Seychelles National Tuna Development and Management Plan

Deliverable 11: Final Version of the National Tuna Fishery Management Plan

DELIVERABLE # 11

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Version History

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APPROVAL

We, the undersigned, acknowledge that we have reviewed **Deliverable #11: Final Version of the National Tuna Fishery Management Plan** presented in this document for the ***Seychelles National Tuna Development and Management Plan*** and hereby provide our approval.

Signature: _____ Date: _____

Print Name: _____

Title: _____

Role: _____

REMARKS AND OBSERVATIONS (if any):

DISCLAIMER

Much of the information on the history of the Indian Ocean tuna fisheries used in this management plan is extracted from:

Marsac, F., Fonteneau, A., & Michaud, A. (Eds.). (2017). *L'or bleu des Seychelles: Histoire de la pêche industrielle au thon dans l'Océan Indien*. IRD éditions.

Information on ecosystem and habitat are mostly extracted from the following two publications:

Stéquert, B., & Marsac, F. (1989). *Tropical tuna: surface fisheries in the Indian Ocean* (No. 282). Food & Agriculture Org.. and from

Kaplan, D. M., Chassot, E., Amandé, J. M., Dueri, S., Demarcq, H., Dagorn, L., & Fonteneau, A. (2014). Spatial management of Indian Ocean tropical tuna fisheries: potential and perspectives. *ICES Journal of Marine Science*, *71*(7), 1728-1749.

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ABBREVIATIONS AND ACRONYMS

ACRONYM	DESCRIPTION
ABNJ	Areas Beyond National Jurisdiction
AFAD	Anchored Fish Aggregating Device
AIS	Automatic Identification System
ALDFGDs	Abandoned, Lost or otherwise Discarded Fishing Gears and Devices
AU-NEPAD	African Union - New Partnership for Africa's Development
BET	Bigeye tuna
B_0	Unfished biomass
B_{curr}	Current biomass
B_{lim}	Limit reference point for spawning stock biomass (SSB)
B_{saftey}	Safety biomass
B_{targ}	Biomass target
B_{thresh}	Threshold biomass
B_y	Biomass in year y
CBD	Convention on Biological Diversity
CCRF	FAO Code of Conduct for Responsible Fisheries
CI	Confidence Interval
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
C_{max}	Maximum catch limit
CMM	Conservation Management Measure
CMS	Convention on Migratory Species
COMESA	Common Market for Eastern and Southern Africa
CPC	IOTC Contracting Party (Member) and Cooperating Non-Contracting Party
CPUE	Catch per Unit of Effort
DFAD	Drifting Fish Aggregating Device
DFL	Dorsal Fork Length
D_{max}	Maximum change in catch limit
DoF	Department of Fisheries
DWFN	Distant Water Fishing Nation
EBM	Ecosystem Based Management
EEZ	Exclusive Economic Zone
EMS	Electronic Monitoring System
e-PSM	Electronic-Port State Measures (application)
ETP	Endangered, Threatened or Protected
ERS	Electronic Reporting System
EU	European Union
FAD	Fish Aggregating Device
FAO	Food and Agriculture Organisation of the United Nations
FIP	Fishery Improvement Program
FIMS	Fisheries Information Management System
FiTI	Fisheries Transparency Initiative
FL	Fork Length
F_{lim}	Fishing mortality limit reference point

F_{mult}	Tuning multiplier
F_{MSY}	Fishing mortality rate corresponding to Maximum Sustainable Yield
F_{targ}	Fishing mortality target
GDP	Gross Domestic Product
GRT	Gross Registered Tons
HCR	Harvest Control Rule
HCR_{mult}	Harvest control rule multiplier
I_{max}	Maximum fishing intensity
IOC	Indian Ocean Commission
IOTC	Indian Ocean Tuna Commission
IRD	Institut de Recherche pour le Développement
ISO	International Organization for Standardization
IUU	Illegal, Unreported and Unregulated
K	Carrying capacity
kg	Kilogram
KPI	Key Performance Indicator
LJFL	Lower Jaw Fork Length
MARPOL	International Convention for the Prevention of Pollution from Ships
MCS	Monitoring, Control and Surveillance
MDAs	Ministries, Departments and Agencies
MEP	Monitoring and Evaluation Plan
MOFBE	Ministry of Fisheries and the Blue Economy
MOU	Memorandum of Understanding
MP	Management Procedure
MSC	Marine Stewardship Council
MSE	Management Strategy Evaluation
MSY	Maximum Sustainable Yield
MTC	Minimum Terms and Conditions
NGO	Non-Governmental Organisation
NISCC	National Information Sharing and Coordination Centre
POC	Province of China
RFMO	Regional Fisheries Management Organisation
SADC	Southern African Development Community
SB_{MSY}	Spawning Stock biomass that will generate Maximum Sustainable Yield
SCG	Seychelles Coast Guard
SCR	Seychelles Rupees
SDF	Seychelles Defence Forces
SDG	Sustainable Development Goal
SFA	Seychelles Fishing Authority
SFPA	Sustainable Fisheries Partnership Agreement
SGP	Simple Gross Profit
SIFA	Seychelles Industrial Fisheries Authority
SILL	Semi-Industrial longliners
SIOFA	Southern Indian Ocean Fisheries Agreement
SMSA	Seychelles Maritime Safety Authority
SMSP	Seychelles Marine Spatial Planning
SPA	Seychelles Ports Authority

SWIO	South West Indian Ocean
SWIOFC	South West Indian Ocean Fisheries Commission
TAC	Total Allowable Catch
TAC_{rec}	Recommended Total Allowable Catch
TCMP	Technical Committee on Management Procedures
TFCC	Tuna Fishery Co-Management Committee
UNCLOS	United Nations Convention on the Law of the Sea
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar
VMS	Vessel Monitoring System
WIO	Western Indian Ocean
WPEB	Working Party on Ecosystems and Bycatch
YFT	Yellowfin tuna

EXECUTIVE SUMMARY

This document is Seychelles' first Tuna Fishery Management Plan. Its purpose is to contribute to the sustainable utilization of the Indian Ocean's tuna fishery resources while balancing ecological, economic, and social considerations. It aligns well with the long-term vision for the Seychelles tuna fisheries of having ***An Indian Ocean that is healthy and full of life from which the Seychelles can make sustainable use of the tuna resources for maximum socio-economic benefits of its people.*** The Plan was developed over a period of 18 months through extensive stakeholders' consultation and review.

The Plan has four overarching goals, focused on resource sustainability, effective fishery governance, economic contribution, and social development.

- **Goal 1:** Resource sustainability: Contribute to regional efforts to ensure the long-term sustainability of the Indian Ocean's tuna stocks and the ecological wellbeing of the environment.
- **Goal 2:** Effective fisheries governance: Strengthen the governance and management of Seychelles' tuna fisheries.
- **Goal 3:** Economic contribution: Enhance the tuna fisheries value chain for the benefit of all stakeholders.
- **Goal 4:** Social development: Ensure that the tuna fisheries contribute to socio-economic development and empowerment of the Seychellois nation.

Plan is made up of 12 sections:

- Section 1 is the ***Identification and description of the fishery***. It identifies the species, management area, fishing methods, fishing fleets, land-based activities covered by the management plan and defines the management approaches, national spatial measures, and restrictions that the Plan will abide to. It provides details on the term of the plan, how adjustments are to be incorporated, the date of its next review, and guidance on the procedures for its update.
- Section 2 describes the ***Goals and objectives*** of the Plan. It describes the long-term policy objectives of the plan and its link to the Seychelles Fisheries Sector Policy and Strategy 2019 and the Seychelles fisheries laws, as well as the Seychelles international, regional, and national commitments for the development and management of fisheries and other marine resources. It describes the long-term vision, overarching goals, and the operational objectives.
- Section 3 provide details on the ***tuna fisheries management structure***. It provides details on the legal framework and different types of arrangements for the implementation of the plan including the institutional, consultation and co-management arrangements as well as arrangements for the allocation of fishery resources.
- Section 4 outlines the ***harvest strategies and control rules*** that will be implemented. It outlines how the Seychelles tuna fishery will be managed in accordance with harvest strategies adopted nationally and by the Indian Ocean Tuna Commission (IOTC).
- Section 5 addresses ***ecosystem and management strategies.*** It provides detail on obligatory requirements and recommendations that the Seychelles government and operators in the tuna fishery will need to implement to reduce the impact of fishing on non-target species, endangered, threatened, and protected species (ETP species), and on marine and coastal ecosystems and habitats. It introduces the management strategies that

will be implemented to strengthen the implementation of these requirements and recommendations.

- Section 6 outlines the ***economic and social considerations.*** It briefly describes the economic and social context under which the Seychelles tuna fishery is operating and list the management strategies that will be implemented to address economic and social concerns in the fishery.
- Section 7 is on ***stock assessment, fishery monitoring and research.*** It provides detail on the current status of target stocks, describes how stock assessments are undertaken, fisheries-dependent monitoring and reporting framework in place, fisheries research and collaboration in research and outlines data and reporting requirements to the IOTC.
- Section 8 focusses on ***compliance and monitoring.*** It provides details on the objectives and approaches that will be followed for fisheries monitoring, control, and surveillance (MCS) to support successful implementation of agreed fisheries management policies, plans and strategies. It provides details on MCS planning, risk assessment, deterrence of non-compliance and outline the roles and responsibilities of enforcement agencies in compliance.
- Section 9 is on ***fishery performance evaluation*** and provide guidance on the approach for monitoring and evaluating the implementation of the Plan and how it should be reviewed, revised, and updated.
- Section 10 details the ***resources required to implement the Plan*** including human and financial resources, and cost recovery.
- Section 11 is the ***implementation plan.*** It details the proposed priority actions to be implemented, the timeline for implementation, and identifies the organisation(s) responsible for taking the lead. It links each proposed priority action to a management strategy and each strategy to its operational objective and the overarching goal.
- Section 12 is the ***monitoring and evaluation plan.*** It details the indicator(s) and or target(s) that should be used to assess the implementation of each priority actions, strategy and over operational objective, and provide details of how often they should be evaluated.

