Marine Stewardship Council Pre Assessment Report

of the

Seafood Exporters' Association of Sri Lanka Longline Fishery for Yellowfin Tuna, Bigeye Tuna & Swordfish

Fishery name	:	Seafood Exporters' Association of Sri Lanka Longline fishery
Fishery location	:	Sri Lanka's Exclusive Economic Zone and International Waters in the Indian Ocean
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SUMMARY OF KEY FINDINGS AND GAPS

1. This MSC pre-assessment of the Seafood Exporters' Association of Sri Lanka Longline fishery is desktop-based using information provided by the client (SEASL) and the Sri Lankan Department of Aquatic Resources (DFAR). Numerous other sources were used including the Indian Ocean Tuna Commission report and data repository and extensive literature review. The information provided and sourced was considered sufficient for a pre-assessment (but inadequate for full assessment).

2. The list of vessels participating in the Units of Assessment was not clearly defined, rather a ***proposed*** set of vessels using only a single gear type, surface-longline, has been identified as likely to meet the MSC criteria to be defined as Units of Assessment.

3. There is an inherent ***RISK*** associated with not clearly defining the vessels participating in the UoAs before applying the MSC Standard to score the fishery. The outcome of the pre-assessment will be dependent upon the selection of vessels used in the fishery. This is an area that is somewhat uncertain to the assessment team. Our approach was to assume a clean dedicated fishery using only longline gear and vessels that do not switch or use multiple gear on any one trip. This is consistent with the most recent MSC TAB (MSC News Release, January 2018) requiring in future dedicated targeting on the UoA(s) on any one trip.

4. Based on our assumed status of fishing operations and likely use of multiple gear types, the catches of the UoAs cannot be differentiated adequately therefore compromising the scoring against Principle 2. This applies in particular to the designation of Primary, Secondary and ETP species catch proportions and where there was uncertainty the precautionary approach was applied.

5. Our approach was therefore to make assumptions on the vessels and gear used, to assume Units of Assessment based on the likely structure and operational characteristics of the fishery acknowledging the following :

    a. The Sri Lankan Government is promoting the development of a directed fresh tuna longline fishery;

    b. MSC Certification acts to incentivise vessel operators to adhere to the preferred fishery operational characteristics and associated governance structure, in particular regulations relating to gear-type, bycatch controls and other management measures for a directed longline fishery;

    c. The current Fishery Improvement Project (FIP), along with the government and industry-led initiatives towards MSC certification, allows for the improved definition of the Units of Assessment and Units of Certification. This assumption therefore facilitates this pre-assessment, while at the same time identifying the RISKs should the proposed fishery not meet the basic requirements needed to define the MSC UoAs.

6. Three Units of Assessment have been defined for the purpose of expediting this pre-assessment. These UoAs would therefore have scoring complexity primarily associated with stocks (P1), a common governance regime (P3) and a largely common ecosystem determination (recognising that when one UoA is defined, the other two UoAs may be designated as Primary or Secondary). Our approach was to define three UoAs as follows :

    a. UoA 1 – Yellowfin tuna (*Thunnus albacares*)

    b. UoA 2 – Bigeye tuna (*Thunnus obesus*)

    c. UoA 3 – Swordfish (*Xiphius gladius*)

7. For the pre-assessment then, a score for each UoA against the Principle 1 (P1) Performance Indicators (PI) was needed. Each species was then also scored for each UoA as Primary against PIs 2.1.1, 2.1.2 & 2.1.3. For brevity and reduction of unnecessary repetition any scoring and justifications that are repeated across the UoAs are simply referenced to UoA 1 in scoring of UoA's 2 & 3. No variation from the default scoring tree was made.

8. The Regional Fisheries Management Organisation governing tuna and other highly migratory fish stocks in the Indian Ocean is the IOTC. As such PIs 1.1.1, 1.1.2, 1.2.1, 1.2.2, 1.2.3, 1.2.4, are addressed primarily with reference to the management and structures put in place by the IOTC, with lesser focus on those developed by Sri Lanka and the proposed UoAs. Jurisdictional aspects are covered in P3, including the spatial and temporal nature of the fishery both in the high seas and inside the Sri Lankan EEZ.

9. The Marine Stewardship Council Certification standard (CR V2.0) has recently come under considerable pressure related to the application of Harvest Control Rules (HCRs) and Harvest Strategies. Increasing market pressure driven through sustainability demands (of which MSC is the main label) has prompted the RFMOs, through the Scientific Committees mostly, to fast track the development of HCRs and Strategies and for these to be harmonised across regions and fisheries. Harmonisation also impact governance scoring not only between fisheries in a common jurisdiction i.e. IOTC, but also between management regions e.g. ICCAT, WCPO.

10. For this specific fishery, there is a risk that floating longline gear, when deployed in inshore areas, is interacting with biogenic/VME reef habitat (as evidenced by the presence of reef-associated Lutjanids and Letherinids in the catches). Although this is a very small number of sets (136/65872) that report catches of these rockfish, evidence is not yet provided that these vessels are not causing harm to VME habitats and this affects scoring of PI 2.4.1.

11. Triggerfish (*Balistidae sp.*) make up 4700 kg (0.06%) of the total catch, catch of this species group may be indicative of gillnet catches or Fish Aggregating Device (FAD) associated catches. Clarification will likely be required during full assessment.

12. Ecosystem interactions of the proposed UoA may result in the fishery failing a full MSC Assessment. Bycatch levels of turtles, whales, sharks and dolphins are of concern.

13. Governance, both regional and national, score well against the CR V2.0

14. Further consultation and a site visit to estimate the level of compliance with national regulations would be imperative for a full assessment.

Acronyms

BET	Bigeye Tuna
CMM	Conservation and Management Measures
CPUE	Catch Per Unit of Effort
DFAR	Department of Fisheries and Aquatic Resources
EEZ	Exclusive Economic Zone
ETP	Endangered, Threatened and Protected species
EAF	Ecosystem Approach to Fisheries
F	Fishing Mortality
FEC	Population Fecundity
FIP	Fishery Improvement Project
HCR	Harvest Control Rules
ICCAT	International Commission for Conservation of Atlantic Tunas
IFFO	International Fishmeal and Fish Oil Organisation
IOTC	Indian Ocean Tuna Commission
IUU	Illegal, Unreported and Unregulated fishing
MCS	Monitoring, Control and Surveillance
MFAR	Ministry of Fisheries and Aquatic Resources Development
MSC	Marine Stewardship Council
MSE	Management Strategy Evaluation
MSY	Maximum Sustainable Yield
NPOA	National Plans of Action
NARA	National Aquatic Resources Research and Development Agency
PA	Precautionary Approach
PI	Performance Indicator
PRI	Point of Recruitment Impairment
SEASL	Seafood Exporters' Association of Sri Lanka
SG	Scoring Guidepost
SSB	Spawner Stock Biomass
SWO	Swordfish
UoA	Unit of Assessment
UoC	Unit of Certification
WCPO	Western Central Pacific Ocean
YFT	Yellowfin Tuna

MSC PRE-ASSESSMENT OF THE SEAFOOD EXPORTERS ASSOCIATION OF SRI LANKA LONGLINE FISHERY FOR YELLOWFIN TUNA, BIGEYE TUNA AND SWORDFISH

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31 January 2017

1.0 OBJECTIVE AND TERMS OF REFERENCE

The objectives of this report are :

i. To undertake a Marine Stewardship Council (MSC) pre-assessment of the Seafood Exporters Association of Sri Lanka Longline Fishery for Yellowfin tuna, Bigeye tuna and Swordfish;
ii. To provide an indicative MSC scoring based on the information available for the pre-assessment;
iii. Based on scoring, identify gaps in information and risk if the client were to choose to go to full MSC assessment;

2.0 THE MARINE STEWARDSHIP COUNCIL PRE-ASSESSMENT PROCESS

2.1 Aim and scope of the pre-assessment

This pre-assessment aims to evaluate how a fishery might perform in a full MSC assessment against the MSC standard using the most recent MSC standard version 2.0. In particular it identifies which issues might cause the fishery to fail a full MSC assessment (score <60; 'red' issues) or which might result in conditions (score 60-80; 'orange' issues). Note that a pre-assessment is a rapid study not enjoying the same participation from stakeholders as would a full assessment – the conclusions are not, therefore, guaranteed.

Due to the nature of tuna and tuna-like species being highly migratory or "straddling stocks" they are managed by Regional Fisheries Organisations (RFOs). In the case of this assessment all three UoA species fall under the management of the Indian Ocean Tuna Commission (IOTC). This assessment therefore is dependent largely on the state of stocks for each UoA as determined by the IOTC. For Principle (P3) both the IOTC (regional) and National governance regimes will apply. For P3, it is also critical that performance indicators that include both P1 and P2 objectives are applied - for example the precautionary approach, implementation of harvest strategies, consistency with the management measures (CMMs) of the IOTC etc.

This report sets out the results of a pre-assessment of the Seafood Exporters' Association of Sri Lanka Longline Fishery for Yellowfin Tuna, Bigeye Tuna and Swordfish fishery (SLL)[1] against the Marine Stewardship Council (MSC) Principles and Criteria for Sustainable Fishing Certification

[1] We use the acronym SLL for convenience throughout this document

Requirements Version 2.0. The pre-assessment was carried out by Mr. David Japp and Mr. Stewart Norman of *Capricorn Marine Environmental (Pty) Ltd, Cape Town, South Africa*.

A pre-assessment is a short study, and the results are not therefore any guarantee of the results of a full MSC assessment.

2.2 Constraints of the pre-assessment

The pre-assessment team members were based in South Africa while the fishery under assessment is located in the Republic of Sri Lanka. However data made available by the client was detailed and adequate to undertake this pre-assessment. Direct communication with the client facilitated document sharing and troubleshooting. A fuller direct on-site consultation process would likely have strengthened the pre-assessment but would not necessarily alter the initial scoring.

2.3 Unit of Assessment (UoA) and Unit of Certification (UoC)

The MSC Guidelines to Certifiers specifies that the unit of certification is "The fishery or fish stock (=biologically distinct unit) combined with the fishing method/gear and practice (=vessel(s) pursuing the fish of that stock)."

Certification for this fishery would therefore consider both the target species as well as all other species impacted by the fishery.

Management Unit: Yellowfin tuna dominate landings in the SLL fishery that comprises vessels operating both within the EEZ of Sri Lanka and on the high seas waters of the Indian Ocean. This includes vessels carrying only a single gear type (longline) as well as vessels carrying more than one gear type (longline and gill nets) on board. Management of the fishery is in the process of segregating the fishery into two distinct groups, 1) those that carry only longline fishing gear on board and 2) those that carry longline and gillnet gear on board. This was a ***KEY CONSIDERATION*** when defining the proposed Unit of Assessment.

National management of fisheries falls to the mandate of The Ministry of Fisheries and Aquatic Resources Development (MFARD) and the main implementing body of the Ministry, the Department of Fisheries and Aquatic Resources (DFAR). In addition the National Aquatic Resources Research and Development Agency (NARA) contribute to environmental and statistical support and research. Sri Lanka is a Member State (CCM) of the Indian Ocean Tuna Commission (IOTC), the regional authority managing stocks of highly migratory species in the region.

The UoA defines the full scope of what is being assessed, and includes the Unit of Certification (UoC) and any other eligible fishers. The UoA includes the target stock(s), the fishing method or gear type/s, vessel type/s and/or practices, and the fishing fleets or groups of vessels, or individual fishing operators pursuing that stock, including any other eligible fishers that are outside the Unit of Certification.

***In early 2017, the MSC initiated a review of its UoA requirements prompted in part by an ongoing debate in the MSC Technical Advisory Board (*TAB*) in response to concerns that the current rule allows a vessel to catch fish from the same stock using both certified and uncertified fishing gear or catch methods on a single trip. Under the new requirements this will not be possible; certified seafood will only enter MSC certified supply chains if it comes from fishing trips on which all activities on the target stock are certified* (MSC News Release, January 2018).**

In this regard the current report focusing on the SLL considers only those vessels carrying longline gear on a single trip as eligible to be a part of any 'proposed UoA' in the future.

Within the proposed UoA, yellowfin tuna catches amount to approximately 65% of the total annual catch whilst swordfish and bigeye tuna each contribute approximately 10% to the total annual catch of the fishery (Table 3).

Considering that these three species are the main species in the fishery and that they are managed as discreet Indian Ocean stocks, the three separate management units have been defined as the total population of yellowfin, bigeye and swordfish in the Indian Ocean.

Scientific Name: The valid common and scientific names for the main target species is:

- Yellowfin Tuna (*Thunnus albacares*)
- Bigeye Tuna (*Thunnus obesus*)
- Swordfish (*Xiphius gladius*)

The above three species are considered as Principle 1 species and each will be scored as a separate UoA[2].

Table 1: Units of Assessment and Units of Certification for the Seafood Exporters Association of Sri Lanka Longline Fishery

UoA 1 / UoC	
Species:	Yellowfin tuna (*Thunnus albacares*)
Stock:	Indian Ocean Yellowfin tuna
Geographical area:	Exclusive Economic Zone (EEZ) of the Democratic Socialist Republic of Sri Lanka and the north-west waters of the Indian Ocean
Harvest method:	Longline
Management:	Local: Ministry of Fisheries & Aquatic Resources (MFAR); Regional: Indian Ocean Tuna Commission (IOTC)
Client group:	Department of Fisheries and Aquatic Resources
Other eligible fishers:	The Sri Lankan vessels licensed for large pelagic longline fishing within the 200 mile Sri Lankan EEZ and on the High Seas waters of the Indian Ocean that carry longline gear **only**. There are no other eligible vessels in this fishery.
UoA 2 / UoC	
Species:	Bigeye tuna (*Thunnus obesus*)
Stock:	Indian Ocean Bigeye tuna
Geographical area:	Exclusive Economic Zone (EEZ) of the Democratic Socialist Republic of Sri Lanka and the north-west waters of the Indian Ocean
Harvest method:	Longline

[2] Note we assess the UoA and UoC to be the same – this may of course change depending on the fleet disaggregation, or any other longline operators that might in future be included in the UoA.

Management:	Local: Ministry of Fisheries & Aquatic Resources (MFAR); Regional: Indian Ocean Tuna Commission (IOTC)
Client group:	Department of Fisheries and Aquatic Resources
Other eligible fishers:	The Sri Lankan vessels licensed for large pelagic longline fishing within the 200 mile Sri Lankan EEZ and on the High Seas waters of the Indian Ocean that carry longline gear **only**. There are no other eligible vessels in this fishery.
UoA 3 / UoC	
Species:	Swordfish (*Xiphius gladius*)[3]
Stock:	Indian Ocean swordfish
Geographical area:	Exclusive Economic Zone (EEZ) of the Democratic Socialist Republic of Sri Lanka and the north-west waters of the Indian Ocean
Harvest method:	Longline
Management:	Local: Ministry of Fisheries & Aquatic Resources (MFAR); Regional: Indian Ocean Tuna Commission (IOTC)
Client group:	Department of Fisheries and Aquatic Resources
Other eligible fishers:	The Sri Lankan vessels licensed for large pelagic longline fishing within the 200 mile Sri Lankan EEZ and on the High Seas waters of the Indian Ocean that carry longline gear **only**. There are no other eligible vessels in this fishery.

Although gillnets, longline-gillnet combination, ring nets, handlines and trolling lines are also used to target tuna and billfish by Sri Lankan vessels in the EEZ and on the high seas, vessels deploying those gears will not form part of the UoA. Data from those fisheries are however used in the stock assessments of tropical tunas and billfish conducted by the IOTC and will be considered in this report.

Other large pelagic species are taken as bycatch by the UoA, although none qualify to carry the MSC logo as Principle 1 species, nor are they caught at volumes greater than 5% of the total catch of the UoA and are therefore assessed as primary or secondary species under P2.:

Blue Marlin (*Makaira nigricans*),

Indo-Pacific Sailfish (*Istiophorus platypterus*),

Black Marlin (*Makaira indica*), and

Striped Marlin (*Tetrapturus audax*)

[3] We raised the concern here that as is common **practice** globally, swordfish-directed fishing using longlines normally involves a different fishing operation – that is longline gear for tuna is modified (normally set deeper than for YFT), hooks and traces may change, different baits are normally used, as well as the use of light sticks.

3.0 OVERVIEW OF THE FISHERY

The fishery under consideration for this assessment is the Seafood Exporters Association of Sri Lanka (SEASL) longline fishery. The SEASL mission it is to ensure the long term economic, social and environmental sustainability of the seafood export sector in Sri Lanka. Sri Lanka's fish exports to the European Union (EU) make up approximately 65% of its total fish exports. A 15 month ban on fisheries exports to the EU (February 2015-June 2016) resulted in a concerted effort by the Sri Lankan government and members of SEASL to combat Illegal, Unreported and Unregulated (IUU) fishing.

The fishery is currently (start April 2017) participating in a Fishery Improvement Project (FIP) jointly embarked upon by the SEASL and the Ministry of Fisheries and Aquatic Resources Development (MFARD). This pre-assessment was conducted based on the fleet licensed to fish in 2016 and the catch data from the 2016 fishing year. Whereas the FIP is updated to incorporate only those vessels registered to fish within and beyond Sri Lanka's EEZ in 2017.

The SEASL and its defined fishers that form the UoAs (SLL) are a subset of the broader Sri Lankan pelagic longline fishery which operates extensively within the Sri Lankan EEZ and in the high seas waters of the Indian Ocean, targeting primarily yellowfin tuna, bigeye tuna and swordfish. Tuna, tuna-like species and billfishes are migratory stocks and are therefore managed as a "shared resource" amongst various countries. The Indian Ocean Tuna Commission (IOTC) manages those stocks within its jurisdiction (Figure 1). Sri Lanka has been a Contracting Party (Full Member) of the IOTC since 1994 and as such is bound by its Resolutions and Conservation measures (CMMs) and should also adopt any Recommendations.

Members are required to submit annual national reports to the IOTC scientific and compliance committees. The species and gear type disaggregated catch and effort data contained within the national scientific reports contributes to the stock assessments undertaken by the commission to evaluate the status of the fish stocks managed under its jurisdiction. National reports submitted to the Technical Compliance Committee (TCC) highlight areas where national legislation has been developed and implemented to meet the latest CMMs adopted by the Commission.

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Figure 1: Indian Ocean and the Indian Ocean Tuna Commission area of jurisdiction.

Sri Lanka has had an unfortunate history of poor reporting of catches in their National Reports, However in recent years (2015/2016/2017) the situation is much improved. The MSC Pre-assessment undertaken here relies heavily on the accuracy and integrity of the data found in the National reports submitted by Sri Lanka to the IOTC. In addition the pre-assessment team received data directly from the Department of Aquatic Resources and Development (DFAR) through the client representative.

3.1 Fleet Composition, Operational Characteristics and Spatial Extent of the Fishery

The tuna fisheries in Sri Lanka occur broadly within the EEZ and also in high-seas. Traditional coastal fishing mainly targets neritic tuna and associated species such as carangids within the continental shelf and slope areas, up to about 40 km from the shore i.e. well within the EEZ and in part areas that may be designated as Archipelagic Waters (nearshore internal areas and between islands) and within territorial waters (inside 12 nm). More than 99% of fishing crafts are below 15 m in length and do not have line or net hauling devices. Limited deck space and the manual operation of fishing gears limit the fishing capacity of most boats. Coastal fishing is conducted mainly with 6-7 m FRP boats/out-board motor boats and 7-10 meters/3.5GT in-board motor boats. Fishing activities within EEZ are seasonal depending on the monsoon pattern. Fishing in coastal and offshore areas is more successful in the periods just before and just after the monsoon seasons.

The offshore fisheries are however confined to the area beyond the shelf up to the 200 nm within EEZ and further into the high seas of the Indian Ocean as shown in Figure 2.

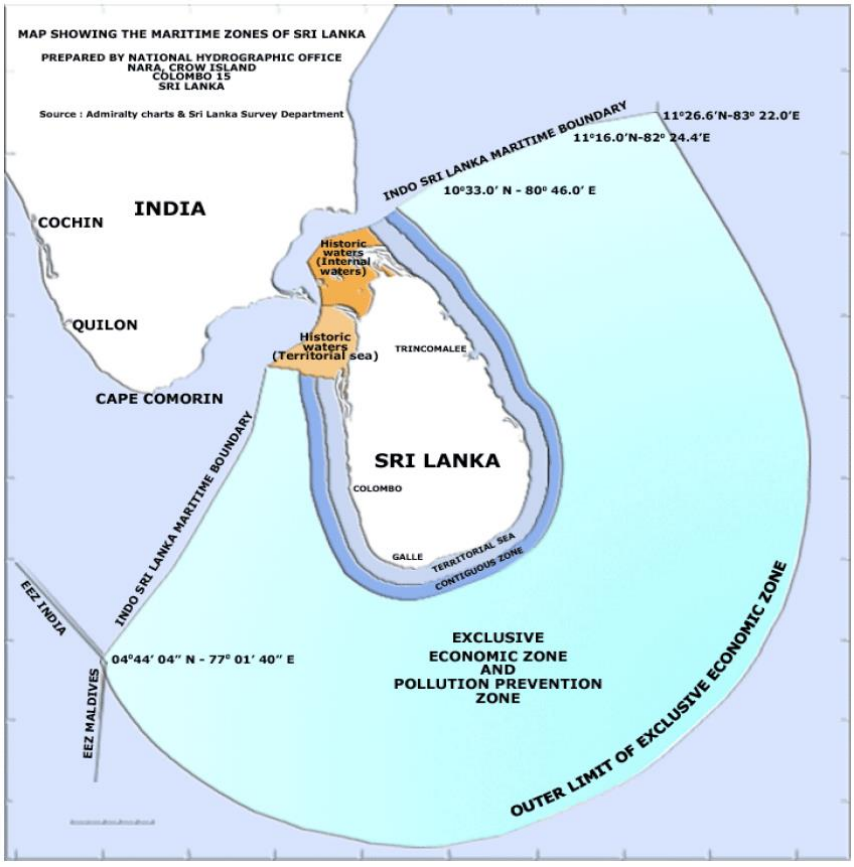


Figure 2: Figure showing the Sri Lankan fishing zones (EEZ).

The fleet breakdown as reported in the National Scientific Report submitted by Sri Lanka to the IOTC (IOTC-2017-SC20-NR25) is detailed below and in Table 2. There are currently no joint venture

fishing arrangements between Sri Lanka and distant-water fishing nations and Sri Lanka does not license foreign fishing vessels to fish in her waters.

2945 "longline" vessels were licensed to fish within the Sri Lankan EEZ in 2016 and a further 1536 were authorised by the IOTC to fish on the high seas in 2016 (Table 2). Of these vessels authorised to fish in either the IOTC or EEZ, catch data for 1910 vessels that fished using **only longline gear** in 2016 were provided to the consultants. Those vessels can be further split between as longline vessels registered to fish both within (1400) and beyond (510) Sri Lanka's EEZ in 2016 and are assessed under each UoA. Only the vessels >10.3m in length are permitted to engage in high-seas fishing.

Table 2: National Tuna fleet structure by gear type, including vessel size, for 2016 (as reported to the IOTC (IOTC-2017-SC20-NR25).

Length Over All	Number of vessels operating within EEZ	Number of vessels operating on the High seas and within the EEZ		Gears used	Duration of Operations
		Number authorised by IOTC	Number Active		
5-10.3m	2400	–	–	40%-GI only 25%-LL only 20%-PRSN 15%-Multi gear (LL/GI;PRSN,HL, TS)	Approximately 18% of small boats perform single day trips. The remainder of vessels operate for between 5-30 days
10.3-15m	545	1532	1447		
15-24m	–	14	14		
Total	**2945**	**1536**	**1461**		

According to the National report to the IOTC 40% of the total effort in large pelagic fisheries is large-mesh drift gill nets (GN), targeting skipjack tuna. The gill nets are made of 20-25 pieces and 5" or 6" stretched mesh. There are conflicting sources of information indicating that between 10 % and 25% of the fleet are dedicated longliners targeting tuna for the fresh tuna export market and deploying between 200-1600 hooks. The number of pieces of nets and the number of hooks varies depending on the size of the boat. Multi-gear vessels are common in the fishing fleet and estimated to make up approximately 15% of the fleet, though this figure is likely higher. The use of fishing gear is determined based on the availability of fish, climate condition, the availability of the bait, skill of the crew etc.

Ring net fishing (purse seine) has recently been favoured for catching of mackerel scads *(Decapterus macarellus)* with the decline of neritic tuna. Ring nets gained popularity among coastal fishermen in the south, southwest and east provinces and sometimes among offshore fishermen during poor fishing months. Ring nets contributed 20% to the total effort in 2016. The other fishing gears being used to a lesser extent are hand line and trolling.

The Indian mackerel (*Decapterus russelli*), milkfish and frozen squid are generally used as the bait for longline fishing.

3.2 Fleet Disaggregation and Monitoring

The Fisheries and Aquatic Resources Act, No. 2 of 1996 defines a “long line” as a fishing gear having a main line and number of branch lines fixed at regular intervals, with each branch line having a hook with or without bait. When a long line is allowed to float freely at the surface, mid-water or close to the bottom, it is known as a floating long line and when the line is anchored close to the bottom or at the bottom it is called the bottom long line.

