations.

The VMS system tracks these vessels within South Africa's EEZ, ensuring no South African flagged vessel undertakes fishing operations within Marine Protected Areas (MPA) or undertakes illegal transshipments at sea. Fishing permit conditions outline requirements for the installation and operation of a VMS unit and also actions to be undertaken by the Rights Holder/Skipper in the event of a systems failure of the VMS unit at sea.

Inspections of vessels at sea are logged, together with records of infractions and boarding data. As well as remote surveillance (VMS) and monitoring at sea by patrol vessels, DAFF inspectors (FCO's) inspect landings when catches are discharged, and audit catch, landings and processing records for the fishery to ensure compliance with effort (quota) controls.

**R4; R9-R12; R20**

**References p 24**

*Standard clause 1.3.1.3*

## CATEGORY B SPECIES

Category B species are those which make up greater than 5% of landings in the applicant raw material, but which are not subject to a species-specific research and management regime sufficient to pass all Category A clauses. If there are no Category B species in the fishery under assessment, this section can be deleted.

Category B species are assessed using a risk-based approach. The following process should be completed once for each Category B species.

### **If there are estimates of biomass (B), fishing mortality (F), and reference points**

It is possible for a Category B species to have some biomass and fishing mortality data available. When sufficient information is present, the assessment team should use the following risk matrix to determine whether the species should be recommended for approval.

**Table B(a) - F, B and reference points are available**

<b>Biomass is above MSY/target reference point</b>	Pass	Pass	Pass	Fail	Fail
<b>Biomass is below MSY/target reference point, but above limit reference point</b>	Pass, but re-assess when fishery removals resume	Pass	Fail	Fail	Fail
<b>Biomass is below limit reference point (stock is overfished)</b>	Pass, but re-assess when fishery removals resume	Fail	Fail	Fail	Fail
<b>Biomass is significantly below limit reference point (Recruitment impaired)</b>	Fail	Fail	Fail	Fail	Fail
	<b>Fishery removals are prohibited</b>	<b>Fishing mortality is below MSY or target reference point</b>	<b>Fishing mortality is around MSY or target reference point, or below the long-term average</b>	<b>Fishing mortality is above the MSY or target reference point, or around the long-term average</b>	<b>Fishing mortality is above the limit reference point or above the long-term average (Stock is subject to overfishing)</b>

**If the biomass / fishing pressure risk assessment is not possible**

Initially, the resilience of each Category B species to fishing pressure should be estimated using the American Fisheries Society procedure described in Musick, J.A. (1999). This approach is used as the resilience values for many species and stocks have been estimated by FishBase and are already available online. For details of the approach, please refer to Appendix A. Determining the resilience provides a basis for estimating the risk that fishing may pose to the long-term sustainability of the stock. Table B(b) should be used to determine whether the species should be recommended for approval.

**Table B(b) - No reference points available. B = current biomass; B<sub>av</sub> = long-term average biomass; F = current fishing mortality; F<sub>av</sub> = long-term average fishing mortality.**

<b>B &gt; B<sub>av</sub> and F &lt; F<sub>av</sub></b>	Pass	Pass	Pass	Fail
<b>B &gt; B<sub>av</sub> and F or F<sub>av</sub> unknown</b>	Pass	Pass	Fail	Fail
<b>B = B<sub>av</sub> and F &lt; F<sub>av</sub></b>	Pass	Pass	Fail	Fail
<b>B = B<sub>av</sub> and F or F<sub>av</sub> unknown</b>	Pass	Fail	Fail	Fail
<b>B &gt; B<sub>av</sub> and F &gt; F<sub>av</sub></b>	Pass	Fail	Fail	Fail
<b>B &lt; B<sub>av</sub></b>	Fail	Fail	Fail	Fail
<b>B unknown</b>	Fail	Fail	Fail	Fail
<b>Resilience</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>	<b>Very Low</b>