It is intended that this Seychelles Tuna Fishery Management Plan will be implemented over a period of five years, and that it will be reviewed, and if required updated mid-way in consultation with key stakeholders in the Seychelles fisheries sector and regulatory agencies. The overall responsibility for the implementation of this Management Plan is that of the Seychelles Fishing Authority.

1. IDENTIFICATION AND DESCRIPTION OF THE FISHERY

1.1 Fishery to Which this Plan Applies

Fishery name:	Seychelles Tuna Fishery
Species covered:	The plan covers the 15 tuna and tuna-like species under the IOTC management mandate and other species (sharks, marine turtles, seabirds, cetaceans, and other bycatch species) affected by the Seychelles tuna fisheries. The species under the IOTC management mandate include the following: **Temperate and tropical tunas** • Albacore (*Thunnus alalunga*) • Bigeye (*Thunnus obesus*) • Skipjack (*Katsuwonus pelamis*) • Yellow fin (*Thunnus albacares*) **Billfishes** • Swordfish (*Xiphias gladius*) • Black marlin (*Istiompax indica*) • Blue marlin (*Makaira nigricans*) • Striped marlin (*Kajikia audax*) • Indo-Pacific sailfish (*Istiophorus platypterus*) **Neritic tunas and mackerels** • Bullet tuna (*Auxis rochei*) • Frigate tuna (*Auxis thazard*) • Kawakawa (*Euthynnus affinis*) • Longtail tuna (*Thunnus tonggol*) • Indo-Pacific king mackerel (*Scomberomorus guttatus*) • Narrow-barred Spanish mackerel (*Scomberomorus commerson*)
Fishery location:	The geographical scope of the management plan includes the FAO Area 51 (Western Indian Ocean) and 57 (Eastern Indian Ocean) under the Area of Competence of the Indian Ocean Tuna Commission (IOTC) and all FAO Fishing Areas for which Seychelles vessels have authorisation to fish.
Fishing methods:	Fishing methods covered under this management plan include industrial one boat operated purse seine (PS)), drifting longlines (LLD) operated by industrial and small-scale longline vessels, handlines and pole-lines including jigging lines (LHP), trolling lines (LTL) and unspecified hook and lines (LX) operated by artisanal and recreational vessels (charter vessels and personal vessels).
Fishing fleets:	All Seychelles flagged purse seiners, (including supply vessels, which operate in support of purse seiners), industrial longliners, small-scale longliners, artisanal fishing vessels, and recreational fishing vessels (charter vessels and personal vessels) and foreign vessels while operating within areas under Seychelles jurisdiction.

Land-based activities:	Include land-based activities related to tuna fisheries where there are issues regarding environmental sustainability (e.g. disposal or recycling of old fishing gears, landing and transhipment, etc).
Approaches:	The fishery is to be managed according to the best available scientific evidence, and the Ecosystem Approach to Fisheries Management. If scientific information is not sufficient to provide advice, the precautionary approach will be used.
National spatial measures and restrictions:	All fishing vessels will have to abide by the restrictions and Allowable Activities defined for different zones designated under the Seychelles Marine Spatial Planning (SMSP) Initiative and Approved Area Site Management plans, and Fisheries Exclusion Zones (First Schedule Fisheries Regulations (1987)).
Term of plan:	This plan is for a period of five years (2024 – 2028).
Adjustments to the plan:	The **Implementation Plan** can be adjusted annually based on implementation progress, available human and financial resources and key findings from annual monitoring and evaluation.
Date of next review:	A mid-term review should be undertaken in 2026 and an end of lifespan review should be undertaken in 2028.
Update of the plan:	The Plan should be updated during its fifth year (2028) of implementation.
Key authors:	Jude P. Bijoux, Judith Swan, Murray Duncan, Stewart Laing, Phillipe Lallemand

1.2 Description of the Fishery

1.2.1 Historical Overview

Small-scale tuna fishing in the Indian Ocean has been ongoing over several centuries by the coastal and island countries. Industrialisation of the Indian Ocean tuna fishery started in the 1950s by Japanese deep-sea longliners (Finley, 2016; Zeller et al., 2023). Early catches by these longliners in the Western Indian Ocean indicated that the region rivalled the best fishing grounds in the circum-equatorial zone at the time. These positive results prompted the Seychelles to explore different types of fishing techniques and arrangements to make use of this abundant resource. Compared to the successes of the pole and line fishery in the neighbouring Maldives and Madagascar, trials of this fishing technique by the Seychelles in the early 1980s did not yield encouraging results. The main challenge of the endeavour was in finding and keeping live bait (Marsac et al., 2017). The Seychelles continued to explore other fishing techniques, including purse seining and longlining. First reports of sport fishing were made in the years following the opening of the Seychelles international airport in 1971 (Christ et al., 2020; Le Manach et al., 1950).

The Indian Ocean industrial purse seine fishery started in 1979 with the Japanese purse seiner Nippon Maru. Its successes encouraged prospection by French purse seiners in the early 1980s. These exploratory expeditions provided encouraging results. By October 1983, the first fishing agreement had been signed between the Seychelles and Spain, and in January 1984, the first fishing agreement was signed between the Seychelles and the European Commission. The latter agreement would lead to years of cooperation between the Seychelles and the European Commission/Union in the development of the Indian Ocean tuna fisheries and set Port Victoria on the path to become the hub of the Western Indian Ocean tuna fisheries. By December 1984, 27

Franco-Ivorians and 13 Spanish purse seiners had obtained licenses to fish in areas under Seychelles EEZ, alongside several Asian longliners. In that same year the Seychelles Fishing Authority (SFA) was created. It took over from the Seychelles Industrial Fisheries Authority (SIFA) that had been created just a year before to manage the industrial tuna fisheries. In the first decades of its existence, the focus of the SFA was on the development of the fisheries sector. In 1986, the Seychelles Government enacted the Fisheries Act and Regulations to provide the legal framework for better control and management of fisheries. A revised Fisheries Act came into force in 2014.

The Seychelles started registering purse seiners in 1997, and industrial longliners in 1999. The small-scale longline fishery started operations in 1995. In 2021, the vessels licensed to fish in Seychelles waters had a nominal catch of 440,020 t from the Western Indian Ocean, of which around 32% was taken by Seychelles vessels. The Seychelles EEZ accounted for 13.4% (59,334 t) of the catch made by the vessels licensed to fish in Seychelles waters. Catch in the purse seine fishery continues to be dominated by skipjack (*Katsuwonus pelamis*) and yellowfin tuna (*Thunnus albacares*), whereas in the industrial longline fisheries it is dominated by bigeye (*Thunnus obesus*) and yellowfin. The small-scale longline fishery primarily target yellowfin tuna. However, this was not always the case. In 2003, cadmium levels exceeding European Union (EU) thresholds were detected in a batch of swordfish from the small-scale longline fishery exported to the UK. In October 2004, the EU imposed an embargo on swordfish imports from the Seychelles, jeopardising the viability of the fleet as swordfish accounted for 50-80% of catches depending on the year. The fishery almost collapsed as the small-scale longline fleet halved due to this occurence. The ban was lifted in February 2005 after further investigations revealed that the regulatory thresholds did not apply to swordfish, and the EU established a new threshold for swordfish. It took a long time for the small-scale longline fishery to recover from this incident.

In 2021, the Seychelles had 13 purse seiners, four supply vessels and 64 industrial longliners and 43 small-scale longliners under its flag fishing the Western Indian Ocean. For that same year, Seychelles granted foreign fishing licence to 124 industrial longliners, 33 purse seiners and nine supply vessels to fish in its EEZ. The purse seine fishery continues to be dominated by vessels from Spain, Seychelles and France while the industrial longline fishery is dominated by vessels from Taiwan Province of China (POC), Seychelles, and China.

Today, the Western Indian Ocean tuna fishery is highly developed and is faced by a number of sustainability challenges, including the overexploitation of certain stocks, the environment and ecosystem impacts of Abandoned, Lost or otherwise Discarded Fishing Gears and Devices (ALDFGDs), and bycatch of non-target species (Gopalakrishna Pillai & Satheeshkumar, 2012; Kaplan et al., 2014). The problem of industrial tuna fisheries on non-targeted species and the impacts of ALDFGDs became apparent very early on. In the purse seine tuna fisheries, early observer data puts the annual average discards of tuna and by-catches at around 47 tonnes for every 1,000 tonnes of tuna caught (Amandé et al., 2012) and highlighted the growing problem of fish aggregating devices (FADs) on bycatch (Marsac et al., 2017). Throughout the world it had been shown that the vast majority of discards and bycatch by purse seiners come from schools associated with floating objects, with free schools generally having few associated species (Amandé et al., 2008; Fonteneau et al., 2000; Gilman et al., 2017). The other identified issue with FADs was the entanglement of endangered, threatened and protected (ETP) species like turtles and sharks, and the FADs getting stranded in shallow areas (MacMillan et al., 2022; Pons et al., 2023), where they cause damage to sensitive habitats (Mourot, 2022). The longline fisheries are

also associated with high level of bycatch and discards (Clarke et al., 2014). In certain areas, sharks can account for 75% of discards in the longline fisheries.

Realising that the Indian Ocean area was inadequately served by international fishery bodies and that offshore fisheries resources were not being adequately managed, the Council of the Food and Agriculture Organisation (FAO) of the United Nations established the Indian Ocean Fishery Commission (IOFC) in 1967 by means of the Council's Resolution 2/48. At the first session of the IOFC in 1968, the Committee for the Management of Indian Ocean Tuna (CMIOT) was established with the mandate "to assist IOFC in its consideration of the steps required to introduce management measures for heavily exploited stocks of tuna when these measures are found necessary." Increased in landing from the Indian Ocean in the years that followed, prompted many Indian Ocean coastal States to reiterate their concern over the lack of a proper management body to regulate tuna fishing in the region and on the need to establish long-term institutional arrangements for the management of Indian Ocean tuna stocks. After more than 20 years of discussions and negotiations, the Indian Ocean Tuna Commission (IOTC) was created in 1996 under the aegis of the FAO, with its headquarters in the Seychelles. Its main objective, function and responsibility was to "promote cooperation among its members with a view to ensuring, through appropriate management, the conservation and optimum utilization of stocks covered by [its Establishment] Agreement and to encourage the sustainable development of fisheries based on such stocks."