Sri Lanka's tuna-directed fisheries are however, predominantly artisanal. The smallest boats are 10 m in length. There are only four vessels that the IOTC recognises as 'commercial' (>24m). The small artisanal vessels are multi-gear opportunists targeting fish as it is becomes available; these vessels carry both large mesh gillnets or short longlines on board. Depending on the area fished, communication with other skippers, National Aquatic Resources and Development Agency (NARA) fishing location broadcasts, meteorological conditions and fish availability, the skipper will decide to deploy the most effective gear on any given day.

There is a drive by the Sri Lankan Government to encourage vessels and skippers to carry only a single gear type per trip. This allows for the catch for the entire trip to be allocated to a single fishing method and gear type, in some cases there is uptake by vessels in the artisanal fleet. Unfortunately the risk of converting a vessel to permanently carry only a single gear type is too high in a marginal fishery operating on fish availability. As such, although only a single gear type may be carried for one fishing trip, the skippers are liable to switch gears or carry both gears the following trip if the fish availability or economic situation changes. There is however a shift towards longline fishing only for the bigger tunas, targeting the export market.

The trip length of offshore fishing multiday boats varies from 5-30 days or sometimes longer if catches are good. The weather conditions, small size of the boat and inadequate safety measures on board influences the trip duration. During long voyages the catches from the early parts of the trip are preserved by salting and drying in the sun and the catches from the latter parts of the trip are stored on ice. The spatial distribution of pelagic longline effort is shown in Figure 3.

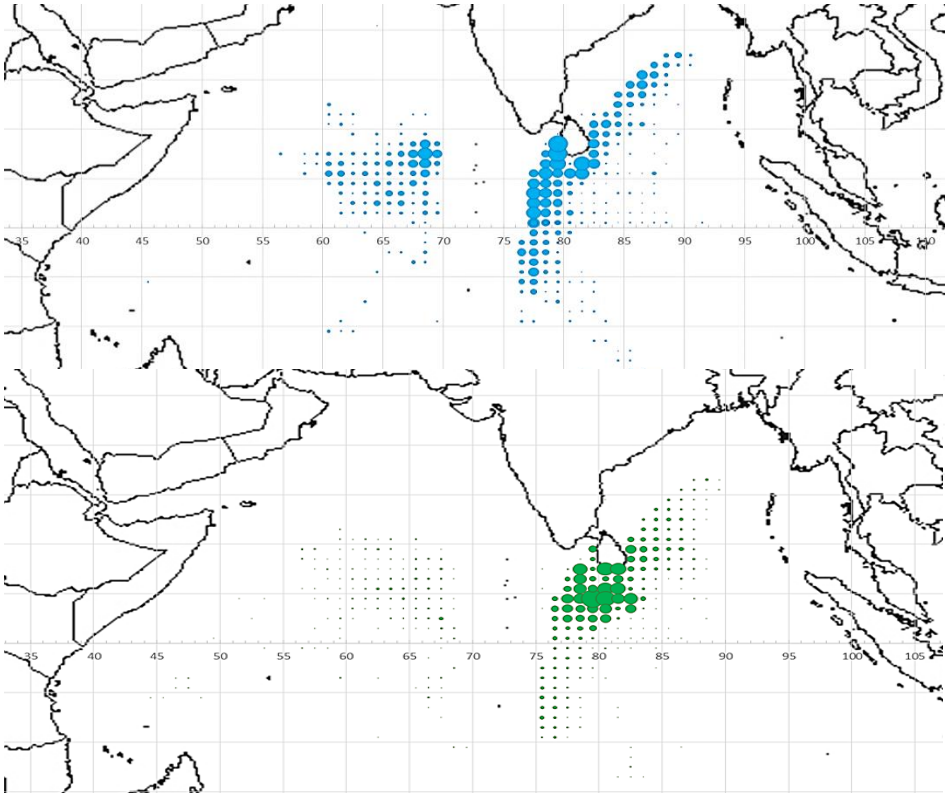


Figure 3: Fishing effort by pelagic longline vessels using only longline gear, for 2015 (UoA vessels, n =1481, blue) and 2016 (UoA vessels, n = 1910, green). Image credit: DFAR.

The development of the offshore and high seas fishing sector has led to the improvement of on board fish handling practice to reduce the post-harvest loss, and growth of this sector is the main fishery policy in the recent past. The legal frame work has been strengthened to expand the high seas fisheries. As such the entry of larger vessels with necessary technological inputs such as chilled seawater (CSW) or refrigerated sea water (RSW) systems, line haulers, fish finders and other equipment is being encouraged, as seen in Sri Lanka's proposed fleet development plan.

However, there is an issue in the industry regarding the high operating cost due to the fuel price, and the poor catch. As a result a substantial number of vessels make short or limited trips and most of the time boats are anchored in harbours – regardless of having obtained a fishing license to operate in the high seas.

The skippers use their radio communications to gather fishing intelligence from other boats about the type of gear, location and species of fish being caught by them. A Vessel Monitoring System (VMS) is in place and activated for all vessels. DFAR sends out daily emails about the vessels tracking system to all exporters. An example of a vessel track is shown in Figure 4.

The National Aquatic Resources Research and Development Agency (NARA) has developed a satellite-based fishing ground forecasting system using near-real time satellite data, on sea surface temperature and other parameters, to provide fishermen with the best available evidence of fish abundance based on known preferences of tunas and other highly migratory fishes (Figure 14). Forecasts are broadcast with a weekly frequency to longline boat owners. With such information in hand fishermen are able to reach fishing grounds with less fuel consumption and with the expectation of better catch in a shorter time, further reducing costs. This may allow for high quality fish to be landed more consistently and further support the growing target export market.

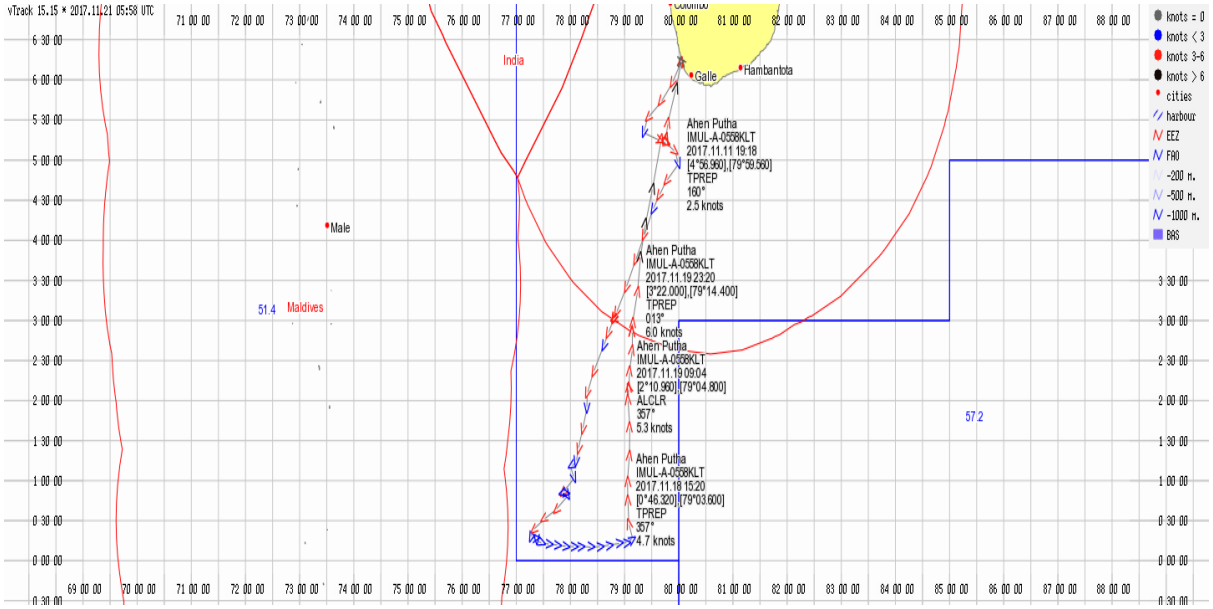


Figure 4: VMS example for a Sri Lankan vessel operating in the high seas.

4.0 CATCHES AND SPECIES EXPLOITED AND STATE OF STOCKS

Segregation of catch on board vessels is not well defined. Typically catches made early on during the trip are dried and salted whilst later catches are stored on ice. There is no segregation of catch onboard and no at-sea scientific observer program. It is therefore not possible to retrospectively verify which tuna and other species were caught using longline and which were caught using gillnets on vessels carrying both types of gear. To some degree DFAR is able to identify which catches came from which gears, although the veracity of that information is not guaranteed without on-board inspection.

Offshore and the high-seas catch in the Indian Ocean is dominated by skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), neritic tuna species and followed by billfish, seerfish and sharks and other bony fish. The SLL fishery however is a multi-species fishery targeting mainly yellowfin tuna, *Thunnus albacares*, along with bigeye tuna, *T. obesus*, and swordfish, *Xiphius gladius*.

Other tuna and billfish species are taken in small amounts by the longline fishery i.e. the skipjack component in the IOTC does largely not apply to the Sri Lankan waters.

4.1 Geographical area of target stocks in the Indian Ocean

Yellowfin tuna (*Thunnus albacares*) are distributed throughout tropical oceans and subtropical oceanic waters. There is a single population found throughout the Indian Ocean. Juvenile yellowfin tuna are commonly found associated with juvenile bigeye tuna and skipjack tunas in surface waters. Adult yellowfin are more commonly found schooling in both surface and subsurface waters. The Indian Ocean stock is defined by the management jurisdiction of the IOTC (Figure **5**).

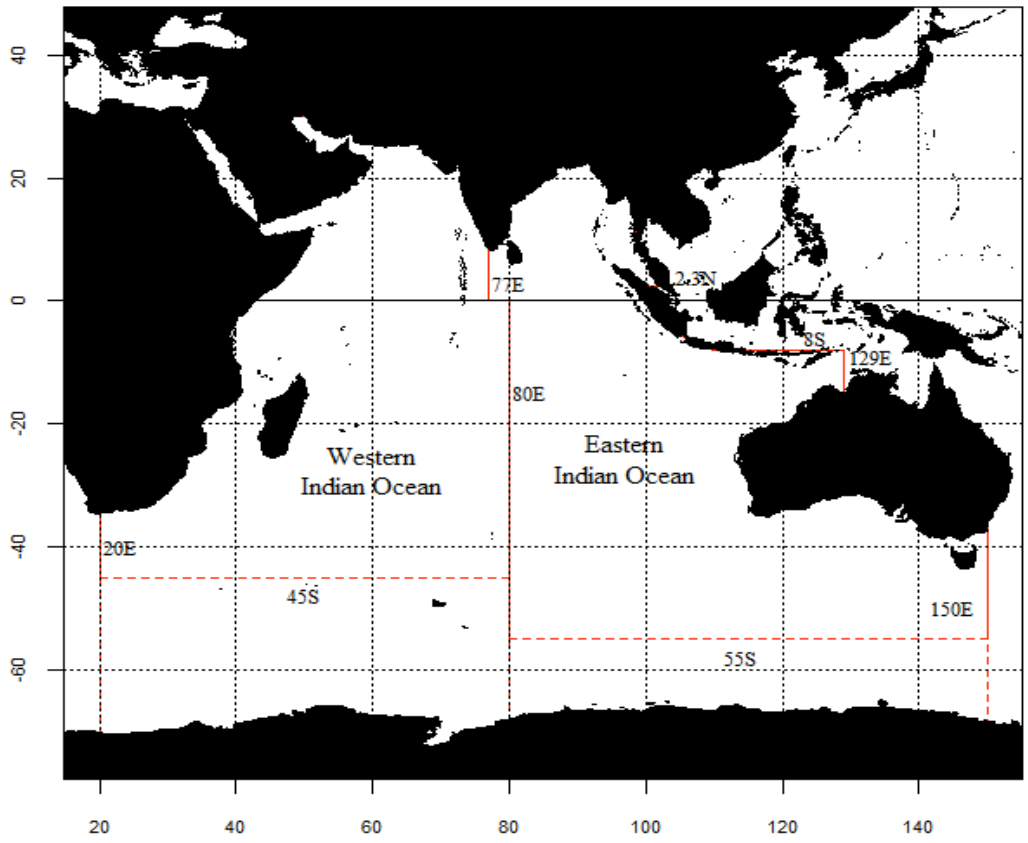
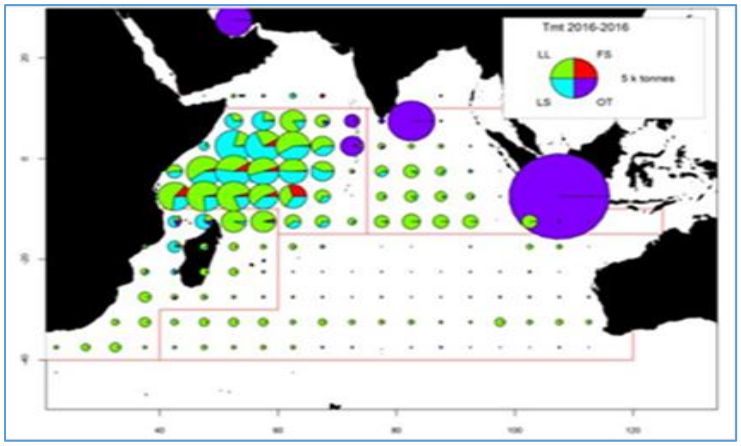


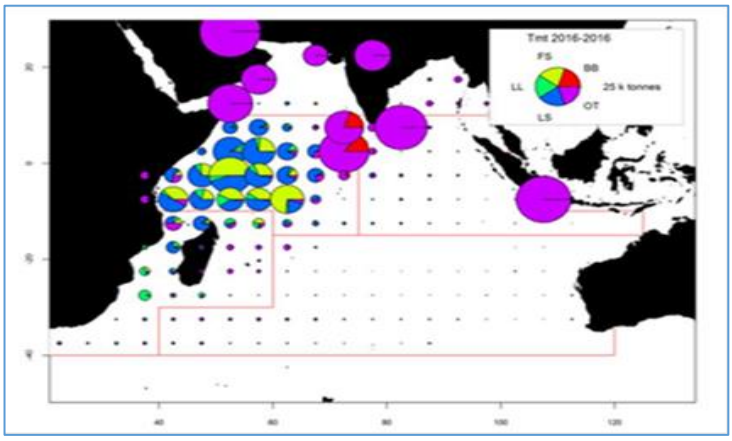
Figure 5: Geographic area of the target stocks

The IOTC breaks down catches by gear type, area and country as best they can based on the available information received from its Members. Statistics are illustrated for all three target species in the figures below (Figure 6) and the cumulative proportions by country in Figure 7 (for 2016).

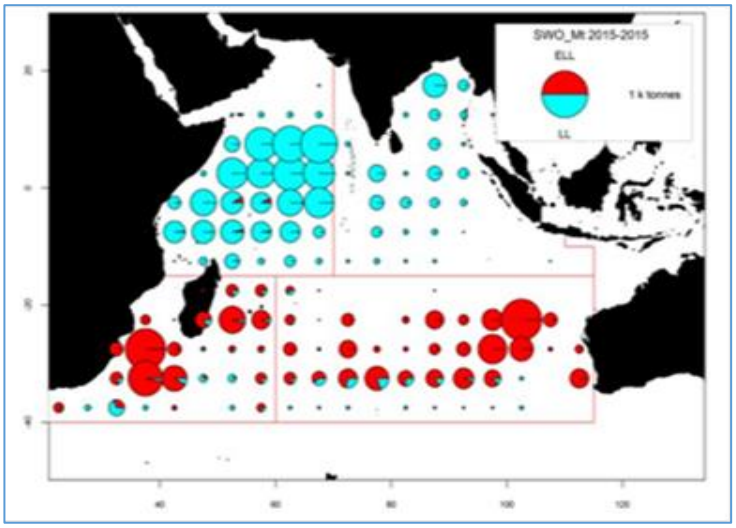
Catches of fleets for which the flag countries do not report detailed time and area data to the IOTC are recorded within the area of the countries concerned, in particular driftnets from I.R. Iran and Pakistan, **gillnet and longline fishery of Sri Lanka**, and coastal fisheries of Yemen, Oman, Comoros, Indonesia and India.



a. Yellowfin Tuna



b. Bigeye tuna



c. Swordfish

Figure 6 (a-c): Distribution of UOAs for 2016 showing the relative significance of the catches in and around Sri Lanka (Note Longline = LL). (Figure adapted from IOTC-2017-WPTT19-R).

Overall, Sri Lanka contributes a significant amount (10%) of the total tropical tuna catches in the Indian Ocean (Figure 7).

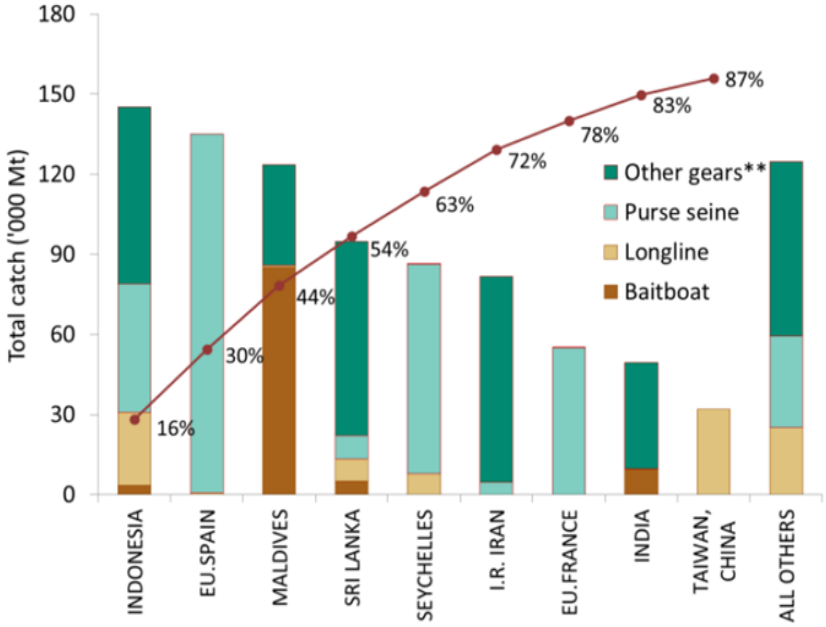


Figure 7: All tropical tunas (Skipjack, yellowfin & bigeye tunas): average catches in the Indian Ocean over the period 2013–16, by country.

Countries are ordered from left to right, according to the importance of catches of tropical tunas reported. The red line indicates the (cumulative) proportion of catches of tropical tunas for the countries concerned, over the total combined catches of species reported from all countries and fisheries. ** Other gears includes handline, gillnet, gillnet-longline, trawling.

5.0 STATE OF UOA STOCKS IN THE INDIAN OCEAN

All UoAs are subject to regular stock assessment through the IOTC scientific committee. Sri Lanka contributes to the assessments indirectly through the provision of data on catches.

- The current status of yellowfin tuna in the Indian Ocean is that the stock is both overfished and experiencing overfishing (Figure 8).
- The bigeye stock is currently not overfished and nor is overfishing taking place (Figure 8).
- The swordfish stock in the Indian Ocean is currently determined to be not overfished and nor is overfishing of the stock taking place (Figure 9).

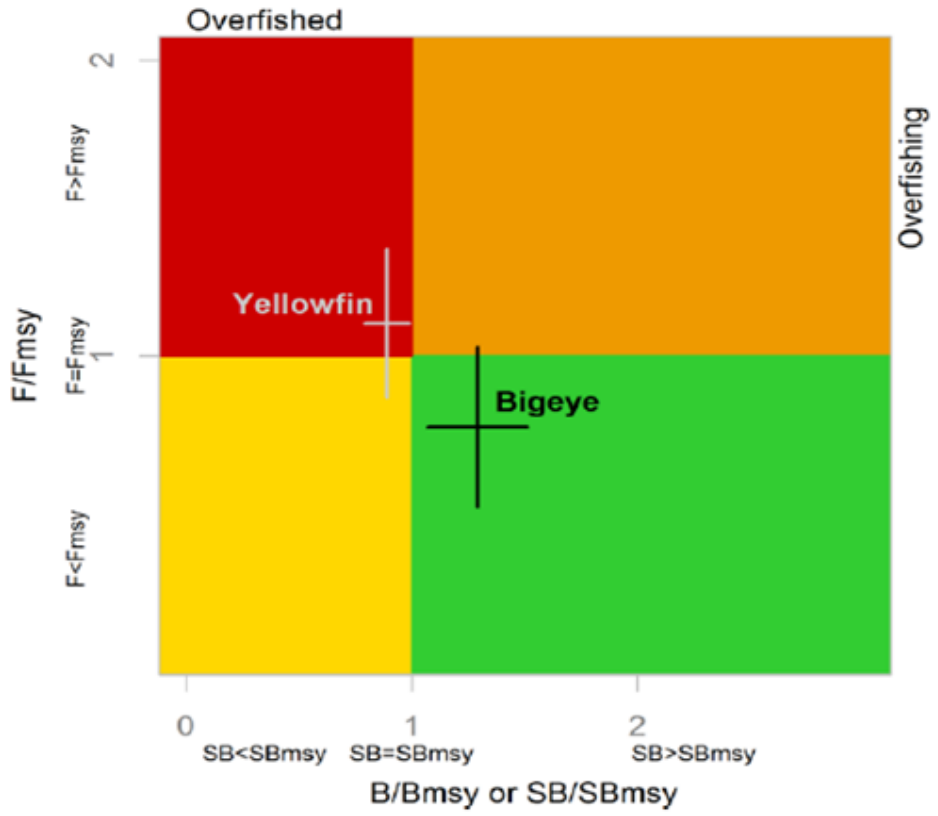


Figure 8: Combined Kobe plot for bigeye tuna (black: 2016), and yellowfin tuna (grey: 2016),

showing the estimates of current stock size (SB) and current fishing mortality (F) in relation to optimal spawning stock size and optimal fishing mortality. Cross bars illustrate the range of uncertainty from the model runs with a 80% CI. (Adapted from IOTC-2017-WPTT19-R).

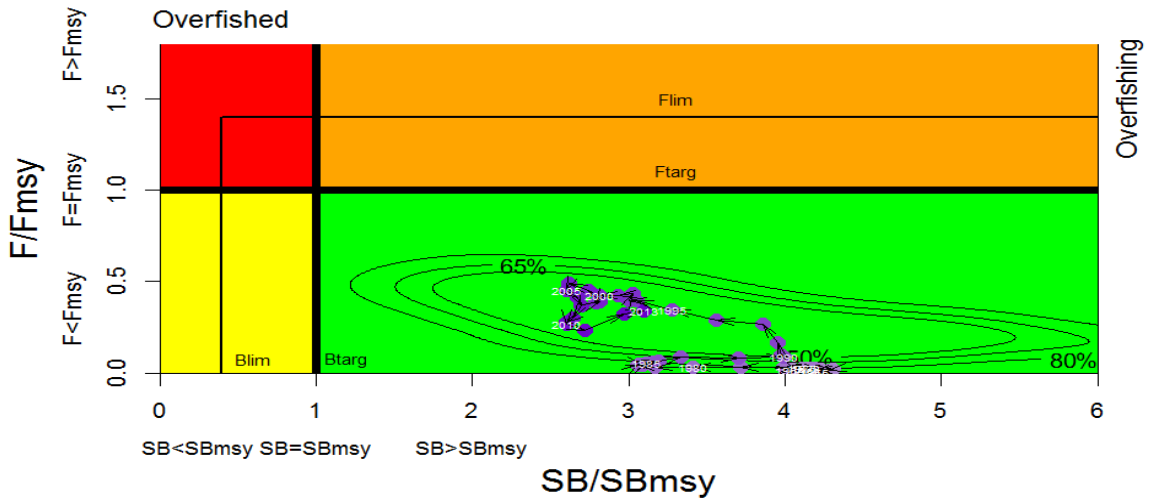


Figure 9. KOBE plot based on the most recent assessment of swordfish in the Indian Ocean.

The overexploited status of yellowfin tuna (YFT) is critical to the MSC assessment. Two recent and or ongoing assessments pertinent to the stocks in the Indian Ocean (IOTC) are:

1. The Maldivian pole and line fishery https://fisheries.msc.org/en/fisheries/maldives-pole-line-tuna/@@assessments
2. The Echebaster purse seine fishery. https://fisheries.msc.org/en/fisheries/echebastar-indian-ocean-purse-seine-skipjack-tuna/@@assessments

It is for example the main reason why the Maldivian pole and fishery, which has recently been re-certified, is NOT certified for YFT (as a UoA). That fishery is certified only for skipjack tuna, with YFT considered a main primary species. Similarly the Echebastar purse seine fishery is certified for skipjack tuna but not for YFT or BET.

Yellowfin Tuna : The yellowfin stock status is estimated by the IOTC to be above the point of recruitment impairment (PRI taken as 20%B_0 or 0.2 SB_0), but below SB_{MSY} with an estimate of SB_{2015}/SB_{MSY}= 0.89 (0.79-0.99), and to have been below SB_{MSY} for 6 of the last 8 years. The estimate of SB_{2015}/SB_0 = 0.29 implies SB_{MSY} = 0.33SB_0 and SB_{2015}/SB_0 is in the range 0.26-0.33.

Bigeye tuna : The PRI for the bigeye stock is taken as 20%B_0 (or 0.2 SB_0) or 0.5SB_{MSY}. Bigeye was assessed in 2016 with SB_{2015}/SB_0 estimated as 0.38 but with no confidence intervals. B_{2015}/SB_{MSY} is estimated at 1.29 (1.07-1.51).