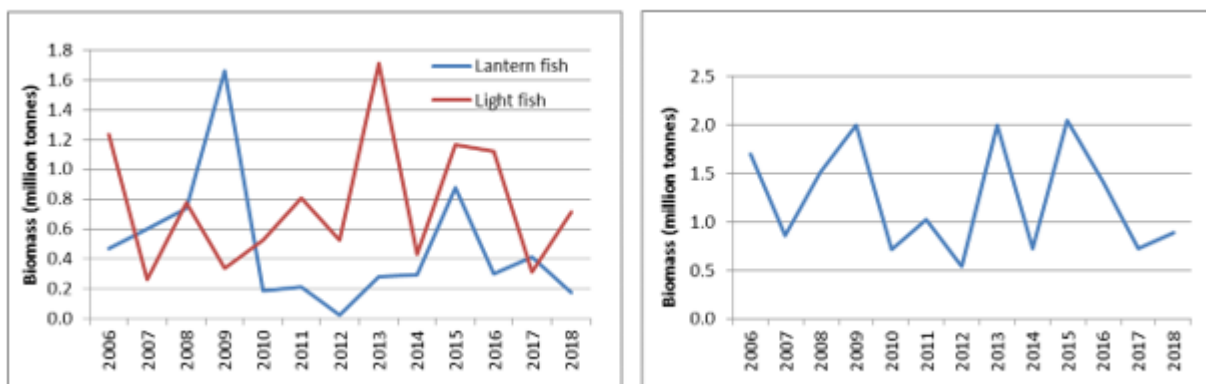
## Assessment Results

<b>Species Name</b>		Lantern fish
<b>B1</b>	Species Name	<i>Lampanyctodes hectoris</i>
	Table used (Ba, Bb)	Bb
	Outcome	<b>PASS</b>

### Evidence:

Category B species are those which make up greater than 5% of landings but which are not subject to a species-specific research and management regime sufficient to pass all Category A clauses.

Biomass and distribution of schooling pelagic and meso-pelagic fish are assessed biannually using hydroacoustic surveys. These surveys, which have been conducted without interruption for the past 30 years, comprise a summer adult biomass survey and a winter recruit survey. Acoustic estimates including the 2018 series were provided by DAFF (Nov 2019 Janet Coetzee, pers. comm, **Figure 2**):



**Figure 2:** Acoustic biomass estimates of Lantern fish (*Lampanyctodes hectoris*) and light fish (*Maurollicus walvisensis*) (Separate and Combined) 2006-2018 **R14**

Biomass estimates suggest a minimum combined biomass (Lantern and Light fish) ranging from 550,000t to 2,000,000t, with an average of 1,300,000t over the past 12 years. Target strength (TS) estimates were conducted in 2006. These estimates are necessary to scale acoustic estimates to fish density. No further verification of these TS estimates has been done since 2006 hence acoustic estimates of abundance are treated as relative.

A simple mean biomass  $B_{av}$  calculation of Lantern fish (2006-2018, **Table 1**) is 479,848t; the 2018 biomass estimate is 176,567t which would mean  $B_{current} < B_{av}$ ; a fail under Table Bb.

Due to previously mentioned uncertainty in acoustic estimates, also evident in the Coefficient of Variations (CVs, **Table 1**) the geometric biomass means (GEOMEAN) was used (DAFF Pers. Comm). The use of the geometric mean ‘normalizes’ ranges being averaged, so that no range dominates weighting and a given percentage change in any of the properties has the same effect on geometric mean. In this case (including 2018 data) the geometric mean is calculated as 325,888t therefore  $B_{current} < B_{av}$ , also a fail under Table Bb:

**Table 1.** Information on mesopelagic fish biomass, catch and level of exploitation (Source DAFF 2019). **R14**

Year	Lantern fish		Light fish		Combined biomass (t)	Exploitation level at 50 000t PUCL	Catch (t)	Actual exploitation level
	Biomass (t)	CV	Biomass (t)	CV				
2006	471319.78	0.28	1231669.26	0.15	1702989.04	0.03	0.0	0.0000
2007	601631.20	0.14	260162.14	0.24	861793.34	0.06	2.0	0.0000
2008	739757.34	0.30	775539.34	0.31	1515296.68	0.03	0.0	0.0000
2009	1658221.37	0.32	335309.87	0.19	1993531.24	0.03	0.0	0.0000
2010	188554.37	0.47	524587.96	0.24	713142.33	0.07	321.0	0.0005
2011	213223.35	0.31	809601.67	0.26	1022825.02	0.05	7288.0	0.0071
2012	20935.97	0.81	523894.64	0.11	544830.60	0.09	22.0	0.0000
2013	282877.73	0.55	1709819.48	0.15	1992697.21	0.03	0.0	0.0000
2014	295460.90	0.42	431166.30	0.20	726627.20	0.07	1.0	0.0000
2015	878538.81	0.40	1166319.88	0.17	2044858.68	0.02	0.0	0.0000
2016	299175.06	0.44	1121356.52	0.18	1420531.58	0.04	0.2	0.0000
2017	411763.67	0.45	309084.21	0.25	720847.88	0.07	325.0	0.00045
2018	176567.58	0.43	710825.28	0.28	887392.86	0.06	5830.0	0.00657