Soon after its creation, the IOTC started adopting resolutions to regulate and manage the impacts of fisheries on the stocks under its mandate, including on associated biodiversity, and to increase the amount of scientific information available for stock management. The Seychelles have actively contributed to the drafting of many of these resolutions and continues to implement them with a high level of compliance (see Assan et al., 2023). At least three tagging programmes have been implemented since and have generated new data on the growth and movement of Indian Ocean tuna species. The IOTC continues to encourage its members to undertake research on various components of the biology of tuna and associated species, including on fisheries, and lastly, to share the data. It periodically assesses the stocks of tuna and tuna-like species under its management mandate, as well as other species affected by IOTC fisheries. CMMs implemented by the IOTC and its members are helping to address many of the environmental impacts of fishing on the environment, but these are not fully resolved.

At the local level, work is currently underway on strengthening the legal framework for the management of fisheries through the revision of the Fisheries Act and Regulations. An essential element of the legal framework revision is the domestication of Regional Fisheries Management Organisation (RFMOs) resolutions to which Seychelles have not objected.

1.2.2 Biology of the Target Stocks

This section of the management plan provides a brief of what is known about the stock of the 15 species under the IOTC management mandate and some of the commonly caught target and non-target species Information comes mainly from stock status summaries published on the IOTC Stock Status Dashboard.

1.2.2.1 Albacore (*Thunnus alalunga*)

Cosmopolitan in all temperate and tropical oceans from 40°N and 40°S but not at the surface near the equator. An epipelagic and mesopelagic oceanic species, abundant in surface waters of 15.6° to 19.4°C. Juveniles concentrate in cold temperate areas. A highly migratory species where adults do yearly counterclockwise migrations following surface currents of the south tropical gyre in the Indian Ocean. Migratory patterns are indicative of a single stock in the Indian Ocean. The species lives for around 9 years and reaches a maximum fork length of 140 cm although catches of 100 cm are more common. The maximum recorded weight is 60.3 kg. In the Indian Ocean, both females and males reach sexual maturity between 5-6 years at an average length of around 85.2 cm FL. Little is known about the spawning of Albacore tuna but it most likely spawns off the coast of Madagascar in the Indian Ocean, between 15 – 25°S during the 4th and 1st quarter. The species feeds on fishes, crustaceans, and squids. IUCN status: Least concern.

1.2.2.2 Bigeye (*Thunnus obesus*)

Inhabits tropical and subtropical waters throughout the Pacific, Atlantic and Indian oceans (52°N - 48°S) down to around 300 m depth but can be found up to 1500 m. Rapid large scale movements indicative of a single stock in Indian Ocean. Occurs in areas where water temperatures range from 13°-29°C, but its optimum is between 17° and 22°C. Bigeye tuna can live up to 15 years and reach a maximum FL of 200 cm and maximum weight of 200 kg. In the Indian Ocean, both females and males reach sexual maturity at 3 years old, or 100 cm FL. Spawning occurs from December to January in the eastern Indian Ocean. Bigeye feed on a wide variety of fishes, cephalopods, and crustaceans during the day and at night. IUCN status: Vulnerable.

1.2.2.3 Skipjack (*Katsuwonus pelamis*)

Inhabits tropical and subtropical waters throughout the Pacific, Atlantic and Indian Oceans between 63°N - 47°S. Rapid large-scale movements are indicative of a single stock. Skipjack prefer warmer waters between 15°C - 30°C and often school near the surface. The species live up to 7 years reaching a maximum size of 110 cm FL or 35.5 kg total weight although a more common weight is around 3 kg. In the Indian Ocean, skipjacks mature at an age of less than two years or between 41 – 43 cm FL for both females and males. Considered highly fecund and batch spawns opportunistically throughout the year when temperatures are optimal (> 24 °C). Feeds on fishes,

crustaceans, cephalopods and molluscs; cannibalism is common. Feeding activity peaks in the early morning and in the late afternoon. IUCN status: Least concern.

1.2.2.4 Yellow fin (*Thunnus albacares*)

Occurs across all tropical and subtropical oceans (59°N - 48°S), usually between 1 – 100 m depth. Large scale movements indicative of a single stock in the Indian Ocean. Species is sensitive to low oxygen and therefore is not usually caught below 250 m in the tropics. Yellowfin tuna can live for 6 – 10 years reaching a maximum size of 240 cm FL or 200 kg whole weight, although sizes in the Indian ocean are between 30 - 180 cm FL. In the Indian Ocean, yellowfin reach sexual maturity between 3 – 5 years or 75 – 114 cm FL for both females and males. Spawning season is December to March in the equatorial region west of 75 °E. Yellowfin is an apex predator feeding on a variety of fishes, crustaceans, and squids. IUCN status: Least concern.

1.2.2.5 Swordfish (*Xiphias gladius*)

Occurs throughout the tropical and temperate global oceans between 69°N - 50°S. Juveniles are found nearer to tropics and they migrate to higher latitudes as they mature. Large solitary adults are most abundant between 15 – 35 °S in the Indian ocean. Can tolerate large depth and temperature ranges between 0 – 1500 m and 5 – 27 °C. Undertakes diel vertical movement to deep depths > 1000 m below sea level. The species can live to greater than 30 years reaching a maximum length of 455 cm LJFL (lower jaw fork length) or 550+ kg total weight. Females reach larger sizes, grow faster and mature later with any specimen greater than 200 kg considered female. In the Indian Ocean, both females and males reach sexual maturity between 4-5 years but at different sizes; 170cm LJFJ (females), 120 cm LJFJ (males). Swordfish are considered highly fecund batch spawners (every three days) with spawning believed to occur in spring/summer with a single known spawning area near Reunion Island identified in the Indian Ocean. The species feeds mainly on fishes (Atlantic mackerel, barracudinas, silver hake, redfish, herring and lanternfishes) but also cephalopods. IUCN status: Near threatened.

1.2.2.6 Black marlin (*Istiompax indica*)

Highly migratory species inhabiting tropical and subtropical waters from 50°N - 45°S. Occurs in oceanic waters above the thermocline and typically near land masses, islands and coral reefs;

however rare excursions to mesopelagic waters down to depths of 800 m are known. It is unknown how long black marlin can live and no age at maturity is available. On a size spectrum they mature at around 100 kg for females and 50 – 80 kg total weight for males. The species is considered a highly fecund batch spawner with spawning occurring in warmer waters between 26 – 27 °C. No spawning grounds have been identified in the Indian Ocean. Black marlin are apex predators feeding on small tuna and other fishes predominantly. IUCN status: Data deficient.

1.2.2.7 Blue marlin (*Makaira nigricans*)

Occurs in tropical and subtropical waters between 50°N - 45°S. The species is highly migratory and predominately occurs offshore in waters where temperatures are greater than 24 °C. Blue marlin can live for up to 28 years reaching a maximum length of 430 cm LJFL (female), 300 cm (males) and weight of 910 kg (female), 200 kg (males). In the Indian Ocean, the species reaches sexual maturity between 2-4 years or a size of 50 cm LJFL / 55 kg (females), 80 cm LJFL / 40 kg (males). Spawning occurs between May and September in the Pacific, but no known spawning times/grounds have been identified in the Indian Ocean. Blue marlin are solitary species that feed on squid and pelagic fishes such as tuna and frigate mackerel. IUCN status: Vulnerable.

1.2.2.8 Striped marlin (Kajikia *audax*)

Occurs in tropical and subtropical waters of the Indian and Pacific Ocean but absent in Atlantic Ocean (46°N - 49°S, 19°E - 69°W). Prefers more temperate, cooler waters, but still found in tropics. The species can live for up to 10 years reaching a maximum size of 314 LJFL (females) and 292 LJFL (males) in the Indian Ocean. Maximum weights are sexually dimorphic with females attaining up to 330 kg and males up to 185 kg (males) in the Indian Ocean. Age at maturity is between 2 – 3 years and size at maturity is unknown. Considered a highly fecund batch spawner with spawning occurring near seamounts or islands between 10°S and 20°S in the northeastern Indian Ocean. Striped marlin feed on fishes, crustaceans and squid. IUCN status: Least concern.

1.2.2.9 Indo-Pacific sailfish (*Istiophorus platypterus*)

Found throughout the tropical and subtropical regions of the Pacific and the Indian Oceans between 50°N - 43°S. Occurs in surface waters above the thermocline and is highly migratory. The species reaches ages of up to 13 years for females and 8 years for males. The maximum

documented size is 350 cm FL or 100 kg total weight. The species is a smaller sized bill fish but one of the fastest growing. Age and size at maturity data for this species is unknown. Spawning has been documented to occur between December – June (February peak), near Reunion Island. Diet consists of fishes, crustaceans, and cephalopods. IUCN status: Vulnerable.

1.2.2.10 Bullet tuna (*Auxis rochei*)

Occurs in tropical to temperate oceans of the world between 61°N - 51°S. Inhabits coastal areas. Bullet tuna can live up to 5 years reaching a maximum length of 50 cm FL, but a maximum weight is not documented. Females reach maturity at 2 years but male age at maturity is unknown. In the Indian Ocean, both females and males are believed to reach sexual maturity at a size of 25 cm FL. Spawning occurs throughout the species' range in multiple batches. Bullet tuna form schools and feed on small fishes, particularly anchovies, crustaceans (especially crab and stomatopod larvae) and squids. The species is considered to be an important prey for a range of predators, especially the commercial tunas. IUCN status: Least concern.

1.2.2.11 Frigate tuna (*Auxis thazard*)

Occurs in tropical to temperate oceans of the world between 61°N - 51°S. Adults are epipelagic in neritic and oceanic waters (50 m). The species lives for up to 5 years attaining a maximum size of 60 cm FL or 1.7 kg. Age at maturity is unknown but both females and males reach sexual maturity at a size of between 29 – 35 cm FL. Spawning season extends from August to April whereas north of the equator it is from January to April. They form schools and feed on small fish, squids and planktonic larvae. They are an important component of the food web as they are preyed upon by apex predators. IUCN status: Least concern.