Swordfish : No new assessment was undertaken in 2016. Thus, stock status is based on the previous assessment undertaken in 2014, as well as indicators available in 2015. The SS3 model, used for stock status advice, indicated that MSY-based reference points were not exceeded for the Indian Ocean population as a whole (F_{2013}/F_{MSY}< 1; Most models applied suggest that the stock was above a biomass level that would produce MSY. Spawning stock biomass in 2013 was estimated to be 58–89% of the unfished levels. . On the weight-of-evidence available in 2016, the stock is determined to be not overfished and not subject to overfishing.

All three UoAs are therefore assessed and managed by the IOTC with measures in place expected to achieve management objectives reflected in reference points.

6.0 ECOSYSTEM CONTEXT

Sri Lanka's fisheries and aquatic resource base includes a territorial sea of 21,500 sq. km. and an Exclusive Economic Zone (EEZ) of 517,000 sq. km. The country has a narrow continental shelf with an average width of22 km. Sri Lankan waters are rich in species diversity.

Sri Lanka has a coastline of around 1,700 km and the coastal zone is of considerable socio-economic importance. The coastal zone contains a variety of coastal habitats that include estuaries and lagoons, mangroves, coral reefs and large extents of beaches and dunes that are vital to ecological functioning and maintenance to bio-diversity.

The last comprehensive survey of the coastal waters done in 1979-80 (by RV Dr Fridtjoff Nansen) and indicated a possible annual harvestable yield of 250,000 t. of fish from the costal inshore area. Estimates of possible annual yield from the rest of the EEZ varied from 90,000 to150,000 tons. A subsequent survey has been initiated as recently as the August 2017 whereby the same vessel shall return to Sri Lanka to with, "the aim of the planned survey is to know the current status of marine resources including fish stocks and to investigate stocks of unexploited/underutilised fishery resources on the continental shelf and slope."

The EEZs of India (western side), Maldives and Sri Lanka, have common boundaries and hence the sea area bounded by these three countries is devoid of any international waters. With the establishment of the EEZ, exploitation of tunas in this area by distant nations was significantly reduced because of the absence of international waters within this area (*Sivasubramaniam 1985)*.

Tuna resources in this area consist of the yellowfin tuna *(T. albacares),* big eye tuna *(T. obsesus),* long-tail tuna *(T. tonggol),* skipjack tuna *(K. pelamis),* eastern little tuna *(E. affinis),* frigate tuna *(A. thazard),* bullet tuna *(A. rochei),* dog-tooth tuna *(G. unicolor)* and the oriental bonito *(Sarda orientalis).* The last five species are generally considered to be insular and with localized migratory habit. The others, particularly the first two species, are known to be widely distributed not only in the area under consideration but also in other parts of the Indian Ocean and the limits of distribution of the stocks of these oceanic species are not clearly understood, though for management purposes the stock boundaries are delineated as the IOTC area of jurisdiction.

6.1 Bycatch in the UOAs

The catch table presented below provides a summary of the data that were extracted by DFAR from the overall annual data base for the records of trips / vessels that submitted catch data using exclusively longline / longline only during a trip. The bycatch species designated into roughly Primary and Secondary species is shown in Table 3.

Table 3: Retained catches by the proposed Unit of Assessment for 2016 (reported by DFAR).

Common name	Scientific name	Total Retained UoA Catch (kg) [1]	Proportion by weight of Retained UoA catch
Yellowfin tuna	*Thunnus albacares*	5079725	66.11%
Swordfish	*Xiphius gladius*	771318	10.04%
Bigeye tuna	*Thunnus obesus*	753090	9.80%
Black marlin	*Maikara indica*	292089	3.80%
Blue marlin	*Maikara nigricans*	211866	2.76%
Unidentified fishes	*N/A*	130481	1.70%
Indo-Pacific Sailfish	*Istiophorus platypterus*	97943	1.27%
Skipjack tuna	*Katsuwonis pelamis*	95488	1.24%
Silky shark	*Carcharhinus falciformis*	46916	0.61%
Indian Scad (Linna)	*Decapterus russelli*	37736	0.49%
Blue shark	*Prionace glauca*	35025	0.46%
Albacore tuna	*Thunnus alalunga*	31387	0.41%
Bullet tuna	*Auxis rochei*	15026	0.20%
Rainbow runner (Lena parawa)	*Elagatis bipinnulata*	14757	0.19%
Spanish mackerel	*Scomberomorus commerson*	7440	0.10%
Wahoo	*Acanthocybium solandri*	7650	0.10%
Shortfin Mako shark	*Isurus oxyrinchus*	5403	0.07%
Striped marlin	*Tetrapturus audax*	5152	0.07%
Hammerhead sharks	*Various species nei*	4646	0.06%
Small tuna	*N/A*	4763	0.06%
Frigate tuna	*Auxis thazard*	2891	0.04%
Kawakawa	*Euthynnus affinis*	2891	0.04%
Other bony fishes *		30250	0.39%
Total Retained Catches		7683933	100.00%

[1]As reported to CapMarine, *LT&B DFAR Longline Database Confidential 2016*, source: DFAR.

*Other bony fishes includes: Rockfish, cuttlefish, unidentified sharks, dolphinfish, bigeye scad, triggerfish, unidentified sailfish, unidentified marlins, paramuwa, maduwa, lalawa, sapuru, seer, bayita, habarali, kata, sawara, surutta, siviya and wanna kata.

= P1 target species, = P2 primary species, = P2 secondary species, = ETP species

(Yellowfin also P2 in UoA 2 & 3, Bigeye also P2 in UoA 1 & 3, Swordfish also P2 in UoA 1 & 2)

These data in our view most accurately represents the catches by the proposed UoAs and allows for the designation of each species as primary or secondary, main or minor, and ETP, according to MSC definitions under SA3.1.3, 3.1.4 & 3.1.5. The catches for the UoAs in 2016 are therefore those made by the 1910 longline vessels assumed to use longline gear only.

A note must be made that triggerfish (*Balistidae sp.*) make up 4700 kg (0.06%) of the total catch and are accounted for within the other bony fishes category. These species may be indicative of gillnet catches or Fish Aggregating Device (FAD) Associated catches.

Notably, the principle bycatch species with economic value for the fishery include the black and blue marlins, indo-pacific sailfish, king and spanish mackerels and various shark species.

6.2 ETP species in the fishing zone

ETP species are defined by the MSC as species that are:

1. Recognised by national ETP legislation;
2. Listed on Appendix I of CITES;
3. Listed in any binding agreements concluded under the Convention on Migratory Species (CMS); or
4. Classified as 'out-of scope' (amphibians, reptiles, birds and mammals) that are listed in the IUCN Red List as vulnerable (VU), endangered (EN) or critically endangered (CE).

ETP species taken in the SLL fishery include several species of sharks, sea turtles and marine mammals and whale sharks.

Table 4: Retained and discarded ETP species for 2016 caught by the UoA.

ETP - Retained	**Number Caught in 2016**	**Weight 2016 (kg)**	**Status**
Silky Shark (*Carcharhinus falciformis*)	1258	102892	Near Threatened
Short fin mako shark (*Isurus oxyrinchus*)	235	11097	Vulnerable
***Scalloped hammerhead shark (*Sphyrna lewini*)**	115	4646	Endangered
****Coral Hind /Red Rockcod - Thabuwa (*Cephalopholis sonnerati*)**	8	506	Regulation Prohibiting
ETP - Discarded	**Number caught in 2016**	**Weight (2016)**	**Status**
Turtles (5 species)	99	49 500	Regulation Prohibiting
Dolphins (unidentified species)	3	1 050	Regulation Prohibiting
Oceanic whitetip (*Carcharhinus longimanus*)	14	784	Regulation Prohibiting
Thresher Shark *(Alopias sp.*)	9	5 400	Regulation Prohibiting
Whale Shark (*Rhincodon typus*)	4	76 000	Regulation Prohibiting
Blue whale (*Balaenoptera musculus*)	1	Unknown	Regulation Prohibiting

* Data for various sharks nei represented here for scalloped hammerhead sharks in line with the precautionary approach

**No data for Coral Hind retained in 2016 – 2015 statistics reflected here instead.

6.2.1 Sharks and Rays

While the IOTC is concerned about the status of silky shark and shortfin mako shark and has noted the species are in decline, the species are not managed by IOTC. Although silky shark and shortfin mako shark are not listed in CITES Appendix 1, they are considered here as ETP.

Silky shark, scalloped hammerhead sharks and shortfin mako shark are listed in Appendix II of the Conservation of Migratory Species (CMS), and Annex 1 of the CMS Memorandum Of Understanding on the Conservation of Migratory Sharks (which identifies shark species that have "unfavourable conservation status"). MSC CR v.2 specifically notes in GSA 3.1.5.2 that species listed by the CMS are to be considered as ETP for an MSC assessment.

The total catches by the combined offshore fleet of Sri Lanka reflect a vastly different story to that purported by the UOA and indicate that longline-gillnet combination gear (though longline is attributed the greater proportion of the catch) accounts for by far the greatest contribution of data to the total data set in the Indian Ocean (Figure 10). However is must be noted that the catch series of each species is dominated by very few fleets which are reporting by species and may therefore not be fully reflective of the ocean-wide trend.

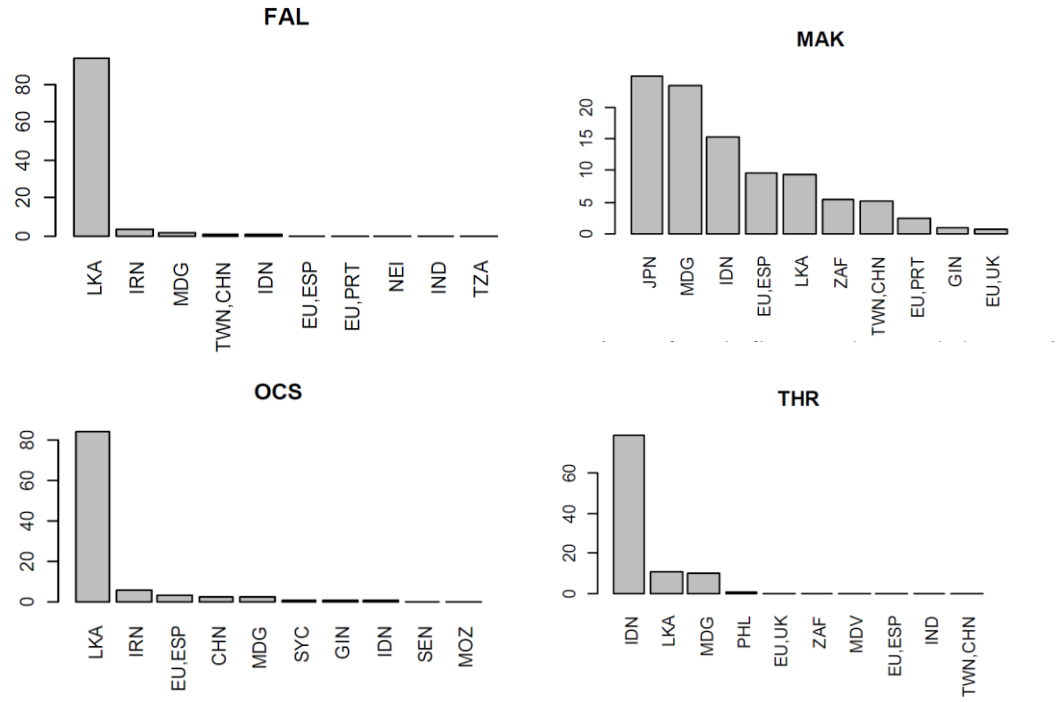


Figure 10: Contribution of each fleet to the total data series highlighting the contribution of data from Sri Lankan Fisheries (LKA), for silky shark (FAL), short-fin mako shark (MAK), oceanic whitetip (OCS) and thresher sharks (THR), figure adapted from IOTC-2017-WPEB13-R.

Sri Lanka is one of the world's largest mobulid (ray/maduwa) fisheries and is responsible for significant catches throughout the Indian Ocean. *All Manta spp. are protected under CITES Appendix II, while all manta and mobula species are also listed on CMS Appendix I & II.*

There were a reported 16 rays caught by the UoA in 2016. Mostly mobulids are caught using gillnets, so the issue of more than one gear type being carried on board by vessels in the SLL and the vessels within the UoA being strictly defined again is highlighted.

6.2.2 Marine Turtles

Out of a total of seven species of turtles in the world, five are reported to nest along the coastal belt of Sri Lanka (Amarasooriya 2000):

- Loggerhead turtle (*Caretta caretta*);
- Green turtle (*Chelonia mydas*);
- *Olive Ridley turtle (Lepidochelys olivacea*);
- Leatherback turtle (*Dermochelys coriace*); and
- Hawksbill turtle (*Eretmochylus imbricate*).

Figure 11: Marine turtles commonly encountered in Sri Lankan waters.

(image from NIO-MTTF_Workshop_Report-Maldives_Oct2015_Sri Lanka DWC Presentation_ H.D.Ratnayake).

The status of the global population of a marine turtle species in a given ocean region does not always reflect the real status of some of its subpopulations. Marine turtle subpopulations may vary widely in population size, geographic range and population trends, which makes it necessary to study marine turtles at a subpopulation level (Justel and Restrpio 2015). Wallace et al 2011 scored the north-eastern Indian Ocean regional management unit (RMU) of turtle populations as having high levels of data uncertainty. This led further to the classification of those sub-populations as high risk and with high levels of threats to the RMU.

The collection of turtle eggs is a traditional practice among the coastal communities of Sri Lanka and almost all the nests are excavated for domestic consumption or to sell in markets and to turtle hatcheries (Richardson 1995). The collection of eggs and improper hatchery practices have been identified as the main threats to the turtle fauna of Sri Lanka (Amarasooriya & Dayaratne 1997).

Other major sources of mortality come through interactions with longline and gillnet fisheries, either directly or through ingestion and entanglement in discarded or lost fishing gear. A research paper by R. Maldeniya & P. Danushka (IOTC–2014–WPEB10–27) investigated the impacts of large pelagic fisheries on sea turtle population sin Sri Lanka. Their work found that the turtles caught on longlines were more to die than those caught in gillnets. The Olive Ridley turtle was found to interact most with longline gear and through interviews with experienced skippers it was noted that the use of imported

squid bait seemed to increase the level of interaction of this carnivorous species with the gear. Further the paper confirmed that without extensive or representative on-board observer coverage the likelihood that all turtle interactions were being reported is very low, this due to the fact that fisherman consider that the major threats to sea turtles come from outside the fishery and that reporting interactions will likely lead to further controls and legislation over their operations.

All species of sea turtle are protected under the Fauna and Flora Protection Ordinance, No 2 of 1937 and the Fisheries and Aquatic Resources Act, No 2 of 1996. Sri Lanka has entered into the International Trade in Endangered Species (CITES) agreement in 1979 which prohibits member nations from export or import of turtles and their parts and products.

S.S. Gunasekara and M.I.G. Rathnasuriya from the National Aquatic Resources Research and Development Agency conducted research on the *Best Practices in Releasing of By-catch of Sensitive Species in Sri Lankan Tuna Multi-day Fishery* by reviewing logbook data from over 4000 vessels using either longline or gillnet gear. In their study they plotted the spatial distribution of turtle interactions (Figure 12). They found that among 577 turtle catch incidents, 315 (54.5%) were associated with gillnets, 190 incidents (32.9%) were associated with longlines and the remaining 72 (12.4%) events were associated with small scale purse seine nets. A total of 2701 turtles were recorded as released during the 577 bycatch events in 2015. All turtles captured by longline gear in the SLL are recorded as discarded/released.

Sri Lanka has signed the Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia and forms a part of the Northern Indian Ocean Marine Turtle Task Force.

In addition the Turtle Conservation Project (TCP) raises awareness amongst communities and fishermen and builds capacity to promote the conservation of marine turtles in Sri Lanka.

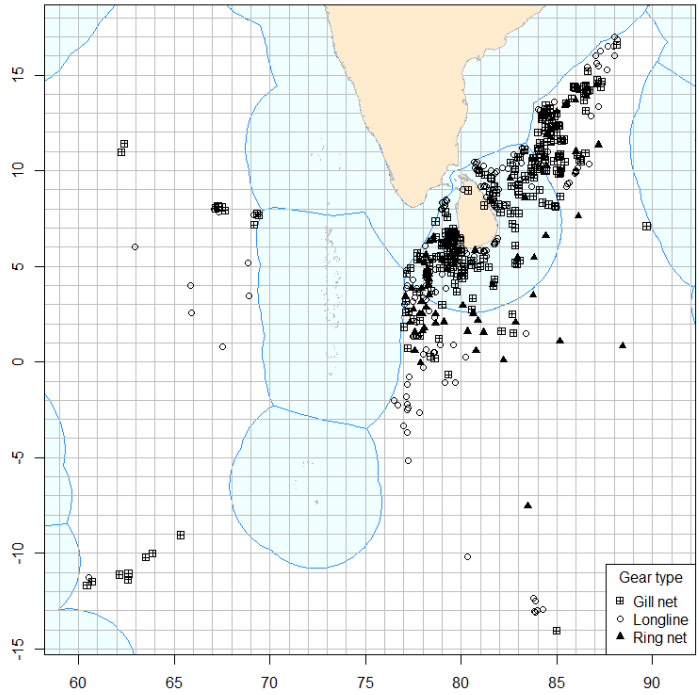


Figure 12: Spatial extent of turtle incidents with fishers licensed to fish by Sri Lanka.

6.2.3 Mammals

It must be noted here that the unintentional catch of dolphins, whale sharks and blue whales by the UoA could seriously jeopardise its chances of achieving MSC certification. These events are not 'one-off' occasions but rather are repeated, as evidenced in the catch reports submitted to the IOTC and the data received from DFAR.

A study conducted by Gunasekara & Rathnasuriya in 2015 found that there were 33 marine mammal interactions with fishing gear recorded in the logbooks of some 4000 vessels licensed to fish by Sri Lanka Of those only 10% were associated with longline gear, the remainder with gillnet gear. This lends itself strongly to the proper identification of the Unit of Assessment and the catches associated with that fleet. The same report indicated that all dolphin and whales were released; however it does not state the fate of the released mammals, dead or alive. Subsequent consultation with stakeholders through the client representative indicated the unreliable nature of discards data within the SLL.

Table 4 indicates that three dolphins (likely bottlenose dolphin (*Tursiops sp.*), four whale sharks (*Rhincodon typus*) and one blue whale (*Balaenoptera musculus*) were caught by the fishery. When compared with the National Scientific Report submitted to the IOTC (IOTC-2017-SC20-NR25) it can be seen that the blue whale was not released alive, the dolphins were released alive and the report accounts for only two of the whale sharks and credits their capture to the gillnet fishery.

6.2.4 Seabirds

Seabirds are not caught in any significant number by the SLL. Sri Lanka has submitted an exemption request to the IOTC to reflect that they do not require a NPOA on seabirds, due to a technicality of process the exemption was not granted. The fact however remains that the bycatch of threatened marine sea birds in the SLL is negligible and this will not be an issue for the UoA moving forward.

6.3 Bait species imported by the fishery

The Indian mackerel (*Decapterus russelli*), milkfish and frozen squid are generally used as the bait for longline fishing. Import figures were provided to the assessors by DFAR and indicate that the bait species need to be scored under Principle 2 as they are of a significant quantity.

Import statistics for frozen squid reflect that five companies were the primary importers in 2016 (months 01-12). A total of approximately 5400 tons of frozen squid was imported for use by longline vessels in 2016. The species name of the squid imported is not available nor the country of origin.

Import statistics for milkfish were also available for 2017 (months 04-12) and showed a total of six companies importing 1250 tons of milkfish for bait.

7.0 GOVERNANCE

There are multiple jurisdictions to be considered *viz.*

- Shared stocks
- Straddling stocks of highly migratory species
- An indigenous component

The two primary fisheries governance mechanisms relating to the responsible management of the fishery fall under :

- Regional (IOTC)
- National (MFARD/DFAR)

In addition to the above the fishery would also be scored on its international commitments including for example :

1. International Convention on the Law of the Sea (UNCLOS)
2. United Nations Fish Stocks Agreement (UNFSA)
3. Port State Measures Agreement (PSMA)
4. International Plan of action for IUU fishing
5. Adoption of the Code of Conduct for Responsible Fisheries (voluntary)
6. International Plans of Action for Seabirds
7. International plan of action for sharks
8. Development of a Fisheries Management Plan (FMP)
9. Adoption of an ecosystem approach to fisheries

Satisfying the above in total or in part would strengthen the governance score for the fishery.

Other MSC elements likely to be critical would include :

- A clear fishery-specific dispute mechanism and an established decision-making mechanism
- An established legal and customary framework
- Monitoring, Surveillance and Control structure
    - VMS
    - Observers
    - Clean record of compliance at Regional and National level
    - No EU cards or processes relating to European Union requirements e.g. yellow cards
    - Accurate catch and effort reporting as well as an integrated reporting system for landings
    - No illegal or systematic shark finning – if it occurs a record of action taken

As Sri Lanka is a full member of the IOTC, commitments to the International Instruments are conditional including UNFSA and UNCLOS. The IOTC has as an objective to promote cooperation among the Contracting Parties (Members) and non- Contracting Cooperating Parties of the IOTC with a view to ensuring, through appropriate management, the conservation and optimum utilization of stocks covered by the organization's establishing Agreement and encouraging sustainable development of fisheries based on such stocks.

The Commission has four key functions and responsibilities which Sri Lanka is committed to :

i. to keep under review the conditions and trends of the stocks and to gather, analyse and disseminate scientific information, catch and effort statistics and other data relevant to the conservation and management of the stocks and to fisheries based on the stocks;
ii. to encourage, recommend, and coordinate research and development activities in respect of the stocks and fisheries covered by the IOTC, and such other activities as the Commission may decide appropriate,
iii. to adopt – on the basis of scientific evidence – Conservation and Management Measures (CMM) to ensure the conservation of the stocks covered by the Agreement and to promote the objective of their optimum utilization throughout the Area;
iv. to keep under review the economic and social aspects of the fisheries based on the stocks covered by the Agreement bearing in mind, in particular, the interests of developing coastal States.

In general, the IOTC management framework is consistent with national laws with national member states as either contracting, or cooperating non-contracting, parties. As a body under FAO, the management framework is also consistent with international laws and standards such as the Code of Conduct for Responsible Fishing (CCRF), implementation of relevant NPOAs, and which are in accordance with the principles expressed in the relevant provisions of the United Nations Convention on the Law of the Sea.

Sri Lanka is a signatory to both UNCLOS and UNFSA.

The Department of Fisheries and Aquatic Resources is a well-structured organisation with a clear structure of responsibility. The fisheries related law is established and includes :

National fisheries and aquatic resources policy of 2006

Fishery development framework (2007)

Fisheries and Aquatic Resources Act No 2 of 1996. (with 2013 amendment No 35)

National Fisheries and aquatic resources regulations including amongst others :

- ✓ Import export regulation
- ✓ A structured and detail catch reporting system
- ✓ Marine mammals
- ✓ High seas fishing permits and conditions
- ✓ Regulations controlling shark exploitation including NPOA (2013)
- ✓ Data collection and catch certificates
- ✓ Fishing gear regulations
- ✓ Adoption of Port State Measures Agreement (PSMA)
- ✓ Implementation of an Observer programme

Regarding MCS there is an ongoing process addressing IUU and dealing with non-compliance (prompted largely due to the EU ban on imports from Sri Lanka).

Figure 13: Fisheries districts in Sri Lanka targeted for implementation of Sri Lankan National Plan of Action to combat Illegal, Unreported and Unregulated Fishing (Figure from presentation by Gunawardane. N.D.P, National fisheries and measures taken to address IUU, DFAR)

8.0 MSC PRE-ASSESSMENT SCORING BY PRINCIPLE

8.1 Principle 1 – The stocks under assessment

Following SA3.1.3, three primary species are identified: yellowfin tuna (*Thunnus albacares*), bigeye tuna (*Thunnus obesus*) and swordfish (*Xiphius gladius*). All three are assessed and managed by the IOTC with measures in place expected to achieve management objectives reflected in either limit or target reference points (SA3.1.3.3).

8.1.1 Stock status and reference points (PI: 1.1.1)

The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing

MSC requires, for a conditional pass, that it is likely that the stock(s) is (are) above the point at which the Point of Recruitment is Impaired (PRI). For an un-conditional pass MSC requires that the stock (relative to PRI) :

i) is 'highly likely' above the PRI, and that

ii) the stock is fluctuating around a level consistent with MSY.

Consistent with GSA2.2.3.1, the population size at the point of maximum sustainable yield or B_{MSY} = 40% of the pristine biomass or 40%B_0 (or 0.4B_0) and the PRI is taken as 20%B_0 (or 0.2 SB_0 in IOTC terminology) or 0.5 B_{MSY}.

<u>UoA1 – Yellowfin Tuna (*Thunnus albacares*) Indian Ocean Stock</u>

The previous stock assessment for yellowfin tuna conducted by the IOTC in 2015 estimated SB2014/SB0 as 0.23 (0.21-0.36) with a probability greater than 80%.

The most recent stock assessment for yellowfin was conducted in 2016 and introduced the most recent catches and a new longline CPUE index. The updated assessment estimates SB_{2015}/SB_0 as 0.29.

For scoring, it is necessary to determine how likely the estimate of 0.29SB_0 is above the PRI of 0.20SB_0.

No likelihood levels are reported for the stock status reported in 2015 and as such the stock can only be scored as likely above the PRI and not highly likely to be above the PRI.

The SG60 requirements are met.

The SG80 requirements are not met.