Life History Data on <i>Lampanyctodes hectoris</i> Hector's lanternfish	
Family:	Myctophidae      Lanternfishes
Max. length (Lmax):	= <input type="text" value="7.0"/> cm <input type="text" value="SL"/> <input type="button" value="Recalculate"/>
L infinity (Linf):	= <input type="text" value="7.5"/> s.e. <input type="text" value="6.3"/> - <input type="text" value="8.9"/> cm <input type="text" value="SL"/> <input type="button" value="Recalculate"/> Estimated from max. length.
L maturity (Lm):	<input type="text" value="5.1"/> s.e. <input type="text" value="3.8"/> - <input type="text" value="6.8"/> cm <input type="text" value="SL"/> Estimated from Linf.
L max. yield (Lopt):	<input type="text" value="4.3"/> s.e. <input type="text" value="3.7"/> - <input type="text" value="5.1"/> cm <input type="text" value="SL"/> Estimated from Linf.
K:	<input type="text" value="0.93"/> /year    tmax = <input type="text" value="3.0"/> years Estimated from tmax and to. <input type="button" value="Recalculate"/> <a href="#">Max. age &amp; size data</a>
to:	<input type="text" value="-0.23"/> years    Estimated from Linf and K.
Natural mortality (M):	<input type="text"/> s.e. <input type="text"/> - <input type="text"/> /year Estimated from Linf., K and annual mean temp. = <input type="text" value="22.0"/> °C <input type="button" value="Recalculate"/>
Life span (approx.):	<input type="text" value="3.0"/> years    Estimated from Linf., K and to. <a href="#">Max. age &amp; size data</a>
Generation time:	<input type="text" value="1.3"/> s.e. <input type="text" value="0.0"/> - <input type="text" value="0.0"/> years    Estimated from Lopt, Linf., K and to.
Age at first maturity (tm):	<input type="text" value="1.0"/> s.e. <input type="text" value="0.8"/> - <input type="text" value="1.3"/> years    Estimated from Lm, Linf., K and to.
Relative Yield per Recruit (Y/R):	<input type="text" value="0.0237"/> <input type="button" value="Recalculate"/> Estimate Y/R from M/K, Lc/Linf and E. Lc = <input type="text" value="3.0"/> cm <input type="text" value="SL"/> E = <input type="text" value="0.50"/> /year Emsy <input type="text" value="0.66"/> /year    Eopt <input type="text" value="0.58"/> /year Fmsy <input type="text" value="4.00"/> /year    Fopt <input type="text" value="2.89"/> /year
Exploitation:	Z = <input type="text"/> F = <input type="text"/> E = <input type="text"/> Estimate Z, F, E from Lc, Lmean, Linf, K, M Lc = <input type="text" value="3.0"/> cm <input type="text" value="SL"/> Lmean = <input type="text"/> cm <input type="text" value="SL"/> <input type="button" value="Recalculate"/>
Resilience / productivity:	<input type="text" value="High; decline threshold 0.99"/> Vulnerable to extinction if decline in biomass or numbers exceeds threshold over the longer of 10 years or 3 generations.
Intrinsic rate of increase (rm):	<input type="text" value="8.00"/> /year    Lr = <input type="text" value="3.0"/> cm <input type="text" value="SL"/> Estimated from Fmsy at Lc = length of recruitment (Lr). <input type="button" value="Recalculate"/>
Main food:	mainly animals (troph. 2.8 and up)
Trophic level:	<input type="text" value="3.2"/> +/- s.e. <input type="text" value="0.24"/> Estimated from food data. <a href="#">Food</a>

**Figure 3:** Lantern fish Life History tool **R15**

According to Fishbase (2019) Lantern fish are highly resilient (**Figure 3**) with a minimum population doubling time of less than 15 months.

An annual PUCL for mesopelagic fish of 50,000t was first introduced in 2012. Since then catches have not exceeded 1,000t until 2018 (5,830t, source DAFF). The exploitation rate of the whole biomass series is within the range 0.02 - 0.09. The 2018 figure for catch (Lantern Fish) represented 0.66% of available combined biomass (**Table 1**). The SAI Global assessors conclude that observed variation in biomass is not related to removals by the fishery.