1.2.2.12 Kawakawa (*Euthynnus affinis*)

Occurs in tropical waters of the Indo-west pacific between 35°N - 38°S. Lives in open waters close to the shoreline preferring temperatures between 18 – 29 °C. Kawakawa live for up to 9 years reaching a maximum size of 100 cm FL and weight of 14 kg. Age at maturity is unknown but both males and females mature at a size between 38 – 50 cm FL. The species is considered highly fecund and spawns in summer months (June – September). Forms large schools and feeds mainly on smaller fish. IUCN status: Least concern.

1.2.2.13 Longtail tuna (*Thunnus tonggol*)

Occurs in tropical waters of the Indo-west Pacific between 47°N - 31°S. Inhabits predominantly neritic areas with broad continental shelfs. Longtail tuna can live up to 20 years reaching a maximum size of 145 cm FL (female and male), although most common sizes in the Indian Ocean are between 40 – 70 cm FL. Maximum recorded weight is 35.9 kg. No age at maturity is known but both females and males are documented to reach sexual maturity at a size of 40 cm FL. Little is known about spawning times and locations for this species. Diet consists of fish, cephalopods, and crustaceans. IUCN status: Data deficient.

1.2.2.14 Indo-Pacific king mackerel (*Scomberomorus guttatus*)

Distribution is the northern tropical waters in western Indian Ocean between 38°N - 7°S. Occurs mainly off coastal waters between 15 – 200 m depth but has been found in estuaries. The longevity of the species is unknown with a maximum recorded length of 76 cm. Age at maturity is between 1 – 2 years for females but nothing is known about males. Size at maturity for both sexes is 39.8 cm FL. Spawning has been documented between March – May in southern India. The species' diet consists of small schooling fishes like sardines and anchovies. IUCN status: Data deficient.

1.2.2.15 Narrow-barred Spanish mackerel (*Scomberomorus commerson*)

Distribution is the tropical waters of the Indo-Pacific between 39°N - 41°S. Inhabits surface waters with juveniles found inshore and adults around the continental shelf. The species aggregates around reefs in small shoals. Maximum age is unknown with a maximum recorded length of 240 cm FL and weight of 70 kg. In the Indian Ocean, sexual maturity is reached at an age of 1.9 years for males and 2.1 years for females and at sizes of around 72.8 cm FL for males and 86.3 cm FL for females. Spawning occurs year-round with peaks in spring and summer. Diets consist of small fishes like anchovy. IUCN status: Near threatened.

1.2.2.16 Other targeted and non-targeted species

Many other species interact with and are caught in association with fisheries targeting IOTC species. These include numerous species of finfish, sharks, marine turtles, seabirds, and cetaceans. Some of the commonly caught finfish include dolphin fish (*Coryphaena spp*.), rainbow runner (*Elagatis bipinnulata*) and kyphosids (*Kyphosus cinerascens*). See Romanov (2002) for a

more complete list. Sharks are frequently caught, and some fleets known to actively target both sharks and IOTC species simultaneously. Commonly caught shark species include the IUCN classified Critically Endangered oceanic whitetip (*Carcharhinus longimanus*) and scalloped hammerhead shark (*Sphyrna lewini*), and the Endangered Shortfin mako shark (*Isurus oxyrinchus*), pelagic thresher shark (*Alopias pelagicus*) along with silky shark (*Carcharhinus falciformis*), blue shark (*Prionace glauca*), among many others.

Six species of marine turtles, 19 species of seabirds and 48 species of cetaceans are reported to be captured in the Indian Ocean tuna fishery including many Endangered and Critically Endangered species. Several international global environmental accords (e.g., Convention on Migratory Species (CMS), Convention on Biological Diversity (CBD), as well as numerous fisheries agreements obligates the Seychelles and other States participating in the tuna fishery to provide protection for these species.

1.2.3 Ecosystem and Habitat

The Indian Ocean, covering an area of 49 million km^2, is the world's smallest ocean basin. Africa and the Arab countries border the western side, the Indo-Asian continent all of the north side, Indonesia and Australia to the east, and the sub-tropical convergence to the south. The Indian Ocean is divided by the FAO in two fishing areas (Area 51 Western Indian Ocean; Area 57 Eastern Indian Ocean) (**Figure 1**). The western area comprises the Gulf of Oman, the Arabian Sea, the Somali Basin, the Mascareignes Basin (between Madagascar and the Seychelles/Mauritius/Reunion Ridge) as well as the Mozambique Channel. The eastern area comprises the Bay of Bengal, the Central Indian Ocean Basin, the Cocos Islands Basin, and the Wharton and North Australian Basins between Australia and the Sunda Islands (Indonesia). The Indian Ocean, hemmed into the north, east and west is characterized by well-defined meteorological and oceanographic phenomena which distinguish it from the Atlantic and Pacific Oceans. The Indo-Asian continent prevent any temperate marine influences from the north, and the strong interaction between ocean and continent results in the seasonal monsoon.

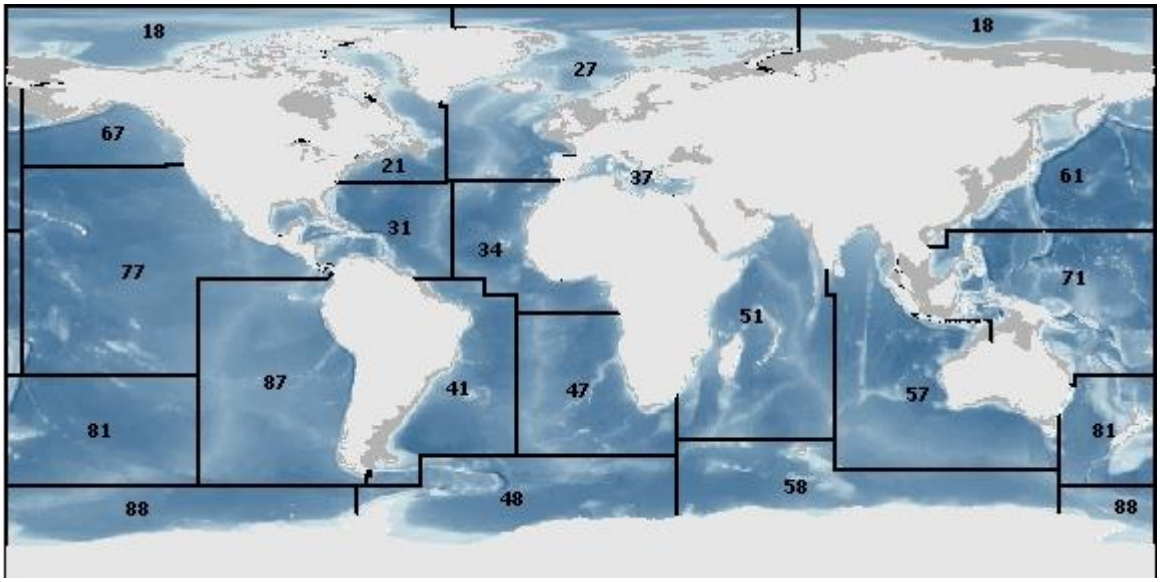

Figure 1. Map showing the boundaries of the FAO Fishing Areas. The Indian Ocean is separated into two areas. Area 51 is the Western Indian Ocean and Area 57 is the Eastern Indian Ocean. Source: FAO.

The distribution of tuna and tuna-like species in the Indian Ocean is not uniformed and is controlled by a number of physical and chemical variables including salinity, temperature, depth, light, nutrient concentration, and oxygen concertation, as well as the biology of individual species. The physical and chemical variables influence primary production and form the basis of marine food webs. These variables are in turn influenced by location, bathymetry, marine geological structures, and meteorological conditions which causes primary productivity to vary spatially and temporarily. Tagging studies undertaken in the WIO on the three tropical tunas have shown that they make rapid large-scale migration over the entire WIO region.

Changes in the relative prevalence among species are consistent with the biophysical oceanographic provinces, although none of the major pelagic species are strictly constrained to a single province. Spatial patterns of catch are not static in time, but rather vary on seasonal and inter-annual timescales. Long-term catch data reveals that tuna catches consist primarily of tropical tunas and that the major fishing area is in the High Seas just to the north of the Seychelles EEZ (**Figure 2**).

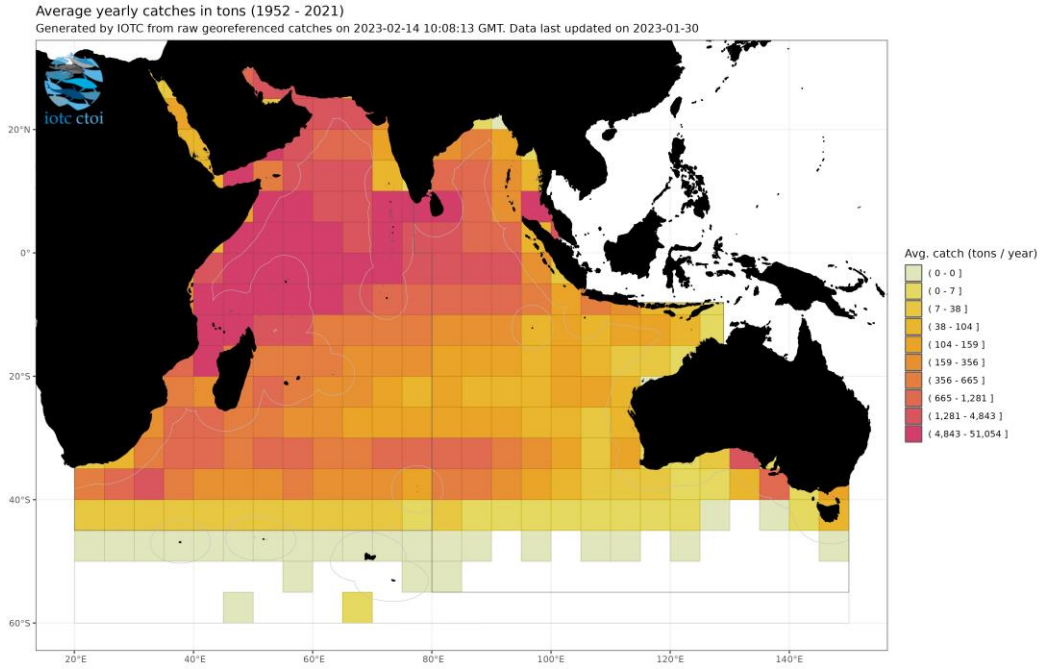

Figure 2. Average yearly catches (t) of tuna and tuna like species in the IOTC Area of Competence for the period of 1952 – 2021. Last updated 2023-01-20. Generated by IOTC from raw georeferenced catches on 2023-02-14.