The SG100 requirements are not met.

The stock is assessed currently to be below SB_{MSY} with an estimate of SB_{2015}/SB_{MSY} of 0.89 (0.79-0.99) and to have been below SB_{MSY} for six of the last eight years.
Current spawning biomass is estimated to be 11% below the interim target reference point of SB_{MSY} (947,000 t), however above the interim limit reference point of 0.4*SB_{MSY}.

The stock cannot be considered to be fluctuating at or around a level consistent with MSY and therefor the SG80 requirements are not met for scoring issue (b).

UoA2 – Bigeye Tuna (*Thunnus obesus*) Indian Ocean Stock

The previous stock assessment for bigeye tuna was conducted in 2016 and indicated, without any confidence intervals, that $SB_{2015}/SB_0 = 0.38$.

The stock assessment model was designed to take into account uncertainty on stock recruitment relationship and the influence of tagging information. Considering the quantified uncertainty, which is conservative, the assessment indicates that, with high likelihood, SB_{2015} is above SB_{MSY}.

SG60 requirements are met

SG80 requirements are met

As there is no quantified level of confidence associated with the assessment it cannot be said that there is a high degree of certainty that the stock is above the PRI and therefore,

SG100 requirements are not met.

SB_{2012}/SB_{MSY} (plausible estimate) = 1.44 (0.87–2.22)

SB_{2015}/SB_{MSY} (80% CI) = 1.29 (1.07-1.51)

It is therefore highly likely that the bigeye tuna stock in the Indian Ocean is at or fluctuating around MSY and the SG80 requirement for scoring issue (b) is met.

As the quantified level of confidence associated with the assessment is <95% there is not a high degree of certainty that the stock is above the PRI and therefore,

SG100 requirements are not met.

UoA3 –Swordfish (*Xiphius gladius*) Indian Ocean Stock

A new assessment on swordfish was undertaken in 2017 using stock synthesis with fisheries data up to 2015 and indicated, SB_{2015}/SB_{1950} (80% CI) = 0.31 (0.26-0.43)

SG60 requirements are met

SG80 requirements are met

As the quantified level of confidence associated with the assessment is <95% there is not a high degree of certainty that the stock is above the PRI and therefore,

SG100 requirements are not met.

SB_{2015}/SB_{MSY} (80% CI) = 1.50 (1.05-2.45)

It is therefore highly likely that the swordfish stock in the Indian Ocean is at or fluctuating around MSY and the SG80 requirement for scoring issue (b) is met.

As the quantified level of confidence associated with the assessment is <95% there is not a high degree of certainty that the stock is above the PRI and therefore,

SG100 requirements are not met.

8.1.2 Stock Rebuilding (PI: 1.1.2)

Where the stock is depleted, there is evidence of stock rebuilding. NOTE: in the event that the stock is not considered to be depleted, this PI is not scored.

UoA1 – Yellowfin Tuna (*Thunnus albacares*) Indian Ocean Stock

The IOTC sets forth the following guidelines for stocks that have a high probability of being overfished with overfishing still occurring 1) aim to end overfishing with a high probability and 2) to rebuild the biomass of the stock in as short a period as possible.

There is a risk of continuing to exceed the MSY-based biomass reference point if catches increase or remain at current levels (2016) until 2018 (88% risk that SB < SBMSY)

SA2.3.4: the assessment team is instructed to explicitly consider levels of fishing mortality rate in this PI, where the information is available.

The increase in effort and associated catches in recent years has substantially increased the pressure on the Indian Ocean stock as a whole and current fishing mortality is considered to be 11% above the interim target reference point of $F_{MSY,}$ and below the interim limit reference point of $1.4*F_{MSY.}$ Originally IOTC Circular 2016-095c Corrigendum was circulated in November 2016 determining the catch limits for yellowfin tuna under resolution 16/01 – stated the Flag state catch limits for 2017 and onwards for yellowfin tuna. The Sri Lankan longline line fleet catch limit was set at 15 287 metric tons per annum. The possible effect of this measure can only be assessed once estimates of abundance in 2018 would be available at the 2019 assessment.

IOTC Resolution 17/01_On an interim plan for rebuilding the Indian Ocean yellowfin stock in the IOTC area of competence, and that superseded Resolution 16/01, adopted the following:

- for fishing vessels targeting tuna and tuna like species in the Indian Ocean of 24 meters overall length and over, and those under 24 meters if they fish outside the EEZ of their flag State, within the IOTC area of competence that depending on the gear type catches would be reduced by between 5-15% of 2014 levels.
- Longline: CPCs whose Longline catches of yellowfin reported for 2014 were above 5000 MT to reduce their Longline catches of yellowfin by 10 % from the 2014 levels.

FishBase Generation time for *Thunnus albacares* = 3.6 years.

The IOTC Technical Committee on Management Procedures noted in 2017 that there is a 50% probability of rebuilding the stock to B_{target} (B_{MSY}) by 2024. Therefore:

SG60 requirements met as the rebuilding timeframe specified is less than 2 generation times.

SG100 requirements not met as the rebuilding timeframe exceeds one generation time.

Rebuilding evaluation

The possible effect of Resolutions 17/01 and 16/01 can only be assessed once estimates of abundance in 2018 would be available at the 2019 assessment.

SG60 requirements are met as monitoring is in place through catch statistic reporting.

SG80 & SG100 requirements are not met as yet there is no evidence that stock rebuilding strategies are likely to be or actually rebuilding the Indian Ocean stock of yellowfin tuna.

UoA2 – Bigeye Tuna (*Thunnus obesus*) Indian Ocean Stock – PI not scored

UoA3 –Swordfish (*Xiphius gladius*) Indian Ocean Stock – PI not scored

8.1.3 Harvest strategy (PI: 1.2.1)

Resolution 15/10 On Target and Limit Reference Points and a Decision Framework lays out the interim target and limit reference points for P1 species as follows:

Stock	Target Reference Point	Limit Reference Point
Yellowfin tuna Swordfish	$B_{TARGET}=B_{MSY}$ $F_{TARGET}=F_{MSY}$	$B_{LIM}=0.40B_{MSY}$ $F_{LIM}=1.40F_{MSY}$
Bigeye tuna	$B_{TARGET}=B_{MSY}$ $F_{TARGET}=F_{MSY}$	$B_{LIM}=0.50B_{MSY}$ $F_{LIM}=1.30F_{MSY}$

Paragraph 6 of Resolution 15/10 states that:

The IOTC Scientific Committee shall recommend to the Commission for its consideration options for harvest control rules for IOTC species in relation to agreed reference points and, in doing so, shall take into account:

a) the provisions set forth in the UNFSA and in Article V of the IOTC Agreement;
b) the following objectives and any other objective identified through the Science and Management Dialogue process designed in Resolution 14/03 (or any revision thereof) and agreed thereafter by the Commission:

    i. Maintain the biomass at or above levels required to produce MSY or its proxy and maintain the fishing mortality rate at or below FMSY or its proxy;
    ii. Avoid the biomass being below BLIM and the fishing mortality rate being above FLIM;

c) the following guidelines:

    i. For a stock where the assessed status places it within the lower right (green) quadrant of the Kobe Plot, aim to maintain the stock with a high probability within this quadrant;
    ii. For a stock where the assessed status places it within the upper right (orange) quadrant of the Kobe Plot, aim to end overfishing with a high probability in as short a period as possible;
    iii. For a stock where the assessed status places it within the lower left (yellow) quadrant of the Kobe plot, aim to rebuild these stocks in as short a period as possible;
    iv. For a stock where the assessed status places it within the upper left quadrant (red), aim to end overfishing with a high probability and to rebuild the biomass of the stock in as short a period as possible.

Preliminary and precautionary Harvest Strategies are in place with elements that are designed to work together to meet the stock management objectives reflected in PI1.1.1 SG80. These strategies are either explicit (Yellowfin tuna) or composed of a combination of Resolutions (Bigeye tuna and Swordfish). Please refer to separate UoA scoring tables for species specific justifications.

8.1.4 Harvest control rules (PI: 1.2.2)

HCRs are proving challenging for some MSC assessments, in particular pelagic or migratory stocks. Stocks managed under Regional Fishery Management Organisations have challenges when implementing common fishing strategies.

HCRs are not currently defined for any of the 3 P1 stocks. However preliminary Management Strategy evaluations have been carried out for both Bigeye and Yellowfin tuna by the Technical Committee on Management Procedures (TCMP) (IOTC‐2017‐TCMP01‐R) and HCRs based on the following tuning objectives and stock management goals are under development.

Yellowfin and Bigeye tunas

The TCMP **NOTED** the default Yellowfin tuna Management Procedure (MP) assumptions, including 3 year TAC setting, 15% TAC change constraint, and tuning objectives proposed for phase 2:

(a) 50% probability of rebuilding to B(target) by 2024 (interpretation from Resolution 16/013)
(b) 50% probability B>B(target) from 2019-2039 (interpretation from Resolution 15/10)

The TCMP **NOTED** the default bigeye tuna MP assumptions, including 3 year TAC setting, 15% TAC change constraint, and tuning objectives proposed for phase 2:

(a) 50% probability B>B(target) from 2019-2039 (interpretation from Resolution 15/10)
(b) 75% probability in Kobe green zone from 2019-2039 (interpretation from Resolution 15/10)

Swordfish

The TCMP NOTED that there is currently no funding to carry out the MSE for swordfish, however, the WPM will begin to develop the MSE based on results from the 2017 assessment using existing platforms to minimize development time and associated costs.

Generally understood harvest control rules are available to ensure that the exploitation rates are reduced as stocks approach PRI and evidence is available that the suite of HCRs available for use by the IOTC (Resolution 16/02-HCRs for Skipjack Tuna refers) are appropriate and effective for controlling exploitation. In addition HCRs are being developed for each P1 stock.

Refer to separate UoA scoring tables for species specific justification.

8.1.5 Information (PI: 1.2.3)

Yellowfin and Bigeye tuna

IOTC-2017-WPTT19-R describes the information sources available for use in the stock assessments of yellowfin and bigeye tuna.

IOTC–2017–WPTT19–07 summarised the standing of a range of data and statistics received by the IOTC Secretariat for tropical tuna, in accordance with IOTC Resolution 15/02 *Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPC's)*, for the period 1950–2016. The paper also provided a range of fishery indicators, including catch and effort trends, for fisheries catching tropical tunas in the IOTC area of competence. It covers data on nominal catches, catch-and-effort, size-frequency and other data, in particular release and recapture (tagging) data.

Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.

Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule,** and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.

There is a **lack** of good information on ALL other fishery removals from the stock.

The artisanal fishery component of yellowfin catches in the Indian Ocean is substantial, accounting for catches of over 200,000 t per annum since 2012. Moreover, the proportion of yellowfin catches from artisanal fisheries has increased from around 30% in 2000 to nearly 50% in recent years.

By their nature data from artisanal fisheries are less reliable than those from industrial fisheries.

With respect to Sri Lanka:

- Catch-at-size data are not available for the Sri Lanka longline and longline-gillnet fishery.
- Catches and CPUE trends for bigeye tuna are not certain or unavailable for some artisanal fisheries including the Sri Lanka gillnet-longline fishery.
- Sri Lanka (gillnet-longline fishery): Although Sri Lanka has reported catches of bigeye tuna for it's gillnet/longline fishery, catches are considered to be too low, possibly due to the mislabelling of catches of bigeye tuna as yellowfin tuna.
- Sri Lanka (gillnet-longline): In previous years Sri Lanka has not reported catch-and-effort data as per the IOTC standards, including separate catch-and-effort data for gillnet-longline and catch-and-effort data for those vessels that operate outside its EEZ.
    - *Update*: In 2014 Sri Lanka provided more detailed catch-and-effort for the first time, which the IOTC Secretariat is currently reviewing.
- Sri Lanka (gillnet-longline): Although Sri Lanka has reported length frequency data for tropical tunas in recent years, sampling coverage is below recommended levels and lengths are not available by gear type or fishing area.
    - In 2014 Sri Lanka provided more detailed catch-and-effort for the first time, which the IOTC Secretariat is currently reviewing.

Swordfish

IOTC–2017–WPB15–R and describes the information sources available for use in the stock assessment of swordfish and includes excerpts from **IOTC–2017–WPB15–07 Rev_1.**

For a number of fisheries important for billfish catches, catch-and-effort remains either totally unavailable, incomplete (i.e., missing catches by species, gear, or fleet), or only partially reported according to the standards of IOTC Resolution 15/02, and therefore of limited value in deriving indices of abundance:

Size data for all billfish species is generally considered to be unreliable and insufficient to be of use for stock assessment purposes, as the number of samples for all species are below the minimum sampling coverage of one fish per tonne of catch recommended by IOTC; while the quality of many of the samples collected by fishermen on commercial boats cannot be verified.

With respect to Sri Lanka:

- Sri Lanka (gillnet/longline): In recent years, Sri Lanka has been estimated to catch over 15% of catches of marlins in the Indian Ocean. Although catches of marlins by species have been reported for its gillnet/longline fishery, the catch ratio of blue marlin to black marlin has changed dramatically in recent years. This is thought to be a sign of frequent misidentification rather than the effect of changes in catch rates or species composition for this fishery. Although the IOTC Secretariat has adjusted the catches of marlins using proportions derived from years with good monitoring of catches by species, the catches estimated remain uncertain.

8.1.6 Stock assessment (PI: 1.2.4)

Yellowfin tuna –

IOTC–2015–WPTT17–30 – provided a stock assessment for Yellowfin tuna in the Indian Ocean in 2015. Since then a new assessment has not been undertaken, although catch statistics and biological parameters are updated as new information becomes available.

Bigeye tuna –

1. Six stock assessment variations were presented to the IOTC for review in 2016 - IOTC–2016–WPTT18–15, 16, 17, 18_Rev1, 19, 20.
2. IOTC–2016–WPTT18–07 summarised the standing of a range of data and statistics received by the IOTC Secretariat for bigeye tuna
3. IOTC–2016–WPTT18–37 provided a summary of the biological indicators of bigeye tuna in the western India Ocean

Swordfish –

1. IOTC–2017–WPB15–20_Rev1 - a stock assessment for swordfish in the Indian Ocean

2. IOTC-2017-SC20-11 - Update on the conditioning of an operating model for the Indian Ocean swordfish stock – presented the first steps towards the development of an Operating Model for the Indian Ocean Swordfish stock.

3. A new assessment was undertaken in 2017 using stock synthesis with fisheries data up to 2015, and takes into account updated growth and maturation parameters for swordfish.

Scoring rationales are broken down by Scoring Issues (SI) in the justifications for each UoA.

8.1.7 Summary of P1 Performance Indicators

The Outcome PI for UoA 1 is tentatively scored as a "Pass with condition". Experience in other UoAs within the Indian Ocean has shown that fisheries are can at best consider yellowfin tuna as a main primary species.

Explicit and defined harvest control rules have not been developed nor operationalised for any of the three UoA P1 species.

The information available was adequate to score the fishery in pre-assessment phase, however further investigation of catch quantities, target species and validation of information would be required under full assessment.

The approximate scoring, rationales and justifications for the P1 PIs is provided in Appendix 1.

Table 5. Summary of scores for the Principle 1 performance indicators (orange-pass with condition; green-pass)

UoA 1 Yellowfin tuna

Outcome	1.1.1	Stock status	
	1.1.2	Stock rebuilding	
Management	1.2.1	Harvest strategy	
	1.2.2	Harvest control rules & tools	
	1.2.3	Information & monitoring	
	1.2.4	Assessment of stock status	

UoA 2 Bigeye tuna

Outcome	1.1.1	Stock status	
Management	1.2.1	Harvest strategy	
	1.2.2	Harvest control rules & tools	
	1.2.3	Information & monitoring	
	1.2.4	Assessment of stock status	

UoA 3 Swordfish

Outcome	1.1.1	Stock status	
Management	1.2.1	Harvest strategy	
	1.2.2	Harvest control rules & tools	
	1.2.3	Information & monitoring	
	1.2.4	Assessment of stock status	

8.2 Principle 2 – The ecosystem components

There is a distinction between 'primary' and 'secondary' bycatch species, regardless of whether they are retained or discarded – the distinction being whether there is management with reference points, a harvest control rule etc. The definition of 'main' as >5% of the total catch has been formalised for both primary and secondary bycatch species, although all mammal, reptile and bird species, as well as vulnerable species, should automatically be considered 'main' (unless they are protected, in which case they are 'ETP'). 'Primary' and 'secondary' bycatch species are further categorised as less or more resilient and in cases where a species is 'less resilient' then the threshold for definition as 'main' is reduced to >2% of the catch.

In this regard INFORMATION becomes critical – if the bycatch and catch levels are not reported to a level that the proportions of each species can be determined, then the PI is most likely to be poorly scored or at least will not score at a level that a condition will NOT be raised.

The habitat and ecosystem PI's are scored to determine that the fishery under assessment does not cause undue impacts on commonly encountered and vulnerable marine habitats and ecosystems. The level of interaction of the gear with the habitat substratum and biota will determine the level of management required to mitigate negative impacts.

Evidence of information gathering and subsequent management measures being developed and implemented are indicative of good practice and will result in a score where a condition would not be raised.

8.2.1 Primary Species (PI: 2.1.1, 2.1.2 & 2.1.3)

Under the CR v.2.0 (MSC 2014), primary species are defined as those species that are in scope but not target (P1) species "*where management tools and measures are in place, intended to achieve stock management objectives reflected in either limit or target reference points*". Secondary species' are then defined by the MSC as fish/shellfish species that do not meet the definition of 'primary' species, or species that are out of scope of the program but where the definition of endangered, threatened or protected (ETP) species is not applicable (MSC 2014).

For primary and secondary species, a 'main' designation is then given where either i) "*the catch of a species by the UoA comprises 5% or more by weight of the total catch of all species by the UoA*", ii) "*the species is classified as 'less resilient' and the catch of the species by the UoA comprises 2% or more by weight of the total catch of all species by the UoA*", or iii) in cases where a species does not meet the 2% or 5% designated weight thresholds, a species is main if the total catch of the UoA is exceptionally large, such that even small catch proportions of a P2 species significantly impact the affected stocks/populations.

SA 3.1.3.1 (MSC 2014) also requires that bigeye tuna and swordfish are considered as a P2 species in scoring UoA 1 (yellowfin tuna), and that yellowfin tuna and swordfish are considered as a P2 species in scoring UoA 2 (bigeye tuna), and that yellowfin and bigeye tuna are considered as a P2 species in scoring UoA 3 (swordfish) ; in all three cases, these were assessed as main primary species and rather than separate each according to the UoA they are assessed towards the assessments are presented here in text and can be allocated to each UoA accordingly for that UoA's scoring.

Yellowfin tuna (*Thunnus albacares*) Indian Ocean stock

The previous stock assessment for yellowfin tuna conducted by the IOTC in 2015 estimated SB2014/SB0 as 0.23 (0.21-0.36) with a probability greater than 80%.

The most recent stock assessment for yellowfin was conducted in 2016 and introduced the most recent catches and a new longline CPUE index. The updated assessment estimates SB_{2015}/SB_0 as 0.29.

For scoring, it is necessary to determine how likely the estimate of $0.29SB_0$ is above the PRI of $0.20SB_0$. No likelihood levels are reported for the stock status reported in 2015 and as such the stock can only be scored as likely above the PRI and not highly likely to be above the PRI.

The SG60 requirements are met.

The SG80 requirements are not met.

The stock is assessed currently to be below SB_{MSY} with an estimate of SB_{2015}/SB_{MSY} of 0.89 (0.79-0.99) and to have been below SB_{MSY} for six of the last eight years.

There is not a high degree of certainty (>90th %ile) that the stock is above the PRI and the stock cannot be considered to be fluctuating around a level consistent with MSY and therefore,

SG100 requirements are not met.

Bigeye Tuna (*Thunnus obesus*) Indian Ocean Stock

The previous stock assessment for bigeye tuna was conducted in 2016 and indicated, without any confidence intervals, that $SB_{2015}/SB_0 = 0.38$ and, with 80% confidence interval set, that SB_{2015}/SB_{MSY} (80% CI) = 1.29 (1.07-1.51)

The stock assessment model was designed to take into account uncertainty on stock recruitment relationship and the influence of tagging information. Considering the quantified uncertainty, which is conservative, the assessment indicates that SB_{2015} is above SB_{MSY}. Current spawning biomass is considered to at 129% of the interim target reference point of SB_{MSY} and well above the interim limit reference point of $0.2SB_0$.

It can be argued that it is highly likely that the stock is above a level consistent with MSY, but not that there is a high degree of certainty that the stock is above the PRI and therefore,

SG60 requirements are met

SG80 requirements are met

SG100 requirements are not met.

Swordfish (*Xiphius gladius*) Indian Ocean Stock

A new assessment on swordfish was undertaken in 2017 using stock synthesis with fisheries data up to 2015 and indicated, SB_{2015}/SB_{1950} (80% CI) = 0.31 (0.26-0.43) and that SB_{2015}/SB_{MSY} (80% CI) = 1.50 (1.05-2.45).

It can be argued that it is highly likely that the stock is above a level consistent with MSY, but not that

there is a high degree of certainty that the stock is above the PRI and therefore,

SG60 requirements are met

SG80 requirements are met

SG100 requirements are not met.

Main Primary species management strategies and information PIs for yellowfin, bigeye and swordfish are covered in Principle 1 as the same species are considered as Target species in each of their respective Units of Assessment. Scores under PIs 2.1.2 and 2.1.3 are expected to be higher due to the lower probability requirements reflected in Table SA9.

Primary 'minor' species (those that are managed with limit reference points and for which catches do not exceed 5%):

Skipjack tuna (*Katsuwonis pelamis*) Indian Ocean Stock – UoA catch 2016 – 95 tons or 1.25%

A new assessment on skipjack was undertaken in 2017 and indicated, SB_{2016}/SB_0 (80% CI) = 0.40 (0.35-0.47) and that $SB_{2016}/SB_{40\%SSB}$ (80% CI) = 1.00 (0.88-1.17).

The final overall estimate of stock status indicates that the stock is at the target biomass reference point and that the current and historical fishing mortality rates are estimated to be below the target. It is highly likely that the stock is above the PRI and therefore,

SG100 requirements are met.

Albacore tuna (*Thunnus alalaunga*) Indian Ocean Stock - UoA catch 2016 – 31 tons or 0.41%

SB_{2014}/SB_{MSY} (80% CI): 1.80 (1.38–2.23)
SB_{2014}/SB_{1950} (80% CI): 0.37 (0.28–0.46)

Current spawning biomass is considered to be above the target reference point of SB_{MSY}, and therefore above the limit reference point of $0.4*SB_{MSY}$

SG100 requirements are met

8.2.2 Secondary species (PI: 2.2.1, 2.2.2 & 2.2.3)

Scoring justifications are not repeated for each Unit of Assessment, although the rationales provided here refer only to a single UoA they are applicable to all three UoAs.

Table GSA2: Secondary species include fish species that are not managed according to reference points and birds/mammals/reptiles/amphibians that are not ETP species.

The designation of secondary species as either main or minor is based on the quantity of catch of that species taken by the UoA relative to the total catch of the UoA. In the case of the SLL no secondary species are caught at volumes greater than 5% and therefore each secondary species can be classified as minor based on this criterion, however for blue and black marlins:

- The Sri Lankan tuna fishing fleet is one of the main fleets catching both Black and Blue Marlins in the Indian Ocean, contributing approximately 19% and 6% of total catches per species respectively in the Indian Ocean (IOTC–2017–WPB15–R).
- the Unit of Assessment however is attributed a much lower proportion of the catches as it excludes those tuna vessels using gillnet and gillnet-longline combination gear.
- the vessels forming the 'proposed UoA' carry ONLY longline gear on-board and fish exclusively with that gear targeting tunas for the fresh fish export market.
- there is uncertainty of UoA fleet designation (total catches of blue marlin in Sri Lanka are significant at 6% of Indian Ocean total catch but UoA catch at 2.16%);
- feedback from stakeholders indicated emphasis on blue marlin as a main secondary species contributing significantly to the catches of the UoA; and
- Blue marlin is listed as Vulnerable by the IUCN.
- There is ongoing debate about the designation of secondary species as either main or minor (the PNA western and central pacific skipjack and yellowfin tuna purse seine assessment refers)

Therefore both blue marlin and black marlin are scored as secondary main species.

Black Marlin (*Maikara indica*) Indian Ocean Stock – UoA catch 2016 – 292 tons or 3.75%

B_{2015}/B_{MSY} (80% CI): 0.81 (0.55-1.10)

B_{2015}/B_{1950} (80% CI): 0.30 (0.20-0.41)

F_{2015}/F_{MSY} (80% CI): 2.42 (1.52-4.06)

The current catches of Black Marlin in the Indian Ocean (average of 17,373 t in the last 3 years, between 2013-2015) are considerably higher than MSY (9,932 t) and the stock is overfished ($B_{curr} < B_{MSY}$) and currently subject to overfishing ($F_{curr} > F_{MSY}$).

According to the national scientific report submitted to the IOTC by Sri Lanka (IOTC-2017-SC20-NR25) the longline fleet caught 2068 tons of Black Marlin in 2016. These catch statistics however include catches from vessels retaining black marlin as bycatch when targeting tunas and swordfish with both longline and longline-gillnet combination gear.

The proposed Unit of Assessment fishing with longline gear only caught 292 tons of Black Marlin in 2016 or 1.5% of the total catches in the Indian Ocean.