In the opinion of the assessment team; based on recent removals from the fishery and the highly resilient nature of the species there is strong evidence that the commercial fishery is not putting the species at risk of over-exploitation. A PASS is therefore given to Lantern Fish (Category B assessment).

**R6, R8, R14-R15**

**References p24**

*Standard clauses 1.3.2.1*

## CATEGORY D SPECIES

In a whole fish assessment, Category D species are those which make up less than 5% of landings and are not subject to a species-specific management regime. In the case of mixed trawl fisheries, Category D species may make up the majority of landings. In a by-product assessment, Category D species are those which are not subject to a species-specific management regime. In both cases, the comparative lack of scientific information on the status of the population of the species means that a risk-assessment style approach must be taken.

The process for assessing Category D species involves the use of a Productivity-Susceptibility Analysis (PSA) to further subdivide the species into 'Critical Risk', 'Major Risk' and 'Minor Risk' groups. If there are no Category D species in the fishery under assessment, this section can be deleted.

Productivity and susceptibility ratings are calculated using a process derived from the APFIC document "Regional Guidelines for the Management of Tropical Trawl Fisheries, which in turn was derived from papers by Patrick *et al* (2009) and Hobday *et al* (2007). Table D1 should be completed for each Category D species as follows:

- Firstly, the best available information should be used to fill in values for each productivity and susceptibility attribute.
- Table D2 should be used to convert each attribute value into a score between 1 and 3.
- The average score for productivity attributes and the average for susceptibility attributes should be calculated.
- Table D3 should be used to determine whether the species is required to meet the requirements of Table D4. A species which does not need to meet the requirements of D4 is automatically awarded a pass.
- Table D4 should be used to assess those species indicated by Table D3 to determine a pass/fail rating.
- Any Category D species which has been categorised by the IUCN Red List as Endangered or Critically Endangered, or which appears in the CITES appendices, automatically results in a fail.



<b>D1</b>	<b>Species Name:</b>	Light Fish* <i>Maurolicus walvisensis</i>		
	<b>Productivity Attribute</b>		<b>Value</b>	<b>Score</b>
	Average age at maturity (years)**		1	1
	Average maximum age (years)**		2.9	1
	Fecundity (eggs/spawning) ***		1,000-2,000	2
	Average maximum size (cm)**		5.3	1
	Average size at maturity (cm)**		3.9	1
	Reproductive strategy**		Broadcast	1
	Mean trophic level**		3.1	2
	<b>Average</b>			<b>1.29</b>
	<b>Productivity Score</b>			
	<b>Susceptibility Attribute</b>		<b>Value</b>	<b>Score</b>
	Overlap of adult species range with fishery ( <b>Figure D1</b> )		<25%	1
	Distribution		Not used	
	Habitat		Not used	
Depth range: **0-50m		0-50m	3	
Selectivity		No data		
Post-capture mortality		Most dead	3	
<b>Average</b>			<b>2.3</b>	
<b>Susceptibility Score</b>				
<b>PSA Risk Rating</b>			<b>PASS</b>	
<b>(From Table D3)</b>				
<b>References</b>				
* <b>D1</b> Fishbase Light fish <a href="https://www.fishbase.in/summary/Maurolicus-walvisensis.html">https://www.fishbase.in/summary/Maurolicus-walvisensis.html</a>				
** Fishbase Life History Tool				
<b>D2</b> O. I. Rasmussen. J. Giske: Life.history parameters and vertical distribution of <i>Maurolicus muelleri</i> in Masfjorden in summer 16pp Marine Biology (1994) 120:649-664 <a href="http://www.bio.uib.no/te/papers/Rasmussen_1994_Life-history.pdf">http://www.bio.uib.no/te/papers/Rasmussen_1994_Life-history.pdf</a>				
*** <b>D3</b> R. M. Prosch (1991) Reproductive biology and spawning of the myctophid <i>Lampanyctodes hectoris</i> and the sternoptychid <i>Maurolicus muelleri</i> in the southern Benguela Ecosystem, South African Journal of Marine Science, 10:1, 241-252, DOI: 10.2989/02577619109504635 <a href="https://www.tandfonline.com/doi/pdf/10.2989/02577619109504635">https://www.tandfonline.com/doi/pdf/10.2989/02577619109504635</a>				


Add your observation in [Fish Watcher](#)  
[Native range](#) | [All suitable habitat](#) | [Point map](#) | [Year 2100](#)