During the July–October period of peak productivity along the coasts of Somalia and Yemen, the purse-seine catch is dominated by FAD fishing east of Somalia for skipjack, as well as juvenile yellowfin and bigeye. The longline catch during this period is pre-dominantly in the central IO and in the southern IO along a zonal region between South Africa and Australia. From November to February, the longline and purse-seine catch in the central IO intensifies. The latter is dominated by yellowfin catch on free-swimming schools over a zonal region from 0 –10° S stretching from the Seychelles Archipelago (northeast of Madagascar) to the Chagos Archipelago. From March to June, purse-seine fishing descends into the Mozambique Channel and is a mixture of FADs and free-swimming schools, whereas longline is extremely intense east of Somalia

(bigeye and yellowfin) and off the Arabian Peninsula (yellowfin). Seasonal patterns in tuna catches are quite different and often opposed between purse-seine and longline fishing. This has been attributed to changes in the vertical distribution of tuna that favour one or the other fishing method, as well as differences in the spatial distribution of the different age classes and species targeted by the two methods. It is to be noted that historical patterns in fishing locations, particularly in the purse seine fishery, may have changed in more recent years with the abundant use of DFADs.

1.2.4 Economic and Social Characteristics

The Seychelles fisheries sector accounts for about 25% of the country's GDP of which 22% overall is contributed by the industrial fisheries and fish processing sector. The Seychelles industrial fishing vessels are all foreign owned whereas the semi-industrial, artisanal and most hire craft vessels are locally owned. Following poor performance of the local industrial longline vessel *Seykor No.1* in the late 1980s and the small purse seiner *Spirit of Coxe* in the early 1990s the Seychelles tuna fisheries business model has focussed on flagging[1] industrial vessels, developing the semi-industrial, artisanal and sports fishery targeted at the tourism industry and in providing services to industrial vessels in Port Victoria. In 2021, a new fish and fish products export record of 68,134 t with a value of SCR 5,286 million was set (**Table 1**). Over 95% of the value of exported fish and fisheries products are derived from industrial tuna fisheries, tuna canning and by-products from tuna canning in the form of fish oil and fish meal. The volume and value of these exports has been growing over the years.

The Seychelles benefits more directly from the industrial tuna fishery through the payment of access fees and permits, local fishing vessels company expenditures and bunkering costs. For the year 2021 these local payments amounted to SCR 2,468.9 million (**Table 2**).

Table 1. Volume and value of fish and fish products exported for the year 2019, 2020 and 2021. Source: SFA Annual Report (2021).

	2019		2020		2021	
Exports	**Volume (Mt)**	**Value (SCR'M)**	**Volume (Mt)**	**Value (SCR'M)**	**Volume (Mt)**	**Value (SCR'M)**
Canned tuna	35,951	3,098	42,976	4,383	49,145	4,676
Fish oil	1,158	77	881	77	971	69
Fish meal	7,809	115	9,003	174	8,005	151
Fresh and frozen fish	13,886	237	11,180	274	9,957	298
Sea cucumber, shark fin and crustaceans	46	50	58	87	56	92
Total	**58,850**	**3,577**	**64,098**	**4,995**	**68,134**	**5,286**

Table 2. Annual local expenditure (SCR'M) of the industrial fishing fleets between 2018 and 2021. Source: SFA Annual Report (2021).

[1] The registration of fishing vessels from other countries under the Seychelles flag. This process makes them a Seychelles vessel and they become bound by Seychelles' law.

Expenditure categories	2018	2019	2020	2021
Bunkering	1,691.8	1,559.5	1,313.0	1,634.2
Fishing vessels/company expenditures	382.1	363.9	425.0	574.0
Licence/access fees, catch above reference tonnage surcharges, and EU sectoral support	211.5	201.8	278.3	249.4
Others	1.1	0.9	2.1	3.0
Total	**2,286.5**	**2,166.1**	**2,018.5**	**2,468.9**

The tuna fisheries also play an important role in the creation of local jobs. In the industrial fisheries, most of the Seychellois jobs are land-based and are focussed at providing services to the fishing fleets by vessel agents, port operators, stevedoring, bunkering, ship chandlering, repairs and maintenance and logistics services companies. A few Seychellois are employed on purse seine vessels; however, no Seychellois are directly employed in the industrial longline fisheries. Though the vessels in the small-scale longline fishery are locally owned, most fishers (70%) come from Sri Lanka, due to unavailability of local fishers and skill gaps in the local labour force (Antoine et al., 2022).

Many jobs created by tuna fisheries are in the processing industry. The Indian Ocean Tuna (IOT) canning factory is by far the largest single employer, with a workforce of approximately 2,300 workers of which over 70% are foreign nationals. A 2022 employment study (Pearce et al., 2022) across the fisheries sector recorded 190 workers in local (excluding the IOT) processing factories These factories process mostly tuna and tuna-like species and bycatch. The local by-catch processing industry started in 2012 (L. Bossy *pers. comm*).

Though the sport fishery that targets tuna and tuna like species is an important local employer, their contribution to the local labour force is not known. The sport fishery in the Seychelles inner islands mostly serve the tourism industry. The fishery, targets both demersal and tuna and tuna like species and it was estimated in 2022 to have an annual revenue generation of between USD 62.8 – 91.9 million and an annual economic impact of USD 27 – 39.5 million (Advance Africa Management Services, 2022).

2. GOALS AND OBJECTIVES

2.1 Governance and Policy

2.1.1 Long-Term Policy Objectives

The long-term policy objectives of the Seychelles fisheries sector as laid down in the Seychelles Fisheries Sector Policy and Strategy 2019 is to ***Develop fisheries to its full potential whilst safeguarding the marine environment and resource base for sustainability***. This is closely mirrored by the objective of the Fisheries Act to ***ensure the long-term conservation, management, and development of fisheries in Seychelles and genetic material derived from them, while safeguarding the marine resources, biodiversity, environment, and ecosystems for sustainability, for the benefit of the people of Seychelles.*** The focus of the long-term policy objectives is anchored upon three main elements: i) to develop fisheries, ii) ensure that fisheries contribute to socio-economic development of the country, and iii) ensure the long-term sustainability of the fisheries stocks, the environment and other components of marine biodiversity that are affected by fishing practices.

The Seychelles Fisheries Sector Policy and Strategy 2019 advocates the need for fisheries development and management decisions to be based on the best available evidence and scientific data, and on the precautionary approach where such data does not exist. It promotes the application of the provisions of the FAO Code of Conduct on Responsible Fisheries and reaffirms the country's commitment to manage fisheries resources through ecosystem-based approaches and ensure that policies, legislations, and infrastructure development are aligned towards achieving sustainability, taking into account climate change, international commitments, and global developments.

2.1.2 Key Policy Linkages

This management plan adheres to the general principles of the Fisheries Act reproduced in **Appendix A**. It was developed with full consideration of the country's international, regional, and national commitments for the development and management of fisheries and other marine resources, including the legally binding:

- United Nations Convention on the Law of the Sea (UNCLOS).
- The Convention on Biological Diversity, including its Global Biodiversity Framework.
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- UN Agreement Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (United Nations Fish Stocks Agreement (UNFSA).
- 1993 FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (Compliance Agreement).
- FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (PSMA).
- The IOTC Agreement.

And non-legally binding instruments such as the:

- AU-NEPAD - Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa.

- Southern Africa Development Community (SADC) Fisheries Protocol 2011.
- Indian Ocean Commission (COI) Regional Fisheries and Aquaculture Strategy.
- UN Sustainable Development Goals 2030.
- South Western Indian Ocean Fisheries Commission (SWIOFC) Guidelines for minimum terms and conditions (MTC) for foreign fisheries access in the Southwest Indian Ocean Fisheries Commission region.
- 1995 FAO Code of Conduct for Responsible Fisheries.
- 2015 FAO Voluntary Guidelines for Flag State Performance.
- 2011 FAO International Guidelines on Bycatch Management and Reduction of Discards.
- 2018 FAO Voluntary Guidelines on the Marking of Fishing Gear.
- 2022 FAO Voluntary Guidelines for Transhipment.
- 2015 FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries.

Nationally the management plan aligns with numerous national policies and strategies relating to national development and the management of the marine environment. The main ones include the:

- National Development Strategy (2019 – 2023)
- Fisheries Sector Policy and Strategy 2019
- The National Biodiversity Strategy and Action Plan

2.2 Fisheries-Specific Management Objectives

The fisheries specific management objectives were defined through a consultative approach and are based on inputs provided by stakeholders during the consultative workshops and follow up feedback.

2.2.1 Long-Term Vision

The long-term vision for the Seychelles tuna fisheries is to have ***An Indian Ocean that is healthy and full of life from which the Seychelles can make sustainable use of the tuna resources for maximum socio-economic benefits of its people.***

The achievement of this vision would require international, regional, and national approaches.

A range of legally binding international fisheries instruments must be implemented, including UNCLOS, the UN Fish Stocks Agreement and the FAO Port State Measures Agreement, as well as instruments on the environment and biodiversity that have been ratified by Seychelles such as the Nairobi Convention, UNFCCC, CBD, CITES, CMS and MARPOL.

At the regional level, Seychelles authorities must ensure that the legally binding conservation and management measures (CMMs) adopted annually by IOTC are promptly and effectively implemented. The authorities must work in close collaboration with the IOTC and SWIOFC Secretariats and their members, as well as with other regional centres involved in fisheries MCS including SADC and IOC.

In parallel, Seychelles would need to ensure the implementation of national legislations concerning fisheries and environmental protection and ensure that owners and operators of fishing vessels fully comply with Seychelles legislation and license conditions. Authorities should also work closely with other national agencies involved in fisheries activities, including MCS, and implement priority actions identified in the **Implementation Plan.**

2.2.2 Overarching Goals

This plan has four overarching goals: the first is focused on resource sustainability, the second on effective fishery governance, the third on economic contribution, and the last on social development.