Black marlin is likely to be above the point of recruitment impairment and the UoA is not likely to hinder the recovery of the species as the catches reported are negligible in comparison to the rest of the Indian Ocean fisheries.

SG60 requirements are met

The uncertainty in quantity of black marlin caught by the UoA results in this PI being scored with caution. The stock is considered to be overfished and with overfishing occurring. The Unit of Assessment does not have a **demonstrably effective partial strategy** in place such that it does not hinder recovery and rebuilding of the black marlin stock.

SG80 requirements are not met
SG100 requirements are not met

Blue Marlin (*Maikara nigricans*) Indian Ocean Stock – UoA catch 2016 – 212 t or 2.16%

B_{2015}/B_{MSY} (80% CI): 1.11 (0.90–1.35)
B_{2015}/B_{1950} (80% CI): 0.56 (0.44 – 0.71)
F_{2015}/F_{MSY} (80% CI): 1.18 (0.80–1.71)

The current catches of Blue Marlin in the Indian Ocean (average of 14,799 t in the last 5 years, 2011-2015) are higher than MSY (11,926 t) and the stock is currently being overfished ($F_{curr} > F_{MSY}$).

According to the national scientific report submitted to the IOTC by Sri Lanka (IOTC-2017-SC20-NR25) the longline fleet caught 467 tons of Blue Marlin in 2016. These catch statistics however include catches from vessels retaining blue marlin as bycatch when targeting tunas and swordfish with both longline and longline-gillnet combination gear.

The proposed Unit of Assessment fishing with longline gear only caught 212 tons of Blue Marlin in 2016 or 1.4% of the total catches in the Indian Ocean.

Blue marlin is likely to be above the point of recruitment impairment and the UoA is not likely to hinder the recovery of the species as the catches reported are negligible in comparison to the rest of the Indian Ocean fisheries.

SG60 requirements are met

The stock is considered to be overfished and with overfishing occurring. The Unit of Assessment does not have a **demonstrably effective partial strategy** in place such that it does not hinder recovery and rebuilding of the blue marlin stock.

SG80 requirements are not met
SG100 requirements are not met

The MSC CR. V2.0 requires, for there to be a "high degree of certainty" that minor primary species are above biologically based limits, a probability of 80% confidence.

Striped marlin (*Istiophorus platypterus*) Indian Ocean Stock – UoA catch 2016 – 5152 kg or 0.07%

F_{2015}/F_{MSY} (Range): (1.32–3.04)
B_{2015}/B_{MSY} (Range): (0.24–0.62)
B_{2015}/B_{1950} (Range): (0.09.–0.32)

A new assessment was conducted in 2017 indicating and confirming previous assessments that concluded the striped marlin stock in the Indian Ocean is both overfished and overfishing is still occurring (as has been the case for the last twenty years).

Catches by the UoA are not likely to hinder the recovery of the stock as the levels are very low in relation to other fleets fishing for the species. There are available measures that can be applied by the UoA to allow for recovery of the stock within Sri Lankan waters - it is recommended that striped marlin be placed on a catch prohibition legislation document such as the likes of that for the Red Rockcod/Thanbuwa (***Cephalopholis sonnerati).***

SG100 requirements may be tentatively met although the issue relates mostly to the regional jurisdiction and state of the stock.

Kawakawa (*Euthynnus affinis*) Indian Ocean stock – UoA catch 2016 – 2891 kg or 0.04%

F2013/FMSY [*] = 0.98 [0.85‑1.11]
B2013/BMSY [*] = 1.15 [0.97‑1.38]
B2013/B0 [*] = 0.58 [0.33‑0.86]

A stock assessment was carried out in 2015 and the stock is considered to be not overfished and nor is overfishing taking place (although simple and data poor assessment methods were applied). It is recommended that the rate of increasing catches in the Indian Ocean be slowed.

The stock is highly likely to be above the PRI and SG100 requirements are met.

Indo-Pacific sailfish (*Istiophorus platypterus*)– UoA catch 2016 – 98 tons or 1.3%

F2014/FMSY (80% CI): 1.05 (0.63–1.63)
B2014/BMSY (80% CI): 1.13 (0.87–1.37)
B2014/B0 (80% CI): 0.56 (0.44–0.67)

The stock assessment applied in 2015 indicated that the stock is not yet overfished but that it is subject to overfishing. The aspects of the biology, productivity and fisheries for this species combined with the data poor status on which to base a more formal assessment are causes for concern. There is a high degree of certainty that the indo-pacific sailfish is above biologically based limits as the stock was assessed, albeit with data-poor methods, in 2015 by the IOTC to be at 113% of the biomass level that can sustain maximum sustainable yields.

Indian scad, Blue shark, bullet tuna, rainbow runner, Spanish mackerel, wahoo and frigate tuna combined catches make up only 1.50% % of the total UoA catch and are therefore not scored as individual components but are passed at the SG100 level as the UoA is not likely to deplete or hinder the recovery of these species.

Other bony fishes includes: Rockfish, cuttlefish, unidentified sharks, dolphinfish, bigeye scad, triggerfish, unidentified sailfish, unidentified marlins, paramuwa, maduwa, lalawa, sapuru, seer, bayita, habarali, kata, sawara, surutta, siviya and wanna kata, that make up approximately 0.39% of the total catch.

The low catches of the secondary species in the SLL fishery almost certainly have negligible impact on their stocks. While there is no evidence that all these species are highly likely to be above biologically based limits, especially for the *Rockfish* reef-associated species, it is highly likely that the UoA does not hinder their recovery or rebuilding of minor species.

The cumulative impacts of the SLL UoA catch combined with the recently certified Echebaster Skipjack purse seine and the Maldives pole and line fishery are accounted for and do not affect the status of these minor secondary in the Indian Ocean.

SG100 is met for minor secondary species.

Secondary species management strategy

There are ***measures*** in place that make up the foundations of a management strategy (the fleet is registered; catches are submitted in logbooks; port sampling program; observer program in place for larger vessels/being developed for smaller vessels; VMS monitoring) but these are NOT measures to reduce the catches of targeted secondary species nor reduce catches of unwanted secondary species.

The catches of secondary species is a very small proportion of the total catches in the Indian Ocean and it is not likely that the UoA is hindering the recovery of either main or minor secondary species and so the level of management intervention required would be low.

The total catches by the UoA are uncertain and the SLL may be having an effect on the recovery of the main secondary species. Therefore measures should be developed by the SLL to reduce the fishing mortality on those main secondary species and further a strategy should be developed.

There is a wide range of secondary minor species for which the catch rate of the UoA is very low.

There is no evidence of a strategy in place for managing the minor secondary species caught by the UoA and therefore the SG100 requirements are not met.

For scoring issue (d) on shark finning – it is highly likely that shark finning is not taking place as whole sharks are landed by vessels in the UoA and there is no evidence of fins being landed separate from the trunks. There is however not a high degree of certainty of this as coverage of the fleet by observers does not extend to the large majority of vessels that are under 24m in length.

There is no known unwanted catch of secondary species within the UoA, however some degree of clarification will be required during a full assessment to include or exclude certain species (i.e. rockfish, triggerfish) from the UoA catches before stating this with absolute confidence.

Alternative measures and gear types and best-practice techniques are being explored by the SLL with regards to the live-release of ETP species and this will be applicable if there are in fact unwanted species within the fishery.

Secondary species information

Some quantitative information is available to assess the impact of the UoA on secondary species. This information is reported to DFAR through logbook submissions as well as through research and port sampling programmes.

Whether information is adequate to support a strategy on all secondary species is unclear as the veracity of catch data reported by skippers in the large majority of the fleet (vessels <24m) cannot be confirmed as this portion of the fleet does not carry scientific observers.

During a full assessment the proposed UoA and subsequently its defined catches would need to be confirmed and quantified.

At this stage the UoA should pass this PI, the quantified information may be viewed as only qualitative during a full assessment as there is some uncertainty around the accuracy of reporting by skippers.

8.2.3 Endangered, Threatened and Protected species (PI: 2.3.1, 2.3.2, 2.3.3)

Sharks

The reported catches of silky shark show in the IOTC area show a peak just prior to 2000 followed by a steady decline, this based almost exclusively on data from the Sri Lankan longline-gillnet combination fisheries.

The average annual catch of silky shark in the SLL for 2016 is estimated to be about 47 t (851 individuals) or 0.6% of the total catch. The species is retained by the fishery and no attempts are made to release the sharks alive.

The 2016 catch of shortfin mako sharks was approximately 5.5 t (131 individuals) or 0.07% of the total catch. The species is retained by the fishery and no attempts are made to release the sharks alive.

The 2016 catch of hammerhead sharks was approximately 115 individuals or 4646 tons, 0.06% of the total UOA catch. Scalloped hammerheads are likely to make up a portion of the total hammerhead shark catch.

IOTC CMM Resolution 17/05 On the conservation of sharks caught in association with fisheries managed by the IOTC revolves to a large degree around the 'full utilisation' of landed sharks. Also it encourages the live release of unwanted or prohibited species and requests that CPCs undertake research to:

(a) identify ways to make fishing gears more selective, where appropriate, including research into the effectiveness of prohibiting wire leaders;
(b) improve knowledge on key biological/ecological parameters, life-history and behavioural traits, migration patterns of key shark species;
(c) identify key shark mating, pupping and nursery areas; and
(d) improve handling practices for live sharks to maximise post-release survival.

IOTC CMM Resolution 13/05 On the conservation of whale sharks (*Rhincodon typus*) states:

"CPCs using other gear (other than purse seine nets) *types fishing for tuna and tuna-like species associated with a whale shark shall report all interactions with whale sharks to the relevant authority of the flag State…"*

IOTC CMM Resolution 12/09 On the conservation of thresher shark (family Alopiidae) caught in association with the fisheries in the IOTC area of competence.

National legislation – the **Shark Fisheries Management Regulations, 2015**, prohibits the finning of any shark species at sea or the transhipment of fins and prohibits the catching and landing of the following species:

1. Shark species of the Family Alopidae;
    a. *Alopias vulpinus*
    b. *Alopias superciliosus*
    c. *Alopias pelagicus*
2. *Carcharhinus longmanus*
3. *Rhincodon typus*

The Sri Lanka National Plan of Action for the Conservation and Management of Sharks (SL-NPOA-SHARKS) formalised in December, 2013 and is currently being implemented.

Issues identified (and ranked) in the NPOA include but are not limited to the following social and economic issues:

- Loss of employment to fishers engaged in directed coastal thresher shark fishing due to the ban (High)
- Negative impact of the thresher shark ban on the production of and trade in dry fish thus affecting those involved in those activities (Medium)
- Loss of income to fin traders due to decline of demand for shark fins in the international market and ban on thresher shark (Medium)
- **Lack of compliance by the fishers with current regulations on sharks and protection of critical habitats (High)**
- Inadequacy of awareness programs conducted on regulations for fishing communities (High)
- **Lack of knowledge on the importance and need for conservation and management of shark resources among the fishermen (High)**
- Difficulties experienced in releasing live of specimens of the prohibited species (thresher sharks) caught incidentally (Medium)
- Misidentification and under-reporting of shark catches (High)
- **Absence of an onboard observer scheme for validation of data (High)**
- Absence of data collection scheme for shark species caught in the coastal waters (Medium)
- Lack of data on shark products (High)
- Inadequate consultation with stakeholders prior to the introduction of the ban on catching thresher sharks (High)

When investigating these issues it becomes clear that certain shortfalls feed others – for example the lack of an at-sea observer program in a fishery where there is low compliance by fishers becomes a far more significant issue.

The National Port Sampling Program covers in excess 15-18% of total landings and focuses on the multiday and single day large pelagics fishery.

There is also a question regarding the level of enforcement of the law with respect to shutting down the thresher shark fishery and reducing the livelihoods of so many fishermen. In 2017 there was a single investigation into the landing of a thresher shark. Further consultation and a site visit to estimate the level of compliance with national regulations would be imperative for a full assessment.

There is no evidence of shark finning within the UoA and all sharks are landed whole. Although oceanic whitetip, thresher and whale sharks were caught by the UoA in 2016 (Table 4) all individuals were discarded rather than retained on board and landed.

Cetaceans

IOTC CMM Resolution 13/04 on the conservation of cetaceans states:

"*CPCs using other gear types* (other than purse seine nets) *fishing for tuna and tuna-like species associated with cetaceans shall report all interactions with cetaceans to the relevant authority of the flag State…. "*

Turtles

IOTC CMM Resolution 12/04 On the conservation of marine turtles, governs management and measures within the region. Marine turtles are also legally protected in Sri Lanka.

A report describing the implementation of the FAO Guidelines to Reduce Sea Turtle Mortality in Fishing Operation in 2015 was submitted to IOTC in January 2016. Longline vessels are required to have dehookers for removal of hooks and a line cutter on board, to release the caught marine turtles. Gillnets longer than 2.5 km are now prohibited in domestic legislation. Reporting of bycatch has made legally mandatory and facilitated via logbooks.

Seabirds

Sri Lanka has negligible interaction with seabirds.

IOTC CMM Resolution 12/06 On reducing the incidental bycatch of seabirds in longline fisheries.

8.2.4 Habitats (PI: 2.4.1, 2.4.2 & 2.4.3)

Fishing takes place in both coastal and high-seas waters.

In tuna fisheries, which target fish in open waters, there is not likely to be a significant interaction of fishing gear with seabed habitats.

The offshore and high seas component of the SLL fishery operates entirely at the surface in deep, oceanic water and the longline gear does not contact the seabed. Any pelagic habitat impacts will be imperceptible and highly impermanent.

Lost gear may consist of monofilament and/or hooks and is only likely to continue to fish as long as bait remains on the hooks. Bait is stripped relatively quickly off the hooks and lost hooks will accumulate in the deep oceanic benthos and degrade in time.

WWF describe non-demersal longline gear as *minimally damaging fishing gear with no or negligible interaction with the seafloor* (WWF (2015). Ecological sustainability evaluation of seafood: Guidelines for Wild Catch Fisheries, Version 2.0.)

Within the small boat artisanal single day sector lines are set at depths of 50-80 m, between 15 and 25 km from the coastline - in the inshore coastal north-eastern and north-western fishing grounds, (Dissanayake, D. C. T., Samaraweera, E. K. V., & Amarasiri, C. 2010).

A group of fishes collectively represented as *rockfish* in the catch data, and making up approximately 6700 kg or 0.08% of the catch in 2016, are primarily made up of Lutjanids and Letherinids. The presence of these fish in the catches could indicate the interaction of "floating longline" gear with reef habitats. All catches of rockfish in 2016 came from within the EEZ and from a total of 136 longline sets (out of 66 000 sets). The relatively low number of sets which may be interacting with biogenic reef habitats (minor habitat or VME habitat) indicates that it is highly unlikely that those interactions are reducing the structure and function of VME coral reef habitats, though evidence to this is not available. In addition with the structure of the proposed UoA the vessels associated with these catches will need to be investigated further to ensure that they are deploying only longline gear.

Turtle nesting habitats have been identified on the beaches along the Sri Lankan coastline. There is no evidence that lost fishing gear, monofilament lines and/or hooks, are highly unlikely not to have an effect on these habitats.

Weekly forecasts are broadcast to longline vessels targeting tuna for the export market (proposed UoA). Those vessels are incentivised by the availability of larger fish to fish further offshore and further encouraged by the forecasts that identify areas of best possible catches based on near-real time satellite data on sea-surface temperature and fish environmental preferences. The forecasts (example Figure 14) encourage longline operators to target fish further offshore and in the high-seas thus reducing the chance of interactions of fishing gear, deployed or lost, with any nearshore vulnerable reef or turtle feeding habitats.

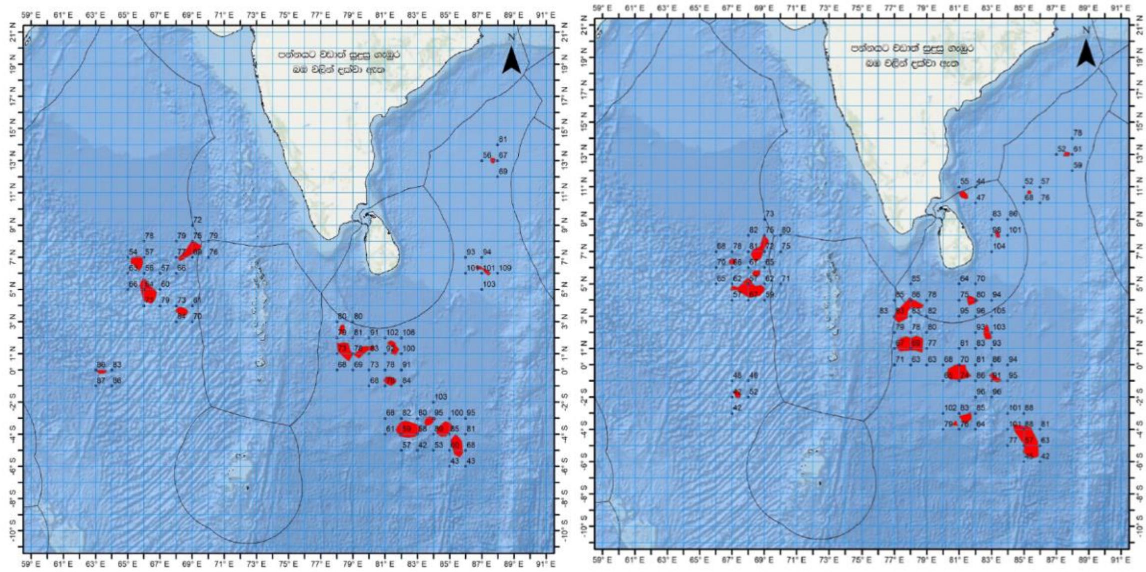


Figure 14: Two examples of the weekly forecast email sent out by NARA indicating best areas for longline fishing. In this example, which is characteristic of others, the most likely fishing areas are far offshore in deep oceanic waters outside of the Sri Lankan EEZ.

Currently, information on the number of hook set is recorded by skippers in logbooks for each set (Figure 15). The proportion of hooks that are lost or amount of line that is lost at sea is not collected on the same or any other logbook form. Some observer trips have been undertaken by larger vessels in the fleet, however again the number of hooks lost is not recorded on the forms but it is likely observed and could be incorporated easily into that program.

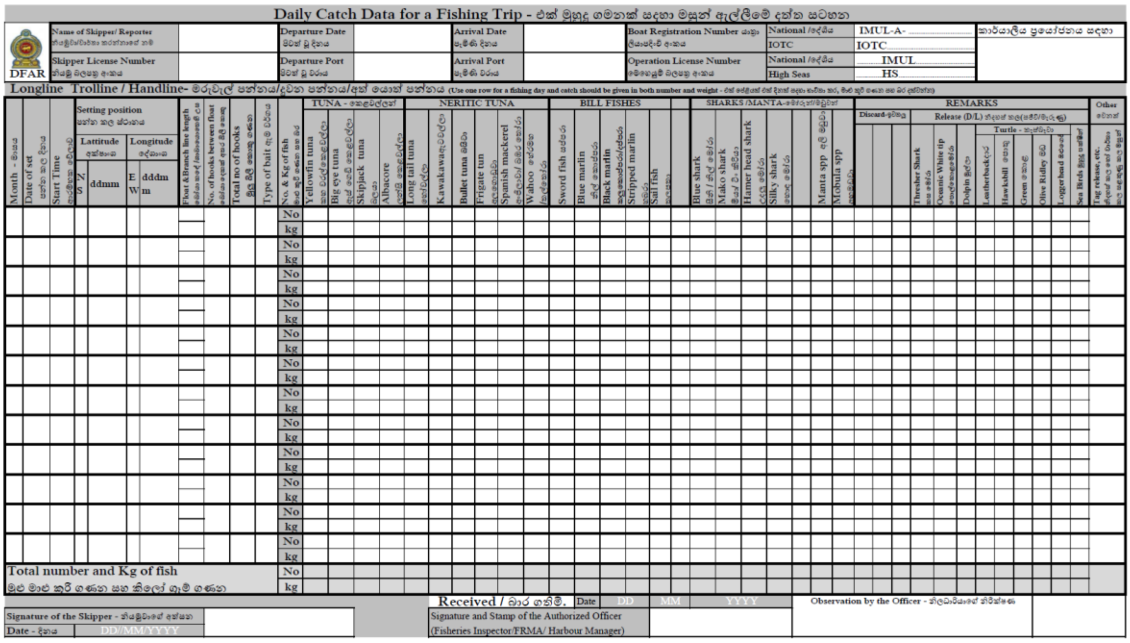


Figure 15: Example of the Sri Lankan Longline fishery Daily Catch Data logbook form completed by skippers and submitted to DFAR.

8.2.5 Ecosystems (PI: 2.5.1, 2.5.2 & 2.5.3)

Fisheries inevitably change ecosystems. Fisheries act as a top predator within an ecosystem and can unbalance natural systems by reducing the numbers of natural top predators or by outcompeting them

for resources. The level of effect on the ecosystem will depend on the magnitude of the fishery removals and on the functional roles of the fish being removed. In the case of tuna fisheries and pelagic ecosystems, there is a lack of data and understanding of the effects on the functioning of the ecosystem in a natural state, let alone the effect of fisheries on that state. The magnitude of the removals can provide some indications of the likelihood of effects having occurred or occurring in future.

The scale of catches of the UoA is a very small proportion of the total catches in the Indian Ocean (Table 6). At such a small scale it is unlikely that the UoAs under assessment would lead to irreversible ecosystem impacts. At a regional scale, the latest stock assessments for bigeye and swordfish suggest that both stocks are being maintained above B_{MSY} level. The same is not the case for yellowfin tuna however and, although catches by the UoA are a small proportion of the total catch in the Indian Ocean, it cannot be said that it is highly unlikely that the fishery won't disrupt the recovery of this species.

Table 6: The proportion of total catches within the IOTC area of jurisdiction (2015/2016) attributable to the SLL for managed species, for which data were readily attainable.

Common name	Scientific name	Total IOTC Catch all gears (tons)	Total SLL catch (tons, reported by DFAR)	SLL proportion of total IOTC reported catch
Yellowfin tuna	*Thunnus albacares*	412679	5079.7	1.23%
Swordfish	*Xiphius gladius*	39700	771.3	1.94%
Bigeye tuna	*Thunnus obesus*	85589	753.1	0.88%
Black marlin	*Makaira indica*	18954	292.1	1.54%
Blue marlin	*Makaira nigricans*	15482	211.9	1.37%
Indo-Pacific Sailfish	*Istiophorus platypterus*	29311	97.9	0.33%
Skipjack tuna	*Katsuwonis pelamis*	446721	95.5	0.02%
Albacore tuna	*Thunnus alalunga*	34726	31.4	0.09%
Striped marlin	*Tetrapturus audax*	4369	5.2	0.12%

Bait species are predominantly imported, in large quantities (Table 7), into Sri Lanka. It is not certain if all the bait are used on longline vessels operating within the UoA or if a portion of the imports are used by vessels in other sectors not forming part of the UoA (gillnet-longline, handline etc.). Some vessels use live bait from wild-capture such as flying fish and bigeye scad, however the quantities and fishing locations are not available for the live bait catch component.

Currently (2017) sardines and milk fish for baits are the preferred bait species for import as squids are very expensive. Bait is imported from countries such as China, Taiwan, Indonesia and the Philippines.

Table 7: Quantities of frozen squid (2016) and milkfish (2017) imported into Sri Lanka.

2016	Frozen squid	2017	Milkfish (*Chanos chanos*)
Company	Quantity (tons)	**Company**	Quantity (tons)
Company A	944.9215	**Company 1**	80.5
Company B	1911	**Company 2**	126

Company C	503.975	**Company 3**	494
Company D	554.995	**Company 4**	315
Company E	1498.41955	**Company 5**	52
		Company 6	184.24
Total Imported	**5413.31105**	**Total Imported**	**1251.74**

There is no evidence of explicit ecosystem objectives in Management Plans however, the *Ten year development policy framework of the fisheries and aquatic resources Sector, 2007-2016, published by MFARD in 2007 states:*

"…the coastal habitats such as mangroves, sea grass beds, coral reefs and estuaries are among the most productive eco-systems and play a major role in supporting fisheries and these need to be conserved and protected. Further the dynamics of fishery resources in the near shore marine waters and coastal water bodies such as lagoons and estuaries are closely interlinked with the dynamics of the rest of the Coastal Zone, its resources and resource use…"

This refers to the inshore and coastal areas and recommends protection and management through Integrated Coastal Zone Management. The offshore ecosystem environment is managed through compliance with IOTC CMMs. The Compendium of Active Conservation and Management Measures for the Indian Ocean Tuna Commission lists and describes the full toolbox of measures in place to conserve the greater Indian Ocean Ecosystem.

Further information on the ecosystem components and nature of Sri Lanka's offshore resources as well as stock assessment updates will be forthcoming from the most recent joint initiative with the Norwegian research vessel RV Dr Fridtjoff Nansen.

8.2.6 Summary of P2 Performance Indicators

For UoA 1 PI 2.1.1 is assessed as scoring an unconditional pass where bigeye tuna and swordfish are assessed as primary main species.

PI 2.1.1 is scored between 60-79, pass with condition, for UoAs 2 and 3 as yellowfin tuna is considered as a primary main species within those UoAs. The stock of yellowfin tuna in the Indian Ocean is likely to be above the PRI but not highly likely and so that component does not meet the SG80 requirements.