Reviewed map  
*Maurolicus walvisensis* [AquaMaps](#) Data sources: [GBIF](#) [OBIS](#)

**Figure D1:** Distribution of Light fish *Maurolicus walvisensis* **D1**

## Life History Data on *Maurolicus walvisensis*

<b>Family:</b>	Sternoptychidae      Marine hatchetfishes								
<b>Max. length (Lmax):</b>	= 4.7 cm <input type="text" value="SL"/> <input type="button" value="Recalculate"/>								
<b>L infinity (Linf):</b>	= 5.1 s.e. <input type="text"/> - <input type="text"/> cm <input type="text" value="SL"/> <input type="button" value="Recalculate"/>								
<b>L maturity (Lm):</b>	3.6 s.e. 2.7 - 4.8 cm <input type="text" value="SL"/> Estimated from Linf.								
<b>L max. yield (Lopt):</b>	2.9 s.e. 2.5 - 3.4 cm <input type="text" value="SL"/> Estimated from Linf.								
<b>K:</b>	<div style="border: 1px solid black; padding: 5px;">                 Estimate K from Linf, Lm and tm:                  Lm = 3.6 cm <input type="text" value="SL"/>                  tm = <input type="text"/> years             </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">                 Estimate K from Linf and tmax:                  tmax = <input type="text"/> years             </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">                 Enter Linf and K:                  Linf = 5.1 cm <input type="text" value="SL"/>                  K = 0.95 /year             </div> <input type="text" value="0.95"/> /year <input type="button" value="Recalculate"/>								
<b>to:</b>	-0.27 years      Estimated from Linf and K.								
<b>Natural mortality (M):</b>	<input type="text"/> s.e. 0.93 - 2.93 /year Estimated from Linf. and annual mean temp. = 8.0 °C <input type="button" value="Recalculate"/>								
<b>Life span (approx.):</b>	2.9 s.e. 0.2 - 0.6 years      Estimated from Linf., K and to.								
<b>Generation time:</b>	1.3 s.e. n.a. - n.a. years      Estimated from Lopt, Linf., K and to.								
<b>Age at first maturity (tm):</b>	1.0 s.e. 0.8 - 1.4 years      Estimated from Lm, Linf., K and to.								
<b>Relative Yield per Recruit (Y/R):</b>	<input type="text" value="0.5"/> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">                 Estimate Y/R from M/K, Lc/Linf and E.                  Lc = 2.0 cm <input type="text" value="SL"/>      E = 0.5 /year                  Emsy <input type="text"/> /year      Eopt <input type="text"/> /year                  Fmsy <input type="text"/> /year      Fopt <input type="text"/> /year             </div> <input type="button" value="Recalculate"/>								
<b>Exploitation:</b>	Z = <input type="text"/> F = <input type="text"/> E = <input type="text"/> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">                 Estimate Z, F, E from Lc, Lmean, Linf, K, M                  Lc = 2.0 cm <input type="text" value="SL"/>                  Lmean = <input type="text"/> cm <input type="text" value="SL"/> </div> <input type="button" value="Recalculate"/>								
<b>Resilience / productivity:</b>	High; decline threshold 0.99 Vulnerable to extinction if decline in biomass or numbers exceeds threshold over the longer of 10 years or 3 generations.								
<b>Intrinsic rate of increase (rm):</b>	<input type="text"/> /year      Lr = 2.0 cm <input type="text" value="SL"/> Estimated from Fmsy at Lc = length of recruitment (Lr). <input type="button" value="Recalculate"/>								
<b>Food consumption (Q/B):</b>	<input type="text" value="25.2"/> times the body weight per year <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">                 Enter Winf, temperature, aspect ratio (A), and food type to estimate Q/B                  Winf = 1.3 g      Temp. = 8.0 °C                  A = 1.32                 <div style="text-align: center; margin-top: 5px;">  </div> <table style="width: 100%; text-align: center; margin-top: 5px;"> <tr> <td>Detrivore</td> <td>Herbivore</td> <td>Omnivore</td> <td>Carnivore</td> </tr> <tr> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input checked="" type="radio"/></td> <td><input type="radio"/></td> </tr> </table> </div> <input type="button" value="Recalculate"/>	Detrivore	Herbivore	Omnivore	Carnivore	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Detrivore	Herbivore	Omnivore	Carnivore						
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>						

**\*\* Figure D2** Life History Data Light Fish **D1**

Table D2 - Productivity / Susceptibility attributes and scores.