- **Goal 1 - Resource sustainability:** Contribute to regional efforts to ensure the long-term sustainability of the Indian Ocean's tuna stocks and the ecological wellbeing of the environment.

- **Goal 2: Effective fisheries governance:** Strengthen the governance and management of Seychelles' tuna fisheries.

- **Goal 3: Economic contribution:** Enhance the tuna fisheries value chain for the benefit of all stakeholders.

- **Goal 4: Social development:** Ensure that the tuna fisheries contribute to socio-economic development and empowerment of the Seychellois nation.

These four goals closely align with those of the Seychelles National Development Strategy 2024 – 2028 and the Seychelles Fisheries Sector Policy and Strategy 2019. Additionally, the four goals align with the general principles of the 1995 United Nations Fish Stock Agreement, and the objectives, functions and responsibilities of the IOTC as defined in the IOTC Establishment Agreement

The social and economic goals for the Seychelles tuna industry are addressed in detail as part of the Seychelles Tuna Industry Development Framework, which was developed in parallel with this Plan.

2.2.2 Operational Objectives

The plan has 14 operational objectives of which three are related to resource sustainability, six to effective fisheries governance, one to economic contribution and four to social development. The operational objectives include:

Resource sustainability objectives:

- **Objective 1.1:** All tuna stocks are fished in accordance with domestic laws, IOTC CMMs applicable to Seychelles and international best practices.
- **Objective 1.2:** Adverse environment and ecosystem impacts resulting from tuna fisheries are minimized, avoided, or prevented.
- **Objective 1.3:** Fisheries practices are improved to meet international best practices.

Effective fisheries governance objectives:

- **Objective 2.1:** Position Seychelles as a leading country for the responsible management of the Indian Ocean tuna stocks.
- **Objective 2.2:** Strengthen governance of tuna fisheries and implementation of the management plan.
- **Objective 2.3:** Fishing quotas allocated to the Seychelles through the IOTC are equitably shared.
- **Objective 2.4:** Enhance research, data collection, data analyses and use of research results to inform evidence-based decision making.
- **Objective 2.5:** Enforce and increase compliance with legislation and license conditions by all fishing vessels owners and operators.
- **Objective 2.6:** Apply transparency standards to the management of the tuna fisheries and reduce conflicts among users.

Economic contribution objectives:

- **Objective 3.1:** Optimize revenue from tuna fisheries.

Social development objectives:

- **Objective 4.1:** Increase Seychellois stakeholders' representation in the harvesting and processing sub-sector.
- **Objective 4.2:** Increase Ocean literacy and understanding of the tuna fishing sector among the population.
- **Objective 4.3:** Improve safety in the tuna fishing industry.

Objective 4.4: Industry actors become stewards of the tuna resources and the marine environment on which the fishery depends. To achieve each objective, several priority actions are identified for implementation as part of the **Implementation Plan.**

3. FISHERIES MANAGEMENT STRUCTURE

3.1 Legal Framework

The legal framework for the implementation of this management plan is provided by:

- Fisheries Act of 2014.
- Fisheries Regulations of 1987 as amended.
- Fisheries (Shark Finning) Regulations of 2006.

IOTC Resolutions to which Seychelles have not objected are binding on the Seychelles and are being domesticated in the revised Fisheries and Aquaculture Bill and Regulations.

Other key legislations in Seychelles that can have a direct impact on tuna fisheries include:

- **The Maritime Zones Act (1999) and relevant statutory instruments.** The legislation establishes the boundaries for Seychelles' maritime zones.
- **Nature Reserves and Conservancy Act (2022).** Provides the legal instrument for establishment and management of marine protected areas, including Sustainable Use Areas where fishing is or could be allowed.
- **Merchant Shipping Act (Amended) 2014.** Makes provision with respect to ownership, registration, licensing and marking of ships in Seychelles and to a wide variety of matters relating to navigation in Seychelles waters and by Seychelles ships.
- **Export of Fishery Products Act (1996).** Provides for the control of the production of fishery products intended for exportation.
- **The Environment Protection Act (2016).** Provides for the protection, improvement, and preservation of the environment, to set objectives and guiding principles aimed at protecting the environment and human health for the promotion of environmental principles so as to facilitate the implementation of international commitments including the prevention, control, and abatement of environmental pollution in Seychelles and for matters connected therewith or incidental thereto. Serves to ensure that all development and activities, including fisheries, are subject to environmental controls.

3.2 Institutional Arrangements

At the national level, two main institutions are involved with the management of the Seychelles tuna fisheries. Together, these two institutions are referred to as the Seychelles Fisheries Administration. The institutions are:

- **Department of Fisheries (DoF):** Forms part of the Ministry of Fisheries and Blue Economy (MOFBE). The Department is mandated to provide a conducive policy and legal environment to ensure sustainable fishing.

- **Seychelles Fishing Authority (SFA):** Established through the Seychelles Fishing Authority (Establishment) Act 1984. It is the main organisation involved in fisheries management. Mandated, among other things, to promote, organize and develop fishing, fishing industries and fishing resources in Seychelles and has the lead role in the implementation of this management plan.

The Seychelles fisheries administration would like this management plan to be implemented through a co-management approach. It is proposed as part of the **Implementation Plan** that a Tuna Fisheries Co-management Committee (TFCC) is set up to provide oversight of the plan's implementation. The **11. Implementation** Plan also proposes the setting up of a structure within the SFA to work on tuna fisheries related issues and to support the work of the TFCC. The most ideal institutional placement of this structure is within the Fisheries Resource Management and Technical Coordination Department, responsible for the management of all fisheries.

The proposed structure will be responsible for preparing the annual work plan and budget, coordination and planning with other MDAs and stakeholders, monitoring, and evaluating the plan's performance, updating the management plan when new information becomes available, and for liaising with and reporting to Regional Fisheries Management Organisations (RFMOs) and advisory bodies.

Monitoring, Control and Surveillance (MCS) related activities will be coordinated by the SFA. In doing so, the MCS Department will work in close collaboration with the National Information Sharing and Coordination Centre (NISCC), the Seychelles Coast Guard (SCG), Air Wing of the Seychelles Defense Forces (SDF), the Seychelles Police (including the Marine Police Unit), and the Office of the Attorney General. Collaboration will be guided by the inter-agency MCS Agreement that is already in place, and that will be renewed as required.

At the SFA, there are four main Departments and two units under the Office of the Chief and Deputy Chief Executive Officer that will be directly involved with the implementation of this plan.

- **Fisheries Resource Management and Technical Coordination Department:** Has overall responsibility for the implementation of the management plan, coordination within SFA and with other MDAs and stakeholders.

- **Statistics and Fisheries Economic Department:** Responsible for collection, storage, management and analysis of catch and effort and economics data from the different tuna fisheries.

- **Fisheries Research Department:** Responsible for undertaking research to fill knowledge gaps and support the implementation of the management plan and other resource management initiatives.

- **Monitoring, Control and Surveillance Department:** Responsible for licencing of fishing vessels and ensuring compliance to legislations, fishing license conditions and conservation and management measures in place through effective flag State, coastal State, and port State controls.

- **The Legal Unit:** Responsible for working in close collaboration with the Department of Fisheries for ensuring that conducive policy and legislative frameworks are in place for effective planning and control of fisheries activities.

- **Public Relations Unit:** Responsible for working in close collaboration with other Departments and sections in implementing public relations and communication campaigns on requirements for implementation of the management plan.

3.3 Consultation and Co-Management Arrangements

Article 5(4) of the Fisheries Act (2014) gives powers to the SFA to enter in a co-management arrangement with any person for the management of a fishery if it considers it necessary. In the **Implementation Plan**, **Strategy S2.2.1** proposes to [*Make use of a cooperative co-management approach involving stakeholders to provide oversight of the plan's implementation*]. Key actions proposed under this strategy include: i) the preparation of Terms of Reference for a Tuna Fisheries Co-management Committee, ii) identifying the mechanism for selection of members to form part of the committee and iii) the preparation of annual schedules of meeting and the organisation of meetings of the co-management committee. The setting up of the Tuna Fisheries Co-Management Committee is one of the first priorities for the implementation of this management plan.

3.4 Allocation of Resources

3.4.1 Basic Principles

To be able to participate in the tuna fisheries, vessels will need to have a valid license issued by the SFA in the case of commercial vessels, or the Seychelles Maritime Safety Administration in the case of Hire Craft vessels. Recreational vessels are presently exempted from such requirements, but the draft Fisheries Regulations is proposing the requirement of a permit for the undertaking of recreational and pleasure fishing. Both Hire craft and recreational vessels are prohibited from selling their fish. Vessels fishing in areas outside Seychelles jurisdiction are required to have a valid Certificate of Authorisation to fish outside Seychelles waters issues by the SFA.

To gain access to tuna resources, fishing vessels will need to abide by all national legislations for management of fisheries resources and the protection of the marine environment, as well as all the conditions of their fishing license, and relevant conservation and management measures adopted by any Regional Fisheries Management Organisation (RFMO) applicable to Seychelles.

Vessels fishing for any species with a TAC and allocation mechanism adopted by the IOTC will need to abide by the Individual Fishing Quota (IFQ) or a fleet specific catch limit, where such exist.

3.4.2 Specific Mechanisms

Seychelles is still in a very early stage of managing its tuna fisheries with quota allocation and continues to learn from the process. As such, the specific mechanisms for the allocation of tuna resources are expected to be established during the course of implementation of this management plan and will be subject to change based on how the Seychelles and Indian Ocean tuna fisheries evolve, and on the objectives of the Seychelles government for the tuna fisheries. At the time of producing this management plan, fleet quota allocation was based on historical catch.

Objective O2.3 of this fishery management plan is to ensure that fishing quotas allocated to the Seychelles through the IOTC are equitably shared. **Strategy S2.3.1** on the establishment of a scheme on catch allocation and transfer proposes several key activities to be implemented during the first two years of the implementation of this plan to come up with a clear and transparent system for catch allocation and transfer which would include:

i) developing an appropriate set of criteria and indicators upon which to base quota allocations,
ii) investigate scenarios to inform the choices of fleet and vessel (IFQ) quota allocation, and
iii) formulating procedures in consultation with stakeholders for the allocation and transfer of fleet and Individual Fishing Quotas (IFQs).