PI 2.2.1 and PI 2.2.2 both pass with a condition for all UoAs. The key area of concern here is the status of the blue and black marlin stocks in the Indian Ocean and the degree to which the UoA is hindering the recovery of those stocks. There are measures in place to manage the SLL but partial or full strategies should be developed to confirm that the SLL is not contributing to the overfishing of those stocks.

PI 2.3.1 is scored at below 60. This relates primarily to the number of interactions with *Prohibited Species* and the UoA related mortality of dolphins and whales. Further there is uncertainty in the post-release survival statistics reported by the fleet.

PI 2.3.2 is scored with a conditional pass as there are National Plans of Action in place for sharks and turtles and there is legislation in place for other ETP species.

PI 2.3.3 is scored at below 60. The information provided by skippers cannot be verified as there is no monitoring of catches at sea nor of the quantities of species discarded or the post-release survival of ETP species. Fisher knowledge of ETP species is low and the importance of accurate reporting is not considered to be respected by the fleet members. Information is not considered adequate for the development of a management strategy, nor to determine the outcome status of ETP species.

PI 2.4.1 passes with a condition being raised. There is a degree of uncertainty with respect to the level of interaction of drifting longline fishing gear with vulnerable tropical reef habitats. Until such a time as evidence is provided that gear does not entangle and damage those habitats then this PI cannot score an unconditional pass.

PI 2.5.2 and PI 2.5.3 raise a condition each. An ecosystems approach to fisheries is not entrenched in Sri Lankan legislation and this should be a component of the fishery that is developed by the FIP. Information on the main effects of the UoA on ecosystem structure and functioning is sparse.

We stress that information is critical for P2 and this desktop assessment was restricted to the information available to us.

The approximate scoring, rationales and justifications for the P2 PIs is provided in Appendix 1.

Table 8. Summary of estimated scores for Principle 2 Performance indicators.

Primary species	2.1.1	Outcome	
	2.1.2	Management strategy	
	2.1.3	Information/Monitoring	
Secondary species	2.2.1	Outcome	
	2.2.2	Management strategy	
	2.2.3	Information/Monitoring	
ETP species	2.3.1	Outcome	

	2.3.2	Management strategy	
	2.3.3	Information strategy	
Habitats	2.4.1	Outcome	
	2.4.2	Management strategy	
	2.4.3	Information	
Ecosystem	2.5.1	Outcome	
	2.5.2	Management	
	2.5.3	Information	

8.3 Principle 3 – The management system

8.3.1 Legislative and policy framework (PI 3.1.1, 3.1.2 & 3.1.3)

3.1.1 - The management system exists within an appropriate and effective legal and/or customary framework

3.1.2 The management system has effective consultation processes that are open to interested and affected parties.

3.1.3 The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach

8.3.2 Fishery-specific management systems (PI 3.2.1, 3.2.2, 3.2.3 & 3.2.4)

3.2.1 The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2

3.2.2 The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives

3.2.3 Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with

3.2.4 There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives. There is effective and timely review of the fishery-specific management system

8.3.3 Summary of P3 Performance Indicators

Overall there are no major issues with Principle 3. As with other scores we stress that a full assessment team may find information that may alter the scoring.

Table 9. Summary of estimated scores for P3 performance indicators

Governance and policy	3.1.1	Legal &/or customary framework	
	3.1.2	Consultation, roles & responsibilities	
	3.1.3	Long term objectives	
Fishery specific management system	3.2.1	Fishery specific objectives	
	3.2.2	Decision making processes	
	3.2.3	Compliance & enforcement	
	3.2.4	Monitoring & management performance evaluation	

9.0 Other Relevant Fisheries

Two recent and or ongoing assessments pertinent to the stocks in the Indian Ocean (IOTC) are:

1. The Maldivian pole and line skipjack tuna fishery https://fisheries.msc.org/en/fisheries/maldives-pole-line-tuna/@@assessments
2. The Echebaster Indian Ocean skipjack tuna purse seine fishery. https://fisheries.msc.org/en/fisheries/echebastar-indian-ocean-purse-seine-skipjack-tuna/@@assessments

10.0 RECOMMENDATIONS

Overall the Indian Ocean SEASL Longline Fishery for yellowfin tuna, bigeye tuna and swordfish was assessed to be unlikely to pass full assessment due to a number PIs scoring <60 and the likelihood that the aggregate scores for Principles 1, 2 & 3 will not achieve a score of over 80. The main focus points, issues and recommendations are discussed here.

Principle 1 – The Target Stocks:

During the pre-assessment three Units of Assessment were identified. P1 performance indicators were scored for each UoA separately and it is through the scoring of this principle that the greatest variation in overall scoring among the UoAs will come from during a full assessment.

YFT PI 1.1.1 Score = 60 – 79, PI 1.2.2 Score 60-79, PI 1.2.3 Score 60-79

There is ongoing controversy over the certification of fisheries either targeting yellowfin tuna or catching it as a main bycatch species in the Indian Ocean. In Indian Ocean Maldives pole and line tuna fishery, the yellowfin component of the fishery was suspended in 2016 – this was due to the overfished status of yellowfin tuna. More recently the WWF has formally objected to the Echebaster Indian Ocean Skipjack Purse seine fishery achieving certification - yellowfin is a significant bycatch species in that fishery - citing the overfished status of the stock and the lack of harvest control rules the main reasons for the objection. The same justifications are applicable to the SLL and it must be noted that during a full assessment there is a high probability that certification of the SLL will be challenged on the scoring of Principle 1 PIs.

Based on the pre-assessment scores for the yellowfin UoA the fishery will likely not achieve MSC certification as the aggregate score will amount to less than 80. Further with the current overfished status of the yellowfin stock in the Indian Ocean and the lack of clear HCRs, until the IOTC responds or the stock shows signs of recovery then PI's 1.1.1 and 1.2.2 are likely to be scored at less than 60 during a full assessment.

BET & SWO PI 1.2.2 Score 60-79, PI 1.2.3 Score 60-79

Much the same as for yellowfin tuna, the lack of clear and defined HCRs for bigeye tuna and swordfish in the Indian Ocean is likely to be a focal point during a MSC full assessment of the SLL. Although the outcome PIs for these two UoAs and species are likely to achieve an unconditional pass due to the favourable stock status of both, there is a possibility that the aggregate score for Principle 1 will be marginally above or below 80 due to the scoring of PIs 1.2.2 and 1.2.3.

Principle 2 – The Ecosystem Components

Elements of the Principle 2 component of the SLL assessment are likely to cause the fishery to fail under full assessment. The status of yellowfin tuna in the Indian Ocean is the main reason for concern when scoring Principle 2 Primary species outcome component PI 2.1.1. Although there are two other relevant MSC fisheries in the Indian Ocean where yellowfin tuna are designated as main primary species, those fisheries have recently come under pressure from international NGOs with respect to the yellowfin component of their catches. The SLL UoAs targeting bigeye tuna and swordfish would be subject to the same scrutiny following full assessment.

Guidance on the designation of species as primary or secondary and main or minor is provided in the FCR. The status of blue, black and striped marlins and indo-pacific sailfish in the Indian Ocean is a point of concern when these species are caught in large volumes by any fishery aiming to achieve MSC certification. The SLL catches both black and blue marlin and there may be a risk that the SLL is hindering the recovery of those stocks in the Indian Ocean. With the issues related to the number of

vessels to be included in the UoA (as detailed earlier in the report) these species were scored as secondary main as per the precautionary approach. Clarification of the catches by the UoA would be required during a full assessment.

The issues related to ETP species are clear cut. Sri Lanka has both NPOAs as well as prohibitive legislation relating to sharks, turtles and mammals. The SLL is exceeding the limits set out in that legislation and will fail the outcome component of the ETP scoring under full assessment.

Another point to note is the regional concern over the status of silky shark. Where, based on the volume caught by the SLL, the species would be considered as a secondary minor it is instead scored under the ETP species PIs due to its vulnerable status. The SLL under full assessment would need to show that it has measures in place and provide evidence that those measures are effective at minimising the mortality of silky shark (and hammerhead and thresher sharks).

The lack of any observer program on the majority of boats and the limited port sampling program coupled with unreliable reporting of ETP species catch and discards by skippers are valid justifications for the fishery to score less than 60 for PI 2.3.3.

BET & SWO PI 2.1.1 Score = 60-79

Yellowfin tuna is considered as a primary 'main' species in UoA 2 and UoA 3. Based on the empirical evidence and the likelihood that the stock is above the PRI this PI will score >60, however, for the same reasons as detailed above, there is a risk that this PI may cause the fishery to fail during a full assessment as the aggregate score will be less than 80.

All UoAs, PI 2.2.1 Score = 60-79, PI 2.2.2 Score = 60 – 79

The key area of concern here is the status of the blue and black marlin stocks in the Indian Ocean and the degree to which the UoA is hindering the recovery of those stocks. There are measures in place to manage the SLL but partial or full strategies should be developed to confirm that the SLL is not contributing to the overfishing of those stocks.

All UoAs, PI 2.3.1 Score <60

The level of bycatch of turtles, whales, dolphins and sharks and prohibited species can be estimated qualitatively and exceeds national and international limits. Further quantitative catch data needs to be collected and reported to confirm numbers of ETP species interactions.

All UoAs, PI 2.3.2 Score = 60-79

There are National Plans of Action in place for sharks and turtles and there is legislation in place for other ETP species. Evidence that there is application and uptake of these plans by the fleet and fishers will need to be provided during a full assessment.

All UoAs, PI 2.3.3 <60

The information on ETP species interactions provided by skippers cannot be verified as there is no monitoring of catches at sea, nor of the quantities of species discarded, and there is uncertainty in the post-release survival statistics reported by the fleet. Fisher knowledge of what constitutes an ETP species is low and the importance of accurate reporting is not considered to be respected by the fleet members. Information is not considered adequate for the development of a management strategy, nor to determine the outcome status of ETP species.

Principle 3 – The Management System

Overall there are no major issues with Principle 3. The IOTC governance of tuna stocks, billfish and sharks species as well as ETP species, the Legal and Customary frameworks put in place, the consultation procedures and the designation of roles and responsibilities are all fairly well established and subject to review processes. The IOTC has long-term objectives and goals in place to ensure sustainable utilisation of stocks under their management.

The fishery specific objectives of the SLL are currently under review and improvement. Following the EU Ban on Sri Lankan tuna exports, and through the MSC, the SLL has entered into a FIP. These components were scored at below an unconditional pass as they are still undergoing improvement. Under full assessment there may be an issue with the compliance and enforcement aspects of the SLL and evidence will need to be provided to satisfy passing PI 3.2.3.

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APPENDIX 1. PRELIMINARY EVALUATION OF THE FISHERY AGAINST THE MSC STANDARD (V2.0)

The certification of a fishery depends upon its compliance with the MSC Standard. During a full certification assessment, compliance will be determined by applying the full MSC scoring system.

The MSC standard is divided into three key Principles. The three principles pose the following questions :

- Principle 1 : Is the stock status good? Can the management system maintain a healthy stock, or allow the stock to rebuild if it is depleted?
- Principle 2 : Does the fishery have impacts on habitats, ecosystems or other species?
- Principle 3 : Is the management system effective and precautionary?

In the standard MSC assessment, the assessment teams scores the fishery following the Fisheries Assessment Methodology or FAM. In the FAM, each Principle is composed of a series of 'performance indicators' (PIs) which measure some element of the Principle. Each PI is scored by the assessment team using a series of 'Scoring Guideposts' (SGs). A score between 80-100 is an unconditional pass, a score of 60-80 is a score with conditions, while a score <60 for any PI means that the fishery will fail the assessment. In addition, each Principle must score an average score over all PIs of 80 or more. During the Pre-assessment process a definite score is not allocated to each PI but rather a "likely scoring level" category is awarded to the PI, this is due to the provisional nature of the pre-assessment. The PIs are set out in Table 2.

The key to the likely scoring levels is also given below:

Information suggests fishery is not likely to reach SG60 and therefore would fail on this PI	**<60**
Information suggests fishery will reach SG60 but may need a condition for this PI	**60-79**
Information suggests fishery is likely to exceed SG80 resulting in an unconditional pass for this PI	**≥80**

Green = predicted score 80 or above; orange = predicted score 60-80 (condition); red = predicted score >60 (pre-condition). Two colours in one box means that it is difficult to predict the outcome with any confidence. Summary explanation for predicted score is given in 'comments' box.

Note: For this pre-assessment we have provided provisional scores. We stress that these scores are indicative of a likely score under full assessment and that under full assessment the appointed team would undertake a more thorough consultative process, a more exhaustive data gathering exercise and, with a higher level of scrutiny and judgment, might derive different scores.

Principle 1

UoA1 – Yellowfin Tuna (Thunnus albacares) Indian Ocean Stock

Component	Outcome		
PI 1.1.1- Stock status	**The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Stock status relative to recruitment impairment	It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI	There is a **high degree of certainty** that the stock is above PRI
(b) Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
Justification/Rationale			
PRI = $0.20B_{0.}$ SB_{2014}/SB_0 = 0.23 (80% confidence, 0.21-0.36) SB_{2015}/SB_0 = 0.29 (No confidence intervals) si (a): 60. The stock is assessed currently to be below SB_{MSY} with an estimate of SB_{2015}/SB_{MSY} of 0.89 (0.79-0.99) and to have been below SB_{MSY} for six of the last eight years. The stock cannot be considered to be at or fluctuating around MSY. si (b): <80.			
RBF Required? (✓/✗)	**x**	**Likely Scoring Level (pass/pass with condition/fail)**	**(60) Pass with condition**

Component	Outcome		
PI 1.1.2 Stock Rebuilding	**Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe.**		
Scoring issues	**SG60**	**SG80**	**SG100**

(a) Rebuilding timeframes	A rebuilding timeframe is specified for the stock that is the **shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for the stock.
(b) Rebuilding evaluation	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is **evidence** that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.	There is **strong evidence** that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.

Justification/Rationale

si (a): FishBase Generation time for *Thunnus albacares* = 3.6 years.

The IOTC Technical Committee on Management Procedures noted in 2017 that there is a 50% probability of rebuilding the stock to B_{target} (B_{MSY}) by 2024. Therefore:

SG60 requirements met as the rebuilding timeframe specified is less than 2 generation times.

SG100 requirements not met as the rebuilding timeframe exceeds one generation time.

si (b): The IOTC program of work for the development and assessment of Target Reference Points (TRPs) and Limit Reference Points (LRPs) and Harvest Control Rules (HCRs) through Management Strategy Evaluation (MSE) specifies that an assessment of the performance of HCRs, to achieve TRPs and avoid LRPs with a high probability whilst still taking into account the levels of uncertainty in the stock assessments, shall be completed for yellowfin tuna, bigeye tuna and swordfish by 2017 and presented to the commission meeting in 2018.

The possible effect of Resolutions 17/01 and 16/01 can only be assessed once estimates of abundance in 2018 would be available at the 2019 assessment.

SG80 requirements are not met as there is no evidence available to show that the rebuilding strategies are rebuilding the stock of YFT. it is likely from stock simulation modelling that the YFT stock can be re-built to a target level by 2024 under the current management plan and there is monitoring is in place to measure the effectiveness of the rebuilding strategy.

RBF Required? (✓/✗/)	**x**	**Likely Scoring Level (pass/pass with condition/fail)**	**(60) Pass with condition**

Component	Harvest strategy (management)		
PI 1.2.1 Harvest strategy	**There is a robust and precautionary harvest strategy in place**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Harvest strategy design	The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.
(b) Harvest strategy evaluation	The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
(c) Harvest strategy monitoring	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
(d) Harvest strategy review			The harvest strategy is periodically reviewed and improved as necessary.
(e) Shark finning	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
(f) Review of alternative measures	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
Justification/Rationale			

MSC guidance defines a harvest strategy as the combination of monitoring, stock assessment, harvest control rules and management actions. It is intended that these elements work together towards achieving management objectives.

The management body, the IOTC acknowledges that implementing pre-agreed harvest strategies including harvest control rules is considered a critical component of modern fisheries management and international best practices for fisheries management; and notes that a harvest control rule encompasses a set of well-defined, pre-agreed rules or actions used for determining a management action in response to changes in indicators of stock status with respect to reference points;

There have been a series of interim plans developed for the recovery of the yellowfin stock in the Indian Ocean, Resolution 17/01 builds upon and supersedes all previous CMM interim plans for rebuilding the YFT stock and puts forward a suite of measures towards that end.

Resolution 17/01 applies to fishing vessels targeting tuna and tuna like species in the Indian Ocean of 24 meters overall length and over, and those under 24 meters if they fish outside the EEZ of their flag State, within the IOTC area of competence.

The first measure requires the *reduction of catches* by Contracting Parties and Cooperating Non-Contracting Parties (CPCs) various fleets.

Flag states are required to achieve the catch reduction through appropriately determined methods and report those to the IOTC through annual Implementation Reports

Catch statistics will be reported and monitored in accordance with Resolutions 15/01 and 15/02

The IOTC Compliance Committee will monitor progress of the CPCs with respect to reduction of YFT catches

The Scientific Committee shall re-evaluate the effectiveness of the measures to rebuild the YFT stock whilst taking into account all sources of fishing mortality and possible alternative measures to return and maintain biomass levels at the Commission's target level.

Corrective response measures are not explicitly defined however the likely response is the drafting of further interim plans to rebuild the stock and further reductions in catch and effort of CPS as well as the development of management measures for artisanal fisheries that are exempt from the provisions of Resolution 17/01.

The review period for the interim plan is within 2 years and no later than 2019. Resolution 16/01 has been reviewed and superseded by Resolution 17/01.

There is no unwanted catch of the target stock in the UoA.

The UoA is required to reduce its catches of Yellowfin tuna by 10% from 2014 levels (which were greater than 5000t).

si (a): 80, si (b): 60; si (c): 60; si (d): 100; si (e): 100; si (f): 100

Likely Scoring Level (pass/pass with condition/fail)	**(80) Pass**

Component	Harvest strategy		
PI 1.2.2 Harvest control rules and tools	**There are well defined and effective harvest control rules (HCRs) in place.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) HCRs design and application	**Generally understood** HCRs are in place **or available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, **most** of the time.
(b) HCRs robustness to uncertainty		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.
(c) HCRs evaluation	There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.
Justification/Rationale			

Generally understood rules are in place that are expected to reduce fishing mortality through reductions in catches by CPCs.

Through *Resolution 17/01 an interim plan for the rebuilding of the yellowfin tuna stock in the Indian Ocean* (and that superseded Resolution 16/01) a strategy for reducing total mortality of yellowfin has been developed, however, well-defined harvest control rules are not currently in place and SG80 is not met.

There is no evidence that the HCR (fishing mortality reduction) is appropriate and effective in controlling exploitation but it is expected that reduction in catches will reduce total mortality.

si (a) - 60

Paragraphs 9 & 10 from Res 17/01 state:

9. Each year, the Compliance Committee shall evaluate the level of compliance with the catch limits deriving from this Resolution and shall make recommendations to the Commission accordingly. The Scientific Committee via its Working Party on Tropical Tunas shall, in 2018, conduct a new assessment of the status of the Yellowfin stock using all available data.

10. The Scientific Committee via its Working Party on Tropical Tunas shall in 2018 undertake an evaluation of the effectiveness of the measures detailed in this Resolution, taking into account all sources of fishing mortality and possible alternatives aiming at returning and maintaining biomass levels at the Commission's target level. After consideration of the results of this evaluation, the Commission shall take corrective measures accordingly.

The Scientific Committee has initiated the process of control rule development. There ***is some evidence that some IOTC members have controlled their own catches*** in an effective manner and that this could be extended across key fleets (e.g. larger purse seine and longline vessels).

The details of implementation are not known as of yet. On that basis it can be said that tools are available and shortly to be in use (implementation 2018) and there ***is some evidence that they will work based on projections.*** But there is not necessarily a lot of evidence as yet of likely success

The generally understood and available HCR expected to reduce the exploitation rate of YFT in the Indian Ocean, has yet to be rigorously tested but there is some evidence of implementation and probable success based on projections.

SG60 requirements are met.

Likely Scoring Level (pass/pass with condition/fail)	**(60) Pass with condition**

Component	**Harvest strategy**		
PI 1.2.3 Information / monitoring	**Relevant information is collected to support the harvest strategy**		
Scoring issues	**SG60**	**SG80**	**SG100**

(a) Range of information	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.
(b) Monitoring	Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule,** and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
(c) Comprehen-siveness of information		There is good information on all other fishery removals from the stock.	

Justification/Rationale

si (a) – 80. Sufficient relevant information is available to support the harvest strategy. Although coastal fishery fleet composition and catches are often missing or misreported. There is a concern of poor quality effort data for the significant gillnet-longline fishery of Sri Lanka that is associated with the UoA;
si (b) – 60. Data are submitted annually to the IOTC by member states and used to update stock assessments and guide Management Strategy Evaluation and Operational management actions. Information is absent for certain aspects of the fishery and in some cases catch at length data are not made available by CPCs or if they are then data are not separated by gear type e.g. Sri Lanka.
si (c) – 60 - Data are considered to be generally well known for the major industrial fisheries. Catches are less certain for artisanal coastal fisheries.

IOTC Dataset Concerns/Caveats

Catches and effort data are poor for the Sri Lankan longline-gillnet fishery – although this gear type does not form part of the UoA the data reporting requirements for this sector are the same as for the UoA component and therefore it is likely that the same uncertainties apply to the UoA.

Catch-at-length data is sparse for the Sri Lankan fishery and not yet segregated by gear type.

Some observer data is becoming available for vessels >24m although coverage is still poor.

Likely Scoring Level (pass/pass with condition/fail)	**(65) Pass with Condition**

Component	Harvest Strategy		
PI 1.2.4 Assessment of stock status	**There is an adequate assessment of the stock status.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Appropriateness of assessment to stock under consideration		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
(b) Assessment approach	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
(c) Uncertainty in the assessment	The assessment **identifies major sources** of uncertainty.	The assessment **takes uncertainty into account**.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
(d) Evaluation of assessment			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
(e) Peer review of assessment		The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.
Justification/Rationale			
si (a) – 100. The assessment undertaken in 2015 is appropriate for the stock, takes into account the biological features of the species and stock (spawning grounds, growth rates, diet, tag-recapture etc.). Individual member states submit National statistical reports to the IOTC informing the RFO of the nature of the UoA for incorporation into assessments. si (b) – 80. The assessment estimates stock status relative to reference points that are appropriate to the stock. Although the reference points are used for other stocks and species (F_{MSY}, B_{MSY}) they are appropriate for use with yellowfin tuna. si (c) – 100. The assessment takes uncertainty into account and estimates stock status with a statistical degree of confidence (usually at intervals of 80% confidence). si (d) – 100. In 2015, three models were applied to the yellowfin tuna stock in the IOTC area of competence, a BBPM, SCAA and Stock Synthesis III model, all of which give qualitatively similar results. si (e) – 100. Assessments are interrogated at working group meetings where scientists representing Members of the IOTC undertake to review submitted assessments and parameters. External reviews of the IOTC incorporate peer review of the stock assessment procedure and comparison with other RFOs is constant.			
Likely Scoring Level (pass/pass with condition/fail)			(100) Pass

Component	Outcome		
PI 1.1.1- Stock status	**The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Stock status relative to recruitment impairment	It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI	There is a **high degree of certainty** that the stock is above PRI
(b) Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
Justification/Rationale			
PRI = $0.20B_{0.}$ SB_{2015}/SB_0 = 0.38 (No confidence intervals) SB_{2015}/SB_{MSY} (80% CI) = 1.29 (1.07-1.51) The stock assessment model was designed to take into account uncertainty on stock recruitment relationship and the influence of tagging information. Considering the quantified uncertainty, which is conservative, the assessment indicates that SB_{2015} is above SB_{MSY}. Current spawning biomass is considered to at 129% of the interim target reference point of SB_{MSY} and well above the interim limit reference point of $0.2SB_0$. It can be argued that it is highly likely that the stock is above a level consistent with MSY, and therefore that there is a high degree of certainty that the stock is above the PRI and therefore, SG60 requirements are met SG80 requirements are met			
RBF Required? (✓/✗)	**x**	**Likely Scoring Level (pass/pass with condition/fail)**	**(80) Pass**

Component	Outcome		
PI 1.1.2 Stock Rebuilding	**Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe.**		
Scoring issues	**SG60**	**SG80**	**SG100**

(a) Rebuilding timeframes	A rebuilding timeframe is specified for the stock that is the **shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for the stock.
(b) Rebuilding evaluation	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is **evidence** that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.	There is **strong evidence** that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.

Justification/Rationale
In line with SA2.3.1 this PI is only scored when PI.1.1.1 does not achieve a score of 80.

RBF Required? (✓/×/)	**x**	**Likely Scoring Level (pass/pass with condition/fail)**	**Not scored**

Component	**Harvest strategy (management)**		
PI 1.2.1 Harvest strategy	**There is a robust and precautionary harvest strategy in place**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Harvest strategy design	The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.
(b) Harvest strategy evaluation	The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

(c) Harvest strategy monitoring	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
(d) Harvest strategy review			The harvest strategy is periodically reviewed and improved as necessary.
(e) Shark finning	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
(f) Review of alternative measures	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
Justification/Rationale			

MSC guidance defines a harvest strategy as the combination of monitoring, stock assessment, harvest control rules and management actions. It is intended that these elements work together towards achieving management objectives.