Productivity attributes	Low productivity/ High risk	Medium productivity/ Medium risk	High productivity/ Low risk
	Score 3	Score 2	Score 1
Average age at maturity (years)	>4	2 to 4	<2
Average maximum age (years)	>30	10 to 30	<10
Fecundity (eggs/spawning)	<1 000	1 000 to 10 000	>10 000
Average maximum size (cm)	>150	60 to 150	<60
Average size at maturity (cm)	>150	30 to 150	<30
Reproductive strategy	Live bearer, mouth brooder or significant parental investment	Demersal spawner "berried"	Broadcast spawner
Mean trophic level	>3.25	2.5–3.25	<2.5

Susceptibility attributes		High susceptibility/ High risk	Medium susceptibility/ Medium risk	Low susceptibility/ Low risk
		Score 3	Score 2	Score 1
Availability	1) Overlap of adult species range with fishery	>50% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	<25% of stock occurs in the area fished
	2) Distribution	Only in the country/ fishery	Limited range in the region	Throughout region/ global distribution
Encounterability	1) Habitat	Habitat preference of species make it highly likely to encounter trawl gear (e.g. demersal, muddy/sandy bottom)	Habitat preference of species make it moderately likely to encounter trawl gear (e.g. rocky bottom/reefs)	Depth or distribution of species make it unlikely to encounter trawl gear (e.g. epi-pelagic or meso-pelagic)
	2) Depth range	High overlap with trawl fishing gear (20 to 60 m depth)	Medium overlap with trawl fishing gear (10 to 20 m depth)	Low overlap with trawl fishing gear (0 to 10 m, >70 m depth)
Selectivity		Species >2 times mesh size or up to 4 m length	Species 1 to 2 times mesh size or 4 to 5 m length	Species <mesh size or >5 m length
Post capture mortality		Most dead or retained Trawl tow >3 hours	Alive after net hauled Trawl tow 0.5 to 3 hours	Released alive Trawl tow <0.5 hours

**Note:** Availability 2 is only used when there is no information for Availability 1; the most conservative score between Encounterability 1 and 2 is used.

<b>D3</b>		<b>Average Susceptibility Score</b>		
		<b>1.00 – 1.75</b>	<b>1.76 – 2.24</b>	<b>2.25 – 3.00</b>
<b>Average Productivity Score</b>	<b>1.00 – 1.75</b>	PASS	PASS	PASS
	<b>1.76 – 2.24</b>	PASS	PASS	TABLE D4
	<b>2.25 – 3.00</b>	PASS	TABLE D4	TABLE D4

## FURTHER IMPACTS

The three clauses in this section relate to impacts the fishery may have in other areas. A fishery must meet the minimum requirements of all three clauses before it can be recommended for approval.

<b>F1</b>	<b>Impacts on ETP Species - Minimum Requirements</b>		
F1.1	Interactions with ETP species are recorded.		PASS
F1.2	There is no substantial evidence that the fishery has a significant negative effect on ETP species.		PASS
F1.3	If the fishery is known to interact with ETP species, measures are in place to minimise mortality.		PASS
<b>Clause outcome:</b>			<b>PASS</b>
<b>Evidence</b>			
<b>F.1.1:</b>			
<p>Government officials in DAFF report no evidence of ETP species interaction in pelagic fishery for these species. DAFF Annual Reports include examples of longline and demersal trawl fisheries that catch significant numbers of vulnerable sharks. Landings in the pelagic sector are observed by DAFF inspectors; however due to low rates of Scientific Observer coverage (around 8%), there is a possibility of ETP capture and disposal at sea.</p> <p>Fishing permits allocated to Rights Holders oblige skippers to record any interaction at sea with ETP species and report such interaction to the Competent Authorities on landing. The main potential ETP impact of the small pelagic fishery (Lantern, Light Fish) is indirect, via the removal of prey species for the African Penguin (<i>Spheniscus demersus</i>).</p>			
<b>F1.2:</b>			
<p>St Croix Island near Port Elizabeth is home to the world’s largest colony of African Penguins, categorised as Endangered by the IUCN Red List. St Croix has been used as the basis for several studies into the potential impacts of this fishery on the species. The total size of the penguin population was estimated to be just over 19,000 breeding pairs in 2015, approximately 37% of the number estimated in 2004 and a small fraction of the number thought to exist at the start of the 20th century.</p> <p>There are a number of factors considered to be contributing to the decline in penguin abundance, one of which is that pelagic fishing in the vicinity of islands used by penguins for breeding could be having a negative impact on the breeding success of penguins.</p> <p>This possible impact was examined through experiments, initiated in 2008, that involve alternately opening and closing the areas around two pairs of islands, Robben and Dassen Islands on the West Coast and Bird and St Croix Islands on the South coast and testing to see whether there was a measurable difference in</p>			

breeding success between those periods when an island is closed to fishing compared to when fishing is allowed in the vicinity.