The new quota allocation system that will come out of this process is expected to be applied in the third year of implementation of this plan (See **Strategy S2.3.2**). A report on Proposed Measures for the implementation of a Quota Management System for Seychelles' Tuna Fisheries (IOS, 2022) provides different scenarios based on actual data from the tuna fisheries that can serve as a starting point for coming up with the quota allocation scheme.

For yellowfin and bigeye tuna, which both have a catch limit adopted by the IOTC, quota allocation to different fleet components for the year 2024 and 2025 has been decided by the SFA and will be allocated as per **Table 3**.

- **Yellowfin tuna:** Quota per fleet is based on an annual allocation of 3,000 Mt to the industrial longline fleet, 2,000 Mt to the small-scale longline fleet, 2,400 Mt per purse seiner and 1,5325 Mt as set aside.

- **Bigeye tuna:** The year 2024 is the first time that allocation have been made for bigeye tuna. Allocation was based on a provision of 150 Mt to the small-scale longline fleet, 622 Mt as set aside (based on a similar percentage of the set aside quota used in 2023 for yellowfin tuna), and the division of the remaining quota between the purse sein and industrial long line fleet based on percentage average annual catch for the 2017 – 2021 period.

Table 3. Recommended percentage allocation of Seychelles yellowfin tuna and bigeye tuna catch limit among national fleets for the year 2024 and 2025. Source: SFA.

Fleet	Yellowfin tuna		Bigeye tuna	
	Mt	%	Mt	%
Purse seine	31,200	82.7	6,667	56.1
Industrial Longline	3,000	8.0	4,443	37.4
Small-scale longline	2,000	5.3	150	1.3
Set aside	1,532	4.1	622	5.2
TOTAL	**37,732**	**100**	**11,882**	**100**

For the purse seine fishery, the fleet quota for the two species is to be divided equally among the number of active registered vessels. For the industrial longline fishery, the division of fleet quotas among vessels is decided by their association. For the small-scale longline fleet, no IFQ will be given due to high level of differences in activity among vessels. At the start of the last quarter of the year, the set aside quota can be distributed to interested operators in the fishery if there is a low probability that the Seychelles allocation will not be exceeded. The mechanism for doing this will be decided by the SFA based on development objectives. For the year 2024 and 2025, IFQ can be transferred between or among vessels from the same operator after a request is made to SFA and approved.

Adherence to IFQ will be monitored through logbook declarations. The port sampling programme will be used as a risk assessment tool for cross-checking logbooks declarations. An action is

identified under **Strategy S1.1.1** in the **Implementation Plan** to make use of the SFA FIMS to visualize and monitor catch per species against aggregated Individual Fishing Quotas (IFQs) for the industrial and small-scale longline fishing fleets. The implementation of this action will ensure that information on the use of available quota is publicly available and contribute to the promotion of transparency.

4. HARVEST STRATEGY AND CONTROL RULES

4.1 Harvest Strategy

4.1.1 Description of the Harvest Strategy

The Seychelles domestic tuna fisheries cannot be managed independently of the wider regional management of highly migratory species under the management mandate of the IOTC. The Seychelles Harvest Strategy Policy will thus be applied to ensure that regionally adopted management objectives and national policy objectives are both met. At a minimum, this management plan will implement harvest strategies adopted by the IOTC for stocks that have a regional management strategy. For stocks that do not have a regional management strategy, the Seychelles will develop and implement harvest strategies and control rules where appropriate. Seychelles will re-enforce IOTC management measures with national ones in instances where more stringent measures are required.

At the time of preparing this management plan, only the bigeye tuna had all the elements of a full regional harvest strategy in place. The other two primary target species, yellowfin tuna and skipjack tuna, had elements that were absent or ad hoc (**Table 4**). New elements of the harvest strategies for yellowfin and skipjack tuna, and additional species will be added to this fishery management plan as they are adopted by the IOTC and the Seychelles.

Table 4. Summary of the status of harvest strategy elements in place for the three primary tropical tuna species under the IOTC management mandate as of the end of the year 2023.

Harvest strategy components	Bigeye tuna	Yellowfin tuna	Skipjack tuna
Management objectives	✓	✓	✓
Harvest control rules	✓	ad hoc	✓
Stock assessment and TAC	✓	✓	✓
Allocation mechanism	✓	✓	×
Monitoring programme	✓	✓	✓
Rebuilding plans	✓	✓	Not applicable

As part of the Seychelles harvest strategy, catch will continue to be managed principally through output controls in the form of IFQs in combination with other national laws, IOTC CMMs, input controls in the form of vessel licensing, restrictions in the deployment of instrumented buoys, and technical measures in the form of gear prohibition and restrictions, area restrictions (e.g., industrial fisheries restricted area, MSP High Biodiversity Protection Zones (Zone 1), and technology limitation.

The sections below provide details of each component of the IOTC harvest strategy for the three tropical tuna species.

4.1.1.1 Species specific management objectives

The IOTC general management objective for the Indian Ocean tuna stock, set by Resolution 15/10 On Target and limit references points and a decision-making framework is to:

- Maintain the biomass at or above levels required to produce MSY or its proxy and maintain the fishing mortality rate at or below F_{MSY} or its proxy.

- Avoid the biomass being below B_{lim} and the fishing mortality rate being above $F_{lim.}$

4.1.1.2 Total Allowable Catch

Total allowable catch (sometimes referred as catch limit) for species are periodically set by the IOTC. **Table 5** provide the overall TAC or catch limit for species set by the IOTC that had been communicated by the end of the first quarter of 2024. Two (bigeye and yellowfin) of the seven species with TACs have an allocation scheme in place. National allocations are communicated to IOTC members through IOTC resolutions or IOTC circulars. In accordance with **Strategy S1.1.1** in the **Implementation Plan**, the Seychelles will implement the TAC/catch limits as and when they are communicated by the IOTC.

Table 5. Species under the IOTC management mandates for which a Total Allowable Catch (TAC) or Catch Limit had been communicated by IOTC by the end of the first quarter of 2024. It identifies the year(s) for which the catch limit applies and the IOTC Resolutions that sets the limits.

Species	TAC/Catch limit (t)	Year (s)	Allocation system in place	IOTC Resolution
Bigeye	80,583	2024, 2025	✓	23/04
Yellowfin	297,742	2023	✓	21/01
Skipjack	628,606[2]	2024 – 2026	×	21/03
Striped marlin	3,260	Unspecified	×	18/05
Black marlin	9,932	Unspecified	×	18/05
Blue marlin	11,930	Unspecified	×	18/05
Indo-Pacific sailfish	25,000	Unspecified	×	18/05

4.1.1.2.1 Bigeye Tuna

The TAC for Bigeye tuna is calculated in accordance with the Management Procedure (MP) established by Resolution 22/03 *On a management procedure for bigeye tuna in the IOTC area of competence.* For the year 2024 and 2025. The overall TAC is set at 80,583 t for the year 2024 and 2025 (IOTC Resolution 23/04), with the Seychelles catch limit set at 11,882 t. Overages from the 2024-2025 management period will be deducted from the catch limit for the management period commencing from 2026. However, underage from the 2024-2025 management period will not be added to the catch limit for the management period commencing in 2026. As detailed in the MP the maximum increase or decrease in the TAC shall be 15% relative to the previous TAC.

4.1.1.2.2 Yellowfin Tuna

By the end of the first quarter of 2024, there was no formal Management Procedure in place for deciding on the catch limit for yellowfin tuna. As a result, IOTC catch limits were decided according to set percentage catch reduction based on 2014 catch for CPCs with catch above 5,000 t, or the average 2017-2019 catch for CPCs with catch of less than 5,000 t, with special dispensation for Coastal Developing States, Small Island Developing States and Least Developed States. The procedure for calculating catch limits will be reviewed when a formal MP for the

[2] Calculated in 2023 by applying the HCR specified in Resolution 21/03.

management of the yellowfin tuna stock is adopted by the Commission is in effect. The Seychelles catch limit for 2023 was 36,587 t (with an additional 1,145 t refund for double penalty).

4.1.1.2.3 Skipjack Tuna

The overall skipjack tuna TAC for the year 2024 – 2026 is 628,606 Mt calculated by applying the HCR specified in Resolution 21/03. To enhance the stability of management measures, IOTC Resolution 21/03 stipulates that the HCR shall not recommend a catch limit that is 30% higher, or 30% lower, than the previous recommended catch limit. By the end of 2023, there was no IOTC catch allocation in place for skipjack tuna.

4.1.1.2.4 Billfishes

Though the striped marlin, black marlin, blue marlin and Indo-Pacific sailfish have TAC specified as part of IOTC Resolution 18/05, there is no allocation scheme in place to allocate quota to countries. Over recent years, the average annual catch have been over the TAC for black marlin and Indo-Pacific sailfish but under the TAC for striped marlin and blue marlin.

4.1.2 Monitoring, Review, and Evaluation of the Harvest Strategy

Review of the harvest strategy for species under this plan will be done through the IOTC Management Strategy Evaluation (MSE) process by the Technical Committee on Management Procedures (TCMP) with the objectives of, but not limited to, i) refining the operating model(s)/ used, ii) investigating alternative management procedures, and iii) refining performance statistics. As part of actions identified under **Strategy S2.1.4** in the Implementation Plan, Seychelles will identify and designate representatives to participate and closely follow the MSE process and will update the management plan as required.

4.2 Harvest Control Rules

Harvest control rules (HCRs) are pre-agreed guidelines that determine how much fishing can take place, based on indicators of the targeted stock's status.

4.2.1. Description of the Harvest Control Rules

The skipjack and bigeye tuna are the only two species under the IOTC management mandate with formal HCRs in place. The Seychelles will abide to any HCRs in place or those that may be introduced during the lifetime of this management plan.

4.2.1.1 Skipjack Tuna

4.2.1.1.1 Input from Stock Assessments

Current HCR for skipjack tuna stock is defined by IOTC Resolution 21/03. It recommends a total annual catch limit based on the reported median of three values estimated from each skipjack stock assessment. The values include:

- The estimate of current spawning stock biomass (B_{curr}).
- The estimate of the unfished spawning stock biomass (B_0).
- The estimate of the equilibrium exploitation rate (F_{targ}) associated with sustaining the stock at B_{targ}.