The management body, the IOTC acknowledges that implementing pre-agreed harvest strategies including harvest control rules is considered a critical component of modern fisheries management and international best practices for fisheries management; and notes that a harvest control rule encompasses a set of well-defined, pre-agreed rules or actions used for determining a management action in response to changes in indicators of stock status with respect to reference points;

The Harvest Strategy on place to maintain Bigeye tuna above PRI includes a series of resolutions and measures:

Resolution 15/01 on the recording of catch and effort by fishing vessels in the IOTC area of competence

Resolution 15/02 mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPC's)

Resolution 15/06 On a ban on discards of bigeye tuna, skipjack tuna, yellowfin tuna and a recommendation for non-targeted species caught by purse seine vessels in the IOTC area of competence

Resolution 15/10 On target and limit reference points and a decision framework

Resolution 15/11 on the implementation of a limitation of fishing capacity of Contracting Parties and Cooperating Non-Contracting Parties

Resolution 14/02 for the conservation and management of tropical tunas stocks in the IOTC area of competence.

Resolution 14/05 concerning a record of licensed foreign vessels fishing for IOTC species in the IOTC area of competence and access agreement information

Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC

The progress of Management Strategy Evaluation (MSE) for Indian Ocean bigeye tuna halted in June 2016 when the phase 1 funding ran out, however, funding for Phase 2 ABNJ-CSIRO contract is under development (July 2017 – Dec 2018) to support the continuation of MSE of Bigeye tuna.

The IOTC Technical Committee on Management Procedures (TCMP) in May 2017 noted the default bigeye tuna MP assumptions, including 3 year TAC setting, 15% TAC change constraint, and tuning objectives proposed for phase 2:

a) 50% probability B>B(target) from 2019-2039 (interpretation from Resolution 15/10)

b) 75% probability in Kobe green zone from 2019-2039 (interpretation from Resolution 15/10)

Only once the defined harvest control rules for Bigeye Tuna are published and the MSE complete will SG100 requirements be met (**responsive, designed**)

si (a): 80; si (b): 80 ; si (c): 60; si (d): 100; si (e): 100 ; si (f): 100

Likely Scoring Level (pass/pass with condition/fail)	**(90) Pass**

Component	**Harvest strategy**

PI 1.2.2 Harvest control rules and tools	There are well defined and effective harvest control rules (HCRs) in place.		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) HCRs design and application	**Generally understood** HCRs are in place **or available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, **most** of the time.
(b) HCRs robustness to uncertainty		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.
(c) HCRs evaluation	There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.
Justification/Rationale			

CRv2.0 (MSC 2014) lays out two conditions for acceptance of HCR being available sufficient to justify scoring at the SG60 level.

First, CRv2.0 SA2.5.2a provides for HCR being recognised as available, "…if stock biomass has not previously been reduced below B_{MSY} or has been maintained at that level for a recent period of time".

- The stock is assessed currently to be above SB_{MSY} with an estimate of SB_{2015}/SB_{MSY} of 1.29 (1.07-1.51). The stock assessment ion 2013 indicated SB/SB_{MSY} at 1.44.
- The average catch over the previous five years (2012–16; ≈100,455 t) also remains below the estimated MSY.

Second, CRv2.0 SA2.5.3a provides for HCR being recognised as available if, HCRs are effectively used in some other UoAs, that are under the control of the same management body and of a similar size and scale as the UoA;

There is a comprehensive set of HCRs in place for Skipjack tuna in the Indian Ocean as can be seen in the Maldives Pole and Line Skipjack Fishery UoA. HCRs are applied to the stock of skipjack tuna that is currently at $0.4B_0$ or B_{Target}. Although the threshold level for reductions in fishing mortality has not been breached the HCR stating,

If the current spawning biomass (B_{curr}) is estimated to be at or above the threshold spawning biomass i.e., $B_{curr} >= 0.4B_0$, then the catch limit shall be set at [I_{max} x E_{targ} x B_{curr}],

is in use and expected to maintain the stock at or above a level consistent with MSY most of the time (SG100).

Therefore **Generally understood** HCRs are **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached AND there is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.

Likely Scoring Level (pass/pass with condition/fail)	**(60) Pass with condition**

Component	**Harvest strategy**		
PI 1.2.3 Information / monitoring	**Relevant information is collected to support the harvest strategy**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Range of information	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

(b) Monitoring	Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule,** and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
(c) Comprehen-siveness of information		There is good information on all other fishery removals from the stock.	

Justification/Rationale

si (a) – 80. Data are considered to be relatively reliable for the main industrial fleets targeting bigeye tuna, with the proportion of catches estimated or adjusted by the IOTC Secretariat relatively low
si (b) – 80. Logbooks are submitted by vessel skippers to the DFAR and logbook entries are checked every 3 months. At sea scientific observers have been deployed on a small number of vessels (>24m).
si (c) – 70. Data from the inshore component of Sri Lankas fisheries are lacking.

IOTC Dataset Concerns/Caveats

Sri Lanka (gillnet-longline fishery): Although Sri Lanka has reported catches of bigeye tuna for its gillnet/longline fishery, catches are considered to be too low, possibly due to the mislabelling of catches of bigeye tuna as yellowfin tuna.

Catches and CPUE data are less certain for the Sri Lankan gillnet-longline fishery – though not a part of the UoA there is a possibility that catches of the UoA fall within this category of concern as the UoA vessels are members of the same fleet as the gillnet-longline operators.

Likely Scoring Level (pass/pass with condition/fail)	**(75) Pass with Condition**

Component	Harvest Strategy		
PI 1.2.4 Assessment of stock status	**There is an adequate assessment of the stock status.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Appropriateness of assessment to stock under consideration		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

(b) Assessment approach	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
(c) Uncertainty in the assessment	The assessment **identifies major sources** of uncertainty.	The assessment **takes uncertainty into account**.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
(d) Evaluation of assessment			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
(e) Peer review of assessment		The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

Justification/Rationale

si (a) – 100. The assessment undertaken in 2016 is appropriate for the stock, takes into account the biological features of the species and stock (notably tagging information for BET, Sex-ratio, size at maturity, spawning period and fecundity of bigeye tuna was incorporated into the most recent stock assessment). Individual member states submit National statistical reports to the IOTC informing the RFO of the nature of the UoA for incorporation into assessments.

si (b) – 80. The assessment estimates stock status relative to reference points that are appropriate to the stock. Although the reference points are used for other stocks and species (F_{MSY}, B_{MSY}) they are appropriate for use with bigeye tuna.

si (c) – 100. The reported stock status is based on the SS3 model formulation using a grid designed to capture the uncertainty on stock recruitment relationship and the influence of tagging information. The assessment takes uncertainty into account and estimates stock status with a statistical degree of confidence (usually at intervals of 80% confidence).

si (d) – 100. In 2016, six models were applied to the bigeye tuna stock in the IOTC area of competence (ASAP, BDM, ASPIC, SCAA, BSPM and SS3).

si (e) – 100. Assessments are interrogated at working group meetings where scientists representing Members of the IOTC undertake to review submitted assessments and parameters. External reviews of the IOTC incorporate peer review of the stock assessment procedure and comparison with other RFOs is constant.

Likely Scoring Level (pass/pass with condition/fail)	(100) Pass

Component	Outcome		
PI 1.1.1- Stock status	**The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Stock status relative to recruitment impairment	It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI	There is a **high degree of certainty** that the stock is above PRI
(b) Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
Justification/Rationale			
A new assessment on swordfish was undertaken in 2017 using stock synthesis with fisheries data up to 2015 and indicated, SB_{2015}/SB_{1950} (80% CI) = 0.31 (0.26-0.43) SG60 requirements are met SG80 requirements are met As the quantified level of confidence associated with the assessment is <95% there is not a high degree of certainty that the stock is above the PRI and therefore, SG100 requirements are not met. SB_{2015}/SB_{MSY} (80% CI) = 1.50 (1.05-2.45) It is therefore highly likely that the swordfish stock in the Indian Ocean is at or fluctuating around MSY and the SG80 requirement for scoring issue (b) is met. As the quantified level of confidence associated with the assessment is <95% there is not a high degree of certainty that the stock is above the PRI and therefore, SG100 requirements are not met.			
RBF Required? (✓/✗)	**x**	**Likely Scoring Level (pass/pass with condition/fail)**	**80**

Component	Outcome		
PI 1.1.2 Stock Rebuilding	**Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Rebuilding timeframes	A rebuilding timeframe is specified for the stock that is the **shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for the stock.
(b) Rebuilding evaluation	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is **evidence** that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.	There is **strong evidence** that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.
Justification/Rationale			
In line with SA2.3.1 this PI is only scored when PI.1.1.1 does not achieve a score of 80.			
RBF Required? (✓/×/)	**x**	**Likely Scoring Level (pass/pass with condition/fail)**	**Not scored**

Component	Harvest strategy (management)		
PI 1.2.1 Harvest strategy	**There is a robust and precautionary harvest strategy in place**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Harvest strategy design	The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

(b) Harvest strategy evaluation	The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
(c) Harvest strategy monitoring	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
(d) Harvest strategy review			The harvest strategy is periodically reviewed and improved as necessary.
(e) Shark finning	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
(f) Review of alternative measures	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
Justification/Rationale			

MSC guidance defines a harvest strategy as the combination of monitoring, stock assessment, harvest control rules and management actions. It is intended that these elements work together towards achieving management objectives. The management body, the IOTC acknowledges that implementing pre-agreed harvest strategies including harvest control rules is considered a critical component of modern fisheries management and international best practices for fisheries management; and notes that a harvest control rule encompasses a set of well-defined, pre-agreed rules or actions used for determining a management action in response to changes in indicators of stock status with respect to reference points; The Harvest Strategy on place to maintain Swordfish above PRI includes a series of resolutions and measures: Resolution 15/01 on the recording of catch and effort by fishing vessels in the IOTC area of competence Resolution 15/02 mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPC's) Resolution 15/10 On target and limit reference points and a decision framework Resolution 15/11 on the implementation of a limitation of fishing capacity of Contracting Parties and Cooperating Non-Contracting Parties Resolution 14/05 concerning a record of licensed foreign vessels fishing for IOTC species in the IOTC area of competence and access agreement information Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC The TCMP NOTED that there is currently no funding to carry out the MSE for swordfish, however, the WPM will begin to develop the MSE based on results from the 2017 assessment using existing platforms to minimize development time and associated costs. A species-specific workplan was adopted at the 2017 IOTC meeting (IOTC–2017–S21–R), outlining the steps required to adopt simulation-tested Management Procedures for the highest priority species, among them the Indian Ocean swordfish stock. si (a): 80; si (b): 80 ; si (c): 60 ; si (d): 100 si (e): 100 – Sharks are landed whole and finned once landed. si (f): 100

Likely Scoring Level (pass/pass with condition/fail)	**(80) Pass**

Component	**Harvest strategy**		
PI 1.2.2 Harvest control rules and tools	**There are well defined and effective harvest control rules (HCRs) in place.**		
Scoring issues	**SG60**	**SG80**	**SG100**

(a) HCRs design and application	**Generally understood** HCRs are in place **or available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, **most** of the time.
(b) HCRs robustness to uncertainty		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.
(c) HCRs evaluation	There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.
Justification/Rationale			

There are no definitive HCRs in place for the Swordfish stock. However a suite of measures exist that intend on maintain the stock above provisional reference points related to biomass and fishing mortality.

CRv2.0 (MSC 2014) lays out two conditions for acceptance of HCR being available sufficient to justify scoring at the SG60 level.

First, CRv2.0 SA2.5.2a provides for HCR being recognised as available, "…if stock biomass has not previously been reduced below B_{MSY} or has been maintained at that level for a recent period of time".

- The stock is assessed currently to be above SB_{MSY} with an estimate of SB_{2015}/SB_{MSY} of 1.50 (1.05–2.45)
- There is a very low risk of exceeding MSY-based reference points by 2026 if catches are maintained at 2015 levels

Second, CRv2.0 SA2.5.3a provides for HCR being recognised as available if, HCRs are effectively used in some other UoAs, that are under the control of the same management body and of a similar size and scale as the UoA;

There is a comprehensive set of HCRs in place for Skipjack tuna in the Indian Ocean as can be seen in the Maldives Pole and Line Skipjack Fishery UoA. HCRs are applied to the stock of skipjack tuna that is currently at $0.4B_0$ or B_{Target}. Although the threshold level for reductions in fishing mortality has not been breached the HCR stating,

If the current spawning biomass (B_{curr}) is estimated to be at or above the threshold spawning biomass i.e., $B_{curr} >= 0.4B_0$, then the catch limit shall be set at [I_{max} x E_{targ} x B_{curr}],

is in use and expected to maintain the stock at or above a level consistent with MSY most of the time (SG100).

Therefore **Generally understood** HCRs are **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached AND there is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.

si (a) – 60
si (b) - 60

Likely Scoring Level (pass/pass with condition/fail)	**(60) Pass with condition**

Component	**Harvest strategy**		
PI 1.2.3 Information / monitoring	**Relevant information is collected to support the harvest strategy**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Range of information	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

(b) Monitoring	Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule,** and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
(c) Comprehen-siveness of information		There is good information on all other fishery removals from the stock.	
Justification/Rationale			
si (a) – 60. Some information is available to support the harvest strategy laid out by the IOTC Resolutions. However a key characteristic of the fleet composition remains uncertain in the SLL fishery as the number of vessels targeting swordfish is unknown. Although the fleet development plan indicates that there is in fact a separate swordfish fleet within the SLL, the number of vessels involved is unknown and the exact fishing practice and any gear modifications are unclear. si (b) – 60. Removals are monitored through vessel catch statistics and logbook and data are reported to DFAR for analysis before being submitted to the IOTC. Some independent observer data s available although not to sufficient levels to allow for any conclusions to be made. Observer coverage is planned to increase, although restricted to vessels >24m in length and fishing on the high seas. si (c) – 80. Swordfish bycatch versus target catch are not currently separated within the UoA. Catches by certain fleets targeting the swordfish stock in the Indian Ocean are not reported to IOTC standards (Indonesian longline). Coastal fisheries have less of an effect on the stock than with the other to UoAs.			
Likely Scoring Level (pass/pass with condition/fail)			**(65) Pass with Condition**

Component	**Harvest Strategy**		
PI 1.2.4 Assessment of stock status	**There is an adequate assessment of the stock status.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Appropriateness of assessment to stock under consideration		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
(b) Assessment approach	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

(c) Uncertainty in the assessment	The assessment **identifies major sources** of uncertainty.	The assessment **takes uncertainty into account**.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
(d) Evaluation of assessment			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
(e) Peer review of assessment		The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

Justification/Rationale

si (a) – 80^{+}. A new assessment was undertaken in 2017 using stock synthesis with fisheries data up to 2015, takes into account updated growth and maturation parameters for swordfish. Member states submit National statistical reports to the IOTC informing the RFO of the nature of the UoA for incorporation into assessments.

si (b) – 80. The assessment estimates stock status relative to reference points that are appropriate to the stock. Although the reference points are used for other stocks and species (F_{MSY}, B_{MSY}) they are currently the best known/most appropriate for use with swordfish.

si (c) – 80^{+}. The stock assessment for swordfish in the Indian Ocean used the Stock Synthesis 3 model fitted to all the CPUE indices. The assessment takes uncertainty into account and estimates stock status with a statistical degree of confidence (usually at intervals of 80% confidence).

si (d) – 80^{+}. In 2016, 12 fisheries were included in the assessment and alternate modelling scenarios were tested based on sex and size spatial disaggregation of the stock.

si (e) – 100. Assessments are interrogated at working group meetings where scientists representing Members of the IOTC undertake to review submitted assessments and parameters. External reviews of the IOTC incorporate peer review of the stock assessment procedure and comparison with other RFOs is constant.

Likely Scoring Level (pass/pass with condition/fail)	(90) Pass

Principle 2

Primary Species

Component	Primary Species		
PI 2.1.1 Outcome Status	**The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Main primary species stock status	Main primary species are **likely** to be above the PRI OR If the species is below the PRI. the UoA has measures in place that are **expected** to ensure that the UoA does not hinder recovery and rebuilding	Main primary species are **highly likely** to be above the PRI OR If the species is below the PRI, there is either **evidence of recovery** or a demonstrably effective strategy in place **between all MSC UoAs which categorise this species as main**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main primary species are above PRI **and are** fluctuating around a level consistent with MSY.
(b) Minor primary species stock status			Minor primary species are highly likely to be above the PRI. OR If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species.
Justification/Rationale			
Main: Yellowfin scoring component: Pass at SG60 Bigeye scoring component: Pass at SG80 Swordfish scoring component: Pass at SG80 Minor: Skipjack scoring component: Pass at SG100 Albacore scoring component: Pass at SG100			
RBF required? (✓/×)	**x**	**Likely Scoring Level (pass/pass with condition/fail)**	**UoA 1 – Pass** **UoA 2 – Pass with condition** **UoA 3 – Pass with condition**

Component	Primary Species		
PI 2.1.2 Management strategy	**There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species; and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Management strategy in place	There are **measures** in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to be above the PRI.	There is a **partial strategy** in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the PRI.	There is a **strategy** in place for the UoA for managing main and minor primary species.
(b) Management strategy evaluation	The measures are considered **likely** to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/ species).	There is some **objective basis for confidence** that the measures/ partial strategy will work, based on some information directly about the UoA and/or species involved.	**Testing** supports **high confidence** that the partial strategy/ strategy will work, based on information directly about the UoA and/or species involved.
(c) Management strategy implementation		There is **some evidenc**e that the measures/ partial strategy is being **implemented successfully**.	There is **clear evidence** that the partial strategy/ strategy is being **implemented successfully and is achieving its overall objective as set out in scoring issue (a).**
(d) Shark finning	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
(e) Review of alternative measures	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
Justification/Rationale			

si (a) 90 – Depending on the species component scored either there is a partial or full strategy in place to manage main and minor primary species. Resolution 15/05 puts forwards conservation measures for striped marlin, black marlin and blue marlin. si (b) 100 - Resolution 15/10, that superseded Resolution 13/10, provided a renewed mandate for the Scientific Committee to evaluate the performance of harvest control rules with respect to the species-specific interim target and limit reference points, no later than 10 years following the adoption of the reference points, for consideration of the Commission and their eventual adoption. A species-specific workplan was adopted at the 2017 IOTC meeting (IOTC 2017c), outlining the steps required to adopt simulation-tested Management Procedures for the highest priority species. si (c) 80 – As yet there is no clear quantitative empirical evidence that management strategies are being implemented successfully. si (d) 80 - Assistant Director, Fishery Management Division – "*shark utilisation in Sri Lanka is 100%....Sharks are landed whole and finned once landed. There is no evidence of boats landing only shark fins. Whereas there is plenty of evidence of boats landing whole sharks."* si (e) 80 – there is no unwanted catch of primary species by the UoA	
Likely Scoring Level (pass/pass with condition/fail)	**(85) Pass for all UoAs**

Component	**Primary Species**		
PI 2.1.3 Information	**Information on the nature and amount of primary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Information adequacy for assessment of impact on main primary species	Qualitative information is **adequate to estimate** the impact of the UoA on the main primary species with respect to status. **OR** **If RBF is used to score PI 2.1.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the main primary species with respect to status. **OR** **If RBF is used to score PI 2.1.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is **adequate to assess with a high degree of certainty** the impact of the UoA on main primary species with respect to status.
(b) Information adequacy for assessment of impact on minor primary species			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.

(c) Information adequacy for management strategy	Information is adequate to support **measures** to manage **main** primary species.	Information is adequate to support a **partial strategy** to manage **main** primary species.	Information is adequate to support a **strategy** to manage **all** primary species, and evaluate with a **high degree of certainty** whether the strategy is achieving its objective.
Justification/Rationale			
si (a) 80 – Quantitative information is available to assess adequately the impact of the UoA on the stocks of primary species. Confidence intervals are provided for main primary stocks explaining the variance in modelled parameters. Data are cross-examined and verified by the IOTC. Potential bias in estimates are recognised and catered for in stock assessments. Data is comprehensive for all industrial fisheries targeting the main primary species – however data is limited for coastal artisanal fisheries. Data reporting and collection continue to be improved and clean data sets are retrospectively integrated into updated stock assessments. si (b) 100 – ample data is available to estimate the effect of the UoA on minor primary species. si (c) 80 – The information is adequate to support a partial strategy to manage all primary species, however there will always be a measure of uncertainty that cannot guarantee a high degree of certainty that the management strategy is achieving its objective.			
Likely Scoring Level (pass/pass with condition/fail)			**(85) Pass for all UoAs**

Secondary Species

Component	**Secondary Species**		
PI 2.2.1 Outcome Status	**The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biologically based limit.**		
Scoring issues	**SG60**	**SG80**	**SG100**

(a) Main secondary species stock status	Main secondary species are **likely** to be above biologically based limits. OR If below biologically based limits, there are **measures** in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are **highly likely** to be above biologically based limits. OR If below biologically based limits, there is either **evidence of recovery** or a **demonstrably effective partial strategy** in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are **considerable**, there is either **evidence of recovery** or a, **demonstrably effective strategy in place between those MSC UoAs that have considerable catches of the species**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main secondary species are above biologically based limits.
(b) Minor secondary species stock status			Minor secondary species are highly likely to be above biologically based limits. OR If below biologically based limits there is evidence that the UoA does not hinder the recovery and rebuilding of minor secondary species.
Justification/Rationale			
Black Marlin scoring component: 60 Blue Marlin scoring component: 60 Striped Marlin Scoring component: 100 Kawakawa scoring component: 100 IndoPacific sailfish component: 100 si (a) – 60 si (b) - 100			
RBF required? (✓/×)	**Can be used during full assessment**	**Likely Scoring Level (pass/pass with condition/fail)**	**(70) Pass with condition**

Component	Secondary Species		
PI 2.2.2 Management Strategy	**There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species; and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Management strategy in place	There are **measures** in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **partial strategy** in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **strategy** in place for the UoA for managing main and minor secondary species.
(b) Management strategy evaluation	The measures are considered **likely** to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/ species).	There is **some objective basis for confidence** that the measures/ partial strategy will work, based on some information directly about the UoA and/or species involved.	**Testing** supports **high confidence** that the partial strategy/ strategy will work, based on information directly about the UoA and/or species involved.
(c) Management strategy implementation		There is **some evidenc**e that the measures/ partial strategy is being **implemented successfully**.	There is **clear evidence** that the partial strategy/ strategy is being **implemented successfully and is achieving its overall objective as set out in scoring issue (a)**.
(d) Shark finning	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
(e) Review of alternative measures to minimise mortality of unwanted catch	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.
Justification/Rationale			

Si (a) – 60. Si (b) and (c) 60 – there is no management strategy in place for main or minor secondary species – by their nature these species are not managed – however the fleet as a whole is registered, catches are submitted and monitored, enforcement is in place, a small proportion of the fleet carries observers and there can be a measure of confidence that the measures are being implemented successfully. This can be evidenced through the progress of the Fishery Improvement Project currently underway. si (d) – 60. There is anecdotal evidence of sharks with fins attached being landed by vessels in the UoA and no evidence of shark fins being landed separate to the trunks. Evidence would need to be quantified and provided to assessors in a full assessment. si (e) – 80. There is no known unwanted catch within the SLL fishery (although during full assessment this will need to be confirmed through discards monitoring/stakeholder interview)

Likely Scoring Level (pass/pass with condition/fail)	**(60) Pass with condition**

Component	**Secondary Species**		
PI 2.2.3 Information	**Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effective-ness of the strategy to manage secondary species.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Information adequacy for assessment of impact on main secondary species	Qualitative information is **adequate to estimate** the impact of the UoA on the main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and is **adequate to assess with a high degree of certainty** the impact of the UoA on main secondary species with respect to status.
(b) Information adequacy for assessment of impact on minor secondary species			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
(c) Information adequacy for management strategy	Information is adequate to support **measures** to manage **main** secondary species.	Information is adequate to support a **partial strategy** to manage **main** secondary species.	Information is adequate to support a **strategy** to manage **all** secondary species, and evaluate with a **high degree of certainty** whether the strategy is **achieving its objective**.

Justification/Rationale	
si (a) – 80. Some quantitative information is available to assess the UoA impact on main secondary species. During a full assessment the proposed UoA and subsequently its defined catches would need to be confirmed and the catches re-quantified. si (b) – 100. Catches of minor secondary species are recorded and reported to the DFAR and information is adequate to estimate the impact of the UoA on minor secondary species. si (c) – 80. Information would be adequate to support any partial strategy to manage secondary species however likely inadequate to support a full strategy.	
Likely Scoring Level (pass/pass with condition/fail)	**(80) Pass**

ETP Species

Component	ETP Species		
PI 2.3.1 Outcome Status	**The UoA meets national and international requirements for protection of ETP species.** **The UoA does not hinder recovery of ETP species.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Effects of the UoA on population/ stocks within national or international limits, where applicable	Where national and/or international requirements set limits for ETP species, the **effects of the UoA** on the population/ stock are known and **likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, the **combined effects of the MSC UoAs** on the population /stock are known and **highly likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a **high degree of certainty** that the **combined effects of the MSC UoAs** are within these limits.
(b) Direct effects	Known direct effects of the UoA are likely to not **hinder recovery** of ETP species.	Direct effects of the UoA are **highly likely** to not **hinder recovery** of ETP species.	There is a **high degree of confidence** that there are no **significant detrimental direct effects** of the UoA on ETP species.
(c) Indirect effects		Indirect effects have been considered for the UoA and are thought to be **highly likely** to not create unacceptable impacts.	There is a **high degree of confidence** that there are no **significant detrimental indirect effects** of the UoA on ETP species.
Justification/Rationale			

The effects of the UoA on the population and stocks of ETP species are known and **unlikely** to be within national and regional limits for turtles and mammals.