Further progress in developing methods to evaluate results of this closure program was made in 2015 and 2016. SPSWG agreed to continue the experiment for a further three years from 2016 and to conduct comprehensive analyses of available data by the end of 2019 with a view to making future recommendations.

By the end of 2014, two groups of analyses had been presented to an International Review Panel for evaluation.

Results suggested that by enhancing breeding conditions for penguins, closures would likely benefit juvenile and adult survival in the long run, leading to improved population trajectories. However foraging traits for Dassen Island showed the opposite effects of closure.

Both groups reported inconsistent findings regarding the impact of closures / reduced catches on penguin biological parameters. A plausible explanation offered by the Panel at the time was that there may have been at least one factor driving penguin dynamics that had not been included in any of the models, but which was confounded (confused) with closure periods.

A Technical Team, comprising members from each of the two groups of analysts, was formed in 2015 to implement Panel recommendations. At the time the Panel warned against attempts to draw conclusions on the effects of fishing near islands and of the power to detect such efforts prematurely and provided recommendations for improving economic cost evaluations. In December 2016 the Panel noted that sufficient progress had been made that it should be possible to identify for which combinations of response variable and islands it is possible to conclude there is a fishery effect, for which there is no fishery effect, and for which neither conclusion can as yet be reached. New recommendations are expected to be made by the end of 2019 in respect of furthering the experiment.

**F1.3:**

Oceana’s horse mackerel mid-water trawler, Desert Diamond, has successfully piloted a new device designed to optimise chances of large fish swimming out of the trawl unharmed while mitigating the loss of targeted species through the escape hatch. To guide the path of the fish, the device uses netting, with a long taper forming a tunnel to the top of the cod end where unwanted catch is liberated. The success, which has also been independently verified, follows several years of trials by the trawler of various excluders aimed at mitigating the risk of the by-catch of larger pelagic species.

There is strong evidence that the experimental trawl used in the directed fishery for Lantern Fish does not have incidental catches of other species, given the depths at which the fishery is undertaken. There is currently no need to introduce measures to minimise incidental catches of other species, including ETP species.

**R18; R22-R23**

**References p24**

*Standard clause 1.3.3.1*

<b>F2 Impacts on Habitats - Minimum Requirements</b>		
F2.1	Potential habitat interactions are considered in the management decision-making process.	PASS
F2.2	There is no substantial evidence that the fishery has a significant negative impact on physical habitats.	PASS
F2.3	If the fishery is known to interact with physical habitats, there are measures in place to minimise and mitigate negative impacts.	PASS
<b>Clause outcome:</b>		<b>PASS</b>
<b>Evidence</b>		
<b>F2.1:</b>		
<p>Purse-seine and pelagic trawls are known to rarely interact with physical habitats. Pelagic trawls are fished in the water column and do not impact benthic habitats. Most studies in the assessment area focus on the effects of bottom trawl fisheries on vulnerable marine habitats and ecosystems (VME's). VMS operated by DAFF is mandatory for all South African flagged vessels as it is a condition of the fishing permit. VMS systems have been in operation in the assessment area since 1998.</p> <p>In total 22 areas are managed by DAFF's VMS Department: commercial fisheries, Marine Protected Areas (MPA's) and MSC Certified Fisheries. Breaches of Regulations are punishable by fines of up to 2,000,000 Rand or imprisonment of up to five years. Contravention of international conservation or management measures (CMM's) or conditions imposed by a high seas fishing permit or licence is punishable by a fine of up to 3,000,000 Rand.</p>		
<b>F 2.2:</b>		
<p>The N2K GROUP (European Economic Interest Group) recently published an overview:  <i>'Potential Interactions and Impacts of Commercial Fishing Methods on Marine Habitats and species protected under the EU Habitats Directive'</i></p> <p>Mid-water trawls and mid-water pair trawls towed above the seabed to catch pelagic species were examined. No potential physical interactions were identified through research carried out for the review. Discards associated with pelagic trawl fisheries are known to attract scavengers around nets as well as on the seabed if concentrated. Associated decaying process may result in localised anoxic conditions.</p> <p>There are also reports of seabirds, turtles, and marine mammals such as the white-sided dolphin, common dolphin and grey seal being taken as bycatch in pelagic trawl fisheries. There is no documentary evidence of incidental catches of these species in the fishery under assessment.</p>		
<b>F2.3:</b>		
No evidence to date provided of negative impacts of this fishery on habitats.		
<b>R7, R14; R20-R21</b>		
<b>References p24</b>		
<i>Standard clause 1.3.3.2</i>		