Turtles
Nel et al. (2013) reported that, annually, about 3,500 marine turtles are caught by longline vessels with about 250 marine turtles are observed in purse seine sets. The authors also estimated gillnet impacts on marine turtles; based on limited data they concluded that about 30,000 sea turtles are captured annually in those fisheries.

The SLL UoA caught a reported total of 69 and 99 turtles in 2015 and 2016 respectively and of those 67 were reported released alive in 2015 and 93 released alive in 2016. The species of turtle is reported in the logbooks but not available during pre-assessment.

Other MSC UoAs operating in the Indian Ocean require the cumulative impacts of catch of the those UoAs Echebaster FSC and FAD purse seine set types, and the catch in the Maldives pole and line fishery to be assessed. Guidance is taken from those reports where the Echebaster UoA catches approximately 7 sea turtles a year and the Maldives P&L fishery catches and interacts with 0 turtles a year.

Without an observer program to verify the release status of turtles in the SLL fishery or to provide an independent quantification of turtle interactions aside form skipper reported logbook data it cannot be said that the **combined effects of the MSC UoAs** on the population /stock are known and **highly likely** to be within these limits.

Silky Shark
Murua et al. (2013) reported that in 2000 - 2010, the average annual catch of silky sharks in the longline and gillnet fisheries of the Indian Ocean was about 20,000 t.

The UoA under assessment landed close to 47 tons of silky shark. The Echebaster UoA catches annually an estimated in 103 tons of which approximately 50% would be released alive. The Maldive P&L UoA cathes in the order of 10 tons of silky shark the mahority of which are released alive after light interaction with barbless hooks. The IOTC report on ecosystems and bycatch (IOTC-2017-WPEB13-R) implicates the Sri Lankan tuna fleet as one of the greatest contributors to silky shark catches in the Indian Ocean. Until such time as catches can be independently verified and post-capture release status determined it cannot be said that the UoAs are highly likely to not have a combined negative effect on the biological standing of silky sharks in the Indian Ocean.

Mako shark, hammerhead shark
The catches of mako and hammerhead shark by the UoA accounted for only 10t during 2016 (down from over twice that in 2015) and the UoA is highly unlikely to hinder the recovery of those species.

Thresher Shark
There is legislation prohibiting the catch of thresher sharks by vessels registered to fish by Sri Lanka. There has previously however been a large thresher shark directed fishery and there is still great demand for the products harvested from this species. That the UoA has a reported catch of 9 individuals in 2016 already creates a condition for this PI. Without observer data and with the known lack of compliance amongst fishers and incentive to target and land this species there is a good chance that PI may not achieve a pass under full assessment.

Whale shark
According to the catch statistics 2 whale sharks were released alive and 2 died after interacting with fishing gear in 2016. There is a complete prohibition for catching this species by Sri Lankan vessels. An independent assessment of the interaction of this species with longline gear deployed by the UoA would be required before the assessors could score this PI with any degree of confidence.

Blue whale
A single blue whale was killed by the UoA in 2016 (up from 0 in 2015). This will negatively affect the scoring of any PI related to ETP species. Further investigation of the nature of the interaction and the cause of mortality is needed.

RBF required? (✓/×)	**x**	**Likely Scoring Level (pass/pass with condition/fail)**	**(<60) Fail**

Component	ETP Species		
PI 2.3.2 Management strategy	**The UoA has in place precautionary management strategies designed to:** **- meet national and international requirements; and** **- ensure the UoA does not hinder recovery of ETP species.** **Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Management strategy in place (national and international requirements)	There are **measures** in place that minimise the UoA-related mortality of ETP species, and are expected to be **highly likely to achieve** national and international requirements for the protection of ETP species.	There is a **strategy** in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be **highly likely to achieve** national and international requirements for the protection of ETP species.	There is a **comprehensive strategy** in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to **achieve above** national and international requirements for the protection of ETP species.
(b) Management strategy in place (alternative)	There are **measures** in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **strategy** in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **comprehensive strategy** in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species.
(c) Management strategy evaluation	The measures are **considered likely** to work, based on **plausible argument** (e.g., general experience, theory or comparison with similar UoAs/ species).	There is an **objective basis for confidence** that the partial strategy/ strategy will work, based on **information** directly about the UoA and/or the species involved.	The strategy/ comprehensive strategy is mainly based on information directly about the UoA and/or species involved, and a **quantitative analysis** supports **high confidence** that the strategy will work.
(d) Management strategy implementation		There is some **evidence** that the measures/strategy is being implemented successfully.	There is **clear evidence** that the strategy/ comprehensive strategy is being implemented successfully and is **achieving its objective as set out in scoring issue (a) or (b)**.
(e) Review of alternative measures to minimise mortality of ETP species	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.
Justification/Rationale			

NPOAs are a framework that should facilitate estimation of shark catches, seabird interactions, and development and implementation of appropriate management measures, which should also enhance the collection of bycatch data and compliance with IOTC Resolutions. Sharks: An NPOA-sharks has been finalized and is currently being implemented. Seabirds: Sri Lanka has determined that seabird interactions are not a problem for their fleets. However a formal review has not yet taken place which the WPEB and SC have approved. Marine turtles: Implementation of the FAO Guideline to Reduce Sea Turtle Mortality in Fishing Operation in 2015 was submitted to IOTC in January 2016. Marine turtles are legally protected in Sri Lanka. Longliner vessels are required to have dehookers for removal of hooks and a line cutter on board, to release the caught marine turtles. Gillnets longer than 2.5 km are now prohibited in domestic legislation. Reporting of bycatch has made legally mandatory and facilitated via logbooks. IOTC CMMs govern the management of ETP species in the region There is no evidence that the national plans of action are being implemented by neither the Sri Lankan government nor the UoA and therefore this PI cannot be scored at an unconditional pass.

Likely Scoring Level (pass/pass with condition/fail)	**(70) Pass with condition**

Component	**ETP Species**		
PI 2.3.3 Information	**Relevant information is collected to support the management of UoA impacts on ETP species, including:** **- information for the development of the management strategy;** **- information to assess the effectiveness of the management strategy; and** **- information to determine the outcome status of ETP species**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Information adequacy for assessment of impacts	Qualitative information is **adequate to estimate** the UoA related mortality on ETP species. **OR** **If RBF is used to score PI 2.3.1 for the UoA** Qualitative information is **adequate to estimate productivity and susceptibility** attributes for ETP species.	Some quantitative information is **adequate to assess** the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species. **OR** **If RBF is used to score PI 2.3.1 for the UoA:** Some quantitative information is **adequate to assess productivity and susceptibility attributes** for ETP species.	Quantitative information is available to assess with a high degree of certainty the **magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status** of ETP species.
(b) Information adequacy for management strategy	Information is adequate to support **measures** to manage the impacts on ETP species	Information is adequate to measure trends and support a **strategy** to manage impacts on ETP species	Information is adequate to support a **comprehensive strategy** to manage impacts, minimize mortality and injury of ETP species,

			and evaluate with a **high degree of certainty** whether a strategy is achieving its objectives.
Justification/Rationale			
si (a) – <60. Qualitative information is available to estimate UoA related mortality and impact on ETP species and to assess the whether the UoA may be a threat to the protection and recovery of the fishery. However after discussion with stakeholders there is concern over the reporting of this information, the understanding of importance of accurate reporting and without any monitoring in place the information cannot be used to adequately assess the UoA impact on ETP species. si (b) – <60. As stated above, there is very little confidence in the ETP species reporting and information provided by fishermen and there is no monitoring at sea of catches and reporting accuracy. More information is required on post-release survival of ETP species. Therefore information is considered to be not adequate to support measures to manage the impacts on ETP species.			
Likely Scoring Level (pass/pass with condition/fail)			**(<60) Fail**

Habitats

Component	**Habitats**		
PI 2.4.1 Outcome Status	**The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Commonly encountered habitat status	The UoA is **unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
(b) VME habitat status	The UoA is **unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
(c) Minor habitat status			There is **evidence** that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
Justification/Rationale			

In tuna fisheries, which target fish in open waters, there is not likely to be significant interaction with seabed habitats.

The offshore and high seas component of the fishery operates entirely at the surface in deep, oceanic water and the longline gear does not contact the seabed. Any pelagic habitat impacts will be imperceptible and highly impermanent.

Lost gear may consist of monofilament and/or hooks and is only likely to continue to fish as long as bait remains on the hooks. Bait is stripped relatively quickly off the hooks and lost hooks will accumulate in the deep oceanic benthos and degrade in time.

Habitat interactions are negligible due to the nature of the gear used. The fishery has no impact on habitats that would reduce habitat structure and function to a point where there would be serious or irreversible harm.

WWF describe non-demersal longline gear as *minimally damaging fishing gear with no or negligible interaction with the seafloor* (WWF (2015). Ecological sustainability evaluation of seafood: Guidelines for Wild Catch Fisheries, Version 2.0.)

Within the small boat artisanal single day sector lines are set at depths of 50-80 m, between 15 and 25 km from the coastline - in the inshore coastal north-eastern and north-western fishing grounds, (Dissanayake, D. C. T., Samaraweera, E. K. V., & Amarasiri, C. 2010).

VME habitats are not identified for the offshore component of the fishery and the fishery isonly likely to interact with inshore reef-habitats through the loss of fishing gear that will be highly unlikely to reduce the structure and function of those VME habitats.

VME habitats are thoroughly scored in the Echebaster skipjack tuna purse-seine fishery (see reference in Section 4.1) and scoring issue b must be scored based on the cumulative impacts of all MSC UoA's on VME habitats. Thus although the UoA under assessment here is **highly unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm, other UoA's in the Indian Ocean do not score with as high probability.

si (a) – 100
si (b) – 60
si (c) - 100

RBF required? (✓/✗)	**x**	**Likely Scoring Level (pass/pass with condition/fail)**	**(70) Pass with Condition**

Component	**Habitats**		
PI 2.4.2 Management strategy	**There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.**		
Scoring issues	**SG60**	**SG80**	**SG100**

(a) Management strategy in place	There are **measures** in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a **partial strategy** in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a **strategy** in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.
(b) Management strategy evaluation	The measures are **considered likely** to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/ habitats).	There is some **objective basis for confidence** that the measures/ partial strategy will work, based on **information directly about the UoA and/or habitats** involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on **information directly about the UoA and/or habitats** involved.
(c) Management strategy implementation		There is **some quantitative evidence** that the measures/ partial strategy is being implemented successfully.	There is **clear quantitative evidence** that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).
(d) Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs	There is **qualitative evidence** that the UoA complies with its management requirements to protect VMEs.	There is **some quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/ non-MSC fisheries, where relevant.	There is **clear quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/ non-MSC fisheries, where relevant.
Justification/Rationale			
si (a) – 80. This fishery is extremely unlikely to impact benthic habitats, the term 'if necessary' applies here and management measures should not be required. SG60 and SG80 requirements are therefore met. No full strategy is in place which specifically aims to manage the impacts of the fishery on habitat types (either directly or through ghost fishing). SG100 is therefore not met. si (b) – 80^{+}. The nature of the fishery qualifies the "partial strategy" requirement and there is some confidence, based on information about the fishing operations, that the partial strategy will work to meet SG80 requirements in PI 2.4.1. si (c) 80^{+}– VMS tracks provide evidence of vessel movements and fishing locations. Weekly forecast emails recommend offshore fishing locations to skippers. si (d) – 80. There is only qualitative evidence that the UoA complies with requirements to protect VMEs. The nature of the fishery and the absence of interactions with VMEs mean this issue is met by default, though without clear quantitative evidence only SG80 is met.			
Likely Scoring Level (pass/pass with condition/fail)			**(80) Pass**

Component	Habitats
PI 2.4.3	**Information is adequate to determine the risk posed to the habitat by the UoA and the**

Information	effectiveness of the strategy to manage impacts on the habitat.		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Information quality	The types and distribution of the main habitats are **broadly understood**. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the types and distribution of the main habitats.	The nature, distribution and **vulnerability** of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
(b) Information adequacy for assessment of impacts	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	The physical impacts of the gear on all habitats have been quantified fully.
(c) Monitoring		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in all habitat distributions over time are measured.
Justification/Rationale			
si (a) – 80. The nature, distribution and **vulnerability** of the main habitats in the UoA area have been investigated through numerous studies on reef habitats in the nearshore areas as well as on turtle nesting habitats and the status of nesting beaches. si (b) – 80^{+}VMS provides accurate information on the spatial extent of the fishery and timing and location of fishing gear use. The information is adequate. si (c) – Monitoring of nearshore habitats continues as these areas are important for local tourism as well as ETP turtles. Offshore habitats are monitored via satellite by NARA to facilitate weekly forecast emails. Observers are required on board vessel >24m fishing the offshore environment.		

Likely Scoring Level (pass/pass with condition/fail)	(80) Pass

Ecosystem

Component	Ecosystem		
PI 2.5.1 Outcome Status	**The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Ecosystem status	The UoA is **unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
Justification/Rationale			
si (a) – 80 The quantities of target and bycatch species caught by the UoA make up a very small proportion of total catches in the Indian Ocean and the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.			
RBF required? (✓/×)	**x (possible to use SICA during full assessment with stakeholder engagement)**	**Likely Scoring Level (pass/ pass with condition/fail)**	**(80) Pass**

Component	Ecosystem		
PI 2.5.2 Management strategy	**There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Management strategy in place	There are **measures** in place, if necessary which take into account the **potential impacts** of the UoA on key elements of the ecosystem.	There is a **partial strategy** in place, if necessary, which takes into account **available information and is expected to restrain impacts** of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a **strategy** that consists of a **plan**, in place which contains measures to **address all main impacts of the UoA** on the ecosystem, and at least some of these measures are in place.

(b) Management strategy evaluation	The **measures** are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/ ecosystems).	There is **some objective basis for confidence** that the measures/ partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved	**Testing** supports **high confidence** that the partial strategy/ strategy will work, based on information directly about the UoA and/or ecosystem involved
(c) Management strategy implement-ation		There is **some evidence** that the measures/partial strategy is being **implemented successfully.**	There is **clear evidence** that the partial strategy/strategy is being **implemented successfully and is achieving its objective as set out in scoring issue (a)**.
Justification/Rationale			
National Development Policies incorporate conservation and protection of coastal and offshore environments. However an ecosystems approach to fisheries is not entrenched in either management plans nor legislation. Sri Lanka is, for the most part, meeting its requirements for implementation of IOTC Conservation and Management Measures. The proposed UoA is currently entered into a FIP and there is some evidence that measures are being implemented successfully.			
Likely Scoring Level (pass/pass with condition/fail)			**(70) Pass**

Component	**Ecosystem**		
PI 2.5.3 Information / monitoring	**There is adequate knowledge of the impacts of the UoA on the ecosystem.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Information quality	Information is adequate to **identify** the key elements of the ecosystem	Information is adequate to **broadly understand** the key elements of the ecosystem.	
(b) Investigation of UoA impacts	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but **have not been investigated** in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and **some have been investigated in detail**.	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and **have been investigated in detail**.
(c) Understandin g of component		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main

functions		ecosystem are **known**.	functions of these components in the ecosystem are **understood**.
(d) Information relevance		Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components **and elements** to allow the main consequences for the ecosystem to be inferred.
(e) Monitoring		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
Justification/Rationale			
Information is sparse and the last research survey and stock assessments were undertaken in 1978-1980. Information is adequate to identify key elements of the ecosystem within the Sri Lankan EEZ. An updated stock assessment program is underway as recently as the end of 2017 and will hopefully shed light on the status of resources in Sri Lankan waters. The main functions of the ecosystem components can be inferred from research undertaken elsewhere in the Indian Ocean, although the functional roles of tuna and other highly migratory species within the wider ecosystem remains undefined. Main impacts of the UoA on key ecosystem elements can be inferred from existing information, but **have not been investigated** in detail. Consequences of coastal fisheries the likes of the UoA continuing to exploit resources in the Indian Ocean are being monitored through actions initiated by the IOTC. Compliance with monitoring and reporting within Sri Lanka is improving rapidly and there a general understanding of the effects of the UoA on the ecosystem. Data continue to be collected and data capture and monitoring programs continue to be improved within and without of the UoA.			
Likely Scoring Level (pass/pass with condition/fail)			**(70) Pass**

Component	Governance and Policy		
PI 3.1.1 Legal and/or customary framework	**The management system exists within an appropriate and effective legal and/or customary framework which ensures that it:** – **Is capable of delivering sustainability in the UoA(s)** – **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** – **Incorporates an appropriate dispute resolution framework.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Compatibility of laws or standards with effective management	There is an effective national legal system and a **framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **binding procedures governing cooperation with other parties** which delivers management outcomes consistent with MSC Principles 1 and 2.
(b) Resolution of disputes	The management system incorporates or is subject by law to a **mechanism** for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes which is **considered to be effective** in dealing with most issues and that is appropriate to the context of the UoA.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes that is appropriate to the context of the fishery and has been **tested and proven to be effective**.
(c) Respect for rights	The management system has a mechanism to **generally respect** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **observe** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **formally commit** to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
Justification/Rationale			
Si (a) = 80 Cannot at this level determined how effective the legal system is – probably 80 OK but binding procedures unclear Si (b) = 80 Management system is structured and transparent but only considered to be effective (tested likely also proven – many uncertainties) Si (b) = 80+ Management system observes legal rights and formally commits – commitments to P1 and P2 not fully assessed. Need implementation of management regime separating fishery gear.		
Likely Scoring Level (pass/pass with condition/fail)			**(80) Pass**

Component	Governance and Policy		
PI 3.1.2 Consultation, roles and responsibilities	**The management system has effective consultation processes that are open to interested and affected parties.** **The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Roles and responsibilities	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood**.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for all areas** of responsibility and interaction.
(b) Consultation processes	The management system includes consultation processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used**.
(c) Participation		The consultation process **provides opportunity** for all interested and affected parties to be involved.	The consultation process provides **opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.
Justification/Rationale			
Si (b) = 80^{+} Organisation clearly identified but not tested by site visit. Functions and roles explicitly defined for key areas. Si(b) = 100. Consultations would seem transparent and regular – allows for all interested parties and engagement Si (c) = 80. Insufficient information but at least 80			
Likely Scoring Level (pass/pass with condition/fail)			**(85) Pass**

Component	Governance and Policy		
PI 3.1.3 Long term objectives	**The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard, and incorporates the precautionary approach.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Objectives	Long term objectives to guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are **implicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are **explicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are **explicit** within **and required by** management policy
Justification/Rationale			
Si(a) = 80 to 90 This in part is fulfilled by IOTC – National system needs more scrutiny. Precautionary Approach is accepted. Not complete in respect of being EXPLICIT			
Likely Scoring Level (pass/pass with condition/fail)			**(80) Pass**

Component	Fishery- specific management system		
PI 3.2.1 Fishery-specific objectives	**The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Objectives	**Objectives**, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific management system.	**Short and long term objectives**, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.	**Well defined and measurable short and long term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.
Justification/Rationale			
Si(a) = 75 with conditions The fishery-specific management system would seem broadly consistent with P1 and P2. A more thorough assessment would identify more clearly if "explicit". No FMP available for the specific tuna fishery although the fisheries policy and frameworks are detailed. Long-term objectives would be implicit in the IOTC management, but some reservations regarding National and EEZ management.			
Likely Scoring Level (pass/pass with condition/fail)			**(75) Pass with condition**

Component	Fishery- specific management system		
PI 3.2.2 Decision-making processes	**The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives and has an appropriate approach to actual disputes in the fishery.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Decision-making processes	There are **some** decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
(b) Responsive-ness of decision-making processes	Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
(c) Use of precautionary approach		Decision-making processes use the precautionary approach and are based on best available information.	
(d) Account-ability and transparency of management system and decision making process	Some information on the fishery's performance and management action is generally available on request to stakeholders	**Information on the fishery's performance and management action is available on request,** and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring evaluation and review activity.	Formal reporting to all interested stakeholders **provides comprehensive information on the fishery's performance and management actions** and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
(e) Approach to disputes	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.

	the fishery		
Justification/Rationale			
Si (a) = 60 Not clear if the decision making process is established and or effective. At IOTC level OK. Si(b) = 80 At IOTC level there is responsiveness. At national level it is unclear (more clarity needed). Based on interaction and information provided serious and important issues are addressed Si(c) = 80 Assumes IOTC CMMs will drive the Precautionary Approach. Need to verify PA applied at national level Si (d) = 80 with condition – Information on the fishery is available although it is not yet clearly defined (the UoA). Likely to score at 100 once fully assessed Si (e) = 80 There is evidence that system is attempting to resolve disputes – more scrutiny needed. Likely that there have been legal challenges – not certain related to community responses without a site visit			
Likely Scoring Level (pass/pass with condition/fail)			**(75) Pass with condition**

Component	**Fishery- specific management system**		
PI 3.2.3 Compliance and enforcement	**Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) MCS implementa-tion	Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
(b) Sanctions	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, **are consistently applied** and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.
(c) Compliance	Fishers are **generally thought** to comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	**Some evidence exists** to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a **high degree of confidence** that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
(d) Systematic non-compliance		There is no evidence of systematic non-compliance.	

Justification/Rationale	
Si(a) = 80 At national level there is an MCS structure, observers deployed on high seas. Difficult to actually identify enforcement levels especially due to the large fleet which will be a challenge. Si(b) = 80 There is some evidence of sanctions being applied with fines and legal process. Not sure on consistency but would give the fishery the benefit of the doubt Si(c) = 60 with condition - This Si could be sensitive – it is likely to score 60-80 unless evidence can be provided that fishers comply with the management system Si(d) = 80 with condition – this will also be a difficult scoring issue without evidence. Shark finning and other IUU reporting to IOTC may be problematic. With a large fleet the test (not systematic) is vulnerable to objection.	
Likely Scoring Level (pass/pass with condition/fail)	**(75) Pass with condition**

Component	Fishery- specific management system		
PI 3.2.4 Monitoring and management performance evaluation	**There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives.** **There is effective and timely review of the fishery-specific management system.**		
Scoring issues	**SG60**	**SG80**	**SG100**
(a) Evaluation coverage	There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **key** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.
(b) Internal and/or external review	The fishery-specific management system is subject to **occasional internal** review.	The fishery-specific management system is subject to **regular internal** and **occasional external** review.	The fishery-specific management system is subject to **regular internal and external** review.
Justification/Rationale			
Si(a) = 60 Not clear if there is a mechanism to evaluate the fishery – certainly at IOTC level OK. The fishery UoA remains to be more clearly established so a score of 60-80 with condition likely Si(b) = 60 As with Si(a) not clear if there is regular or occasional external review. At IOTC level OK but National level will require evidence			
Likely Scoring Level (pass/pass with condition/fail)			**(60) Pass with condition**

SUMMARY OF SCORE AND LIKELY SCORING LEVELS FOR THE SRI LANKAN LONGLINE FISHERY FOLLOWING PRE-ASSESSMENT

Table 10: Summary of conservative scores for each Performance Indicator.

Principle	Component	Performance Indicator (PI)		Likely Scoring Category
P1 UoA 1 YFT	Outcome	1.1.1	Stock status	**60-79**
		1.1.2	Stock rebuilding	**60-79**
	Management	1.2.1	Harvest strategy	**>80**
		1.2.2	Harvest control rules & tools	**60-79**
		1.2.3	Information & monitoring	**60-79**
		1.2.4	Assessment of stock status	**>80**
P1 UoA 2 BET	Outcome	1.1.1	Stock status	**>80**
	Management	1.2.1	Harvest strategy	**>80**
		1.2.2	Harvest control rules & tools	**60-79**
		1.2.3	Information & monitoring	**60-79**
		1.2.4	Assessment of stock status	**>80**
P1 UoA 3 SWO	Outcome	1.1.1	Stock status	**>80**
	Management	1.2.1	Harvest strategy	**>80**
		1.2.2	Harvest control rules & tools	**60-79**
		1.2.3	Information & monitoring	**60-79**
		1.2.4	Assessment of stock status	**>80**
P2	UoA 1 Primary species	2.1.1	Outcome	**>80**
		2.1.2	Management strategy	**>80**
		2.1.3	Information/Monitoring	**>80**
	UoA 2 Primary species	2.1.1	Outcome	**60-79**
		2.1.2	Management strategy	**>80**
		2.1.3	Information/Monitoring	**>80**
	UoA 3 Primary species	2.1.1	Outcome	**60-79**
		2.1.2	Management strategy	**>80**
		2.1.3	Information/Monitoring	**>80**
	Secondary species	2.2.1	Outcome	**60-79**
		2.2.2	Management strategy	**60-79**
		2.2.3	Information/Monitoring	**>80**
	ETP species	2.3.1	Outcome	**<60**
		2.3.2	Management strategy	**60-79**
		2.3.3	Information strategy	**<60**
	Habitats	2.4.1	Outcome	**60-79**
		2.4.2	Management strategy	**>80**
		2.4.3	Information	**>80**
	Ecosystem	2.5.1	Outcome	**>80**
		2.5.2	Management	**60-79**
		2.5.3	Information	**60-79**
P3	Governance & Policy	3.1.1	Legal &/or customary framework	**>80**
		3.1.2	Consultation, roles & responsibilities	**>80**
		3.1.3	Long term objectives	**>80**
	Fishery specific management system	3.2.1	Fishery specific objectives	**60-79**
		3.2.2	Decision making processes	**60-79**
		3.2.3	Compliance & enforcement	**60-79**
		3.2.4	Monitoring & Management	**60-79**