<b>F3 Ecosystem Impacts - Minimum Requirements</b>		
F3.1	The broader ecosystem within which the fishery occurs is considered during the management decision-making process.	PASS
F3.2	There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.	PASS
F3.3	If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals.	PASS
<b>Clause outcome:</b>		<b>PASS</b>
<p><b>Evidence</b></p> <p><b>F 3.1:</b> The operation of DAFF follows six Strategic Goals (SG), each further broken down into Strategic Objectives (SO).</p> <p>SG 4: Sustainable use of natural resources in the sector is further defined as follows:</p> <ul style="list-style-type: none"> <li>• <b><i>SO, 4.1 Ensure conservation, protection, rehabilitation and recovery of depleted and degraded natural resources.</i></b></li> <li>• <b><i>SO, 4.2 Ensure adaptation and mitigation to climate change through effective implementation of prescribed frameworks.</i></b></li> </ul> <p>All catches are inspected and weighed at off-loading points (designated ports) by monitors and/or fisheries inspectors, to ensure that Rights Holders remain within their quotas, that bycatch species do not exceed conservation limits and that no other gear restrictions have been exceeded. Integral to the management process is the participation of the fishing industry, primarily through the small pelagic industrial body, the South African Pelagic Fishing Industry Association (SAPFIA).</p> <p>The Marine Living Resources Act (MLRA) includes as one of its recognised principals “the need to apply precautionary approaches in respect of the management and development of marine living resources”. OMPs are aimed at quantifying risks and benefits of alternative short- and long-term management options, in terms that resource managers and decision-makers can understand and relate to.</p> <p>OMPs perform risk analysis, which allows results to be expressed as the probability that a defined event will occur (e.g. the biomass falling below a specified threshold level or the fishery collapsing) within a fixed period. Commonly used risk statistics include the probability of depleting spawning stock biomass below some threshold or median biomass expected at the end of a simulation period compared with the biomass at the onset of this period.</p> <p>Incorporation of ecosystem considerations and the development of ecosystem-based management was first undertaken through the revised Operational Management Procedure (OMP-13). Currently OMP – 17 is under development.</p> <p><b>F 3.2:</b> Removals from the mesopelagic fishery in 2018 amounted to 5,830t; representing an exploitation rate of 0.66% of combined available biomass (Source DAFF). Mesopelagic fish play a large role in the food web</p>		



of the Benguela ecosystem, particularly as a link between zooplankton and hake. They are also consumed by other demersal fish, horse mackerel, cephalopods, large pelagics such as tuna and snoek and seabirds.

Given their importance in the ecosystem, together with the fact that they are caught as bycatch in the small pelagic purse seine fishery the SPSWG in 2016 recommended the establishment of a commercially directed mesopelagic trawl fishery. This ensures monitoring of removals of these species as means to determine effects on the ecosystem.

There is strong evidence that the commercial fishery is not putting the species at risk of over-exploitation, therefore reducing the risk of a negative effect of the fishery on the ecosystem.

**F 3.3:**

Catches of Light Fish & Lantern Fish in the assessment area totalled 325t in 2017 and 5,830t (Lantern Fish only) in 2018. The 2018 figure represents 0.66% of available combined biomass (source DAFF). A Precautionary Upper Catch Limit (PUCL, both species combined) of 50,000t was first recommended in 2012 by DAFF's Small Pelagic Scientific Working Group (SPSWG) and is still in force.

The South African Small Pelagic Fishing Industry Association (SAPFIA) has implemented a dedicated observer programme, the aim of which is to monitor directed catches of anchovy and sardine, as well as other bycatch species. This programme provides valuable information on not only operational patterns, but also on catch size distributions, bycatch and other biological data used by DAFF scientists in the day to day management of the fishery.

Researchers, Managers and the industry work to ensure ongoing sustainability.

**R4, R7, R9, R2, R5, R19**

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*Standard clause 1.3.3.3*