For each value, the reported median from the reference case adopted by the Scientific Committee for advising the Commission is used.

4.2.1.1.2 Control Parameters

The skipjack HCR has five control parameters that are set as follows:

- Threshold level, the percentage of B_0 below which reductions in fishing mortality are required, $B_{thresh} = 40\%B_0$. If biomass is estimated to be below the threshold level, then fishing mortality reductions, as output by the HCR, will occur.

- Maximum fishing intensity, the percentage of E_{targ} that will be applied when the stock status is at, or above, the threshold level Imax = 100%. When the stock is at or above the threshold level, then fishing intensity (I) = I_{max}

- Safety level, the percentage of B_0 below which non-subsistence catches are set to zero i.e., the non-subsistence fishery is closed $B_{saftey} = 0.1B_0$.

- Maximum catch limit (C_{max}), the maximum recommended catch limit = 900,000 t. To avoid adverse effects of potentially inaccurate stock assessments, the HCR cannot recommend a catch limit greater than C_{max}. This value is based upon the estimated upper limit of the MSY range in the 2014 skipjack stock assessment.

- Maximum change in catch limit (D_{max}), the maximum percentage change in the catch limit = 30%. To enhance the stability of management measures the HCR cannot recommend a catch limit that is 30% higher, or 30% lower, than the previous recommended catch limit.

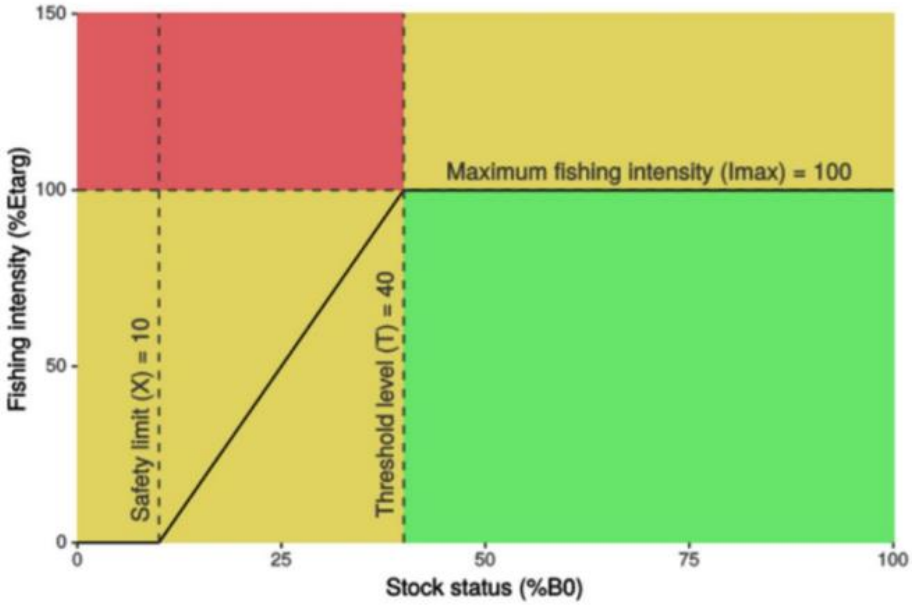

Figure 3. Graphical representation of relationship between fishing intensity and stock status in a model fishery with target and safety limit identified as respectively as 40% and 10% of the unexploited biomass (B_0).

4.2.1.1.3 Biomass and Limit Reference Points

Consistent with paragraph 2 and 3 of Resolution 15/10, the biomass limit reference point, B_{lim}, is set at 20% of unfished spawning biomass (i.e., $0.2B_0$), and the biomass target reference point, B_{targ}, is set at 40% of unfished spawning biomass (i.e., $0.4B_0$).

4.2.1.1.4 Setting of Annual Catch Limit

The skipjack HCR recommends that the total annual catch limit is set as follows:

(a) 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}]

(b) If the current spawning biomass (B_{curr}) is estimated to be below the threshold biomass i.e., $B_{curr} < 0.4B_0$, but greater than the safety level i.e., $B_{curr} > 0.1B_0$, then the catch limit shall be set at [I x E_{targ} x B_{curr}].

(c) If the spawning biomass is estimated to be at, or below, the safety level, i.e., $B_{curr} <= 0.1B_0$ then the catch limit shall be at 0 for all fisheries other than subsistence fisheries.

(d) In the case of (a) or (b), the recommended catch limit shall not exceed the maximum catch limit (C_{max}) and shall not increase by more than 30% or decrease by more than 30% from the previous catch limit.

(e) In the case of (c), the recommended catch limit shall always be 0 regardless of the previous catch limit.

4.2.1.1.4 Implementation of Catch Limit

The catch limits derived from the HCRs is by default required to be implemented in accordance with an allocation scheme agreed for skipjack tuna by the Commission. In the absence of an allocation scheme, the HCR is to be applied as follows:

(a) If the stock is at or above the Threshold level (i.e., $B_{curr} >= 0.4B_0$), then the HCR shall establish an overall catch limit and catches of skipjack tuna for any given year shall be maintained at or below the overall catch limit established by the HCR.

(b) If the stock falls below the Threshold level (i.e., $B_{curr} < 0.4B_0$), the fishing mortality reductions shall be implemented proportionally by CPCs for catches over 1 percent of the catch limit established by the HCR with due consideration to the aspirations and special requirements of Developing Coastal States and Small Island Developing States.

4.2.1.1.5 Additional Measures

The HCR makes provision for the IOTC to consider the development and adoption of CMMs to ensure catches of skipjack tuna are maintained at or below the overall catch limit established by the HCR and to apply fishing mortality reductions if the stock falls below the Threshold level (i.e. $B_{curr} < 0.4B_0$), with due consideration to the aspirations and special requirements of Developing Coastal States and Small Island Developing States.

4.2.1.2 Bigeye Tuna

4.2.1.2.1 Input from Stock Assessments

Current HCR for bigeye tuna stock is defined by IOTC Resolution 22/03. It makes use of two sources of input data: total catch biomass and spatially aggregated longline CPUE from 1980 to the most recent year of catch data and the Pella-Tomlinson biomass dynamic model to estimate the carrying capacity (*K*), intrinsic rate of increase (*I*), initial biomass depletion (*delta*), the production curve shape parameter (*m*), and the annual biomass *B* and its stochastic variability *sigmaB*.

The parameters are then used to calculate the two key variables used in the harvest control rue (HCR):

- Ratio of fishing mortality to the value which produces MSY (FMSY ratio)
- Relative biomass or depletion: B/K

4.2.1.2.2 Control Parameters

The control parameters include the HCR multiplier (HCR_{mult}), which is sensitive to the level of biomass depletion, the tunning parameter (F_{mult}) and a symmetric maximum change of 15% that is applied to the TAC to calculate the actual recommended TAC (TAC_{rec}).

4.2.1.2.3 Biomass and Limit Reference Points

Consistent with paragraph 2 and 3 of Resolution 15/10, the biomass limit reference point for bigeye tuna, B_{lim}, is set at 20% of unfished spawning biomass (i.e., $0.2B_0$), and the biomass target reference point, B_{targ}, is set at 40% of unfished spawning biomass (i.e., $0.4B_0$).

4.2.1.2.4 Setting of Annual Catch Limit

The bigeye annual catch limit is set using fishing mortality and biomass to calculate a TAC. The fishing mortality and biomass are derived from fitted CPUE data using a Pella-Tomlinson biomass dynamic model and are used to calculate the TAC using this equation.

$$TAC_{new} = By\ (1 - exp\ (-Fmult \times HCRmult \times FMSY\ ratio))$$

Where *By* is the calculated biomass for year *y*, HCR_{mult} is the HCR multiplier, F_{mult} is the tunning parameter. The overall fishing mortality used for estimating the TAC is FMSY ratio x HCR_{mult} x tuning parameter (F_{mult}).

The HCR multiplier is sensitive to the level of biomass depletion and is calculated as follows:

(a) For biomass above 40% of carrying capacity (K), the HCR multiplicative factor HCR_{mult} = 1

$$\text{HCRmult} = 1\ if\ \frac{By}{K} \geq 0.4$$

(b) For biomass level between 10 and 40% of the carrying capacity (K), the HCR multiplicative factor (HCR_{mult}) is linear and is calculated as:

$$\text{HCRmult} = 1\frac{\frac{By}{K} - 0.1}{0.3}\ if\ 0.1 < \frac{By}{K} < 0.4$$

(c) For biomass level is less than 10% of the carrying capacity (K), the HCR multiplicative factor is 0.0001

$$\text{HCRmult} = 0.0001\ if\ \frac{By}{K} < 0.1$$

Once the TAC is calculated, a symmetric maximum change of 15% is applied to it to calculate the actual recommended TAC.

4.2.1.2.5 Implementation of Catch Limit

Implementation of catch limits for bigeye tuna for the year 2024 and 2025 is being done through an annual catch limit for IOTC members with annual catch of above 2,000 t (IOTC Resolution 23/04). Catch limits post-2025 are yet to be determined by the IOTC.

4.2.1.2.6 Additional Measures

As additional measures for the implementation of the HCR for bigeye the IOTC requires its members not to grant their consent as a flag or chartering CPC to chartering agreements with flag CPCs that object to Resolution 23/04 in accordance with Article IX, paragraph 5 of the IOTC Agreement. It further prohibits CPCs from exporting their flagged authorized fishing vessels to CPCs that object to Resolution 23/04.

4.2.1.3 Yellowfin Tuna

There is only an ad-hoc (not tested) harvest control rule in place for the Indian Ocean stock of yellowfin tuna, which forms part of an interim rebuilding plan as per IOTC Resolution 21/01 and Resolution 19/01.

4.2.1.3.1 Input from Stock Assessments

Input from stock assessment is only in the form of establishing the yellowfin stock biomass that would generate MSY. Based on the IOTC 2021 stock assessment, MSY was calculated at 349,000 t (80% CI: 286,000 – 412,000 t).

4.2.1.3.2 Control Parameters

The control parameters for calculating the TAC for yellowfin tuna include the mandatory percentage reduction of catch made by different IOTC CPCs, according to historical catch and the reference year and the rules set out for over catch of annual limit. For the Seychelles, the annual catch has to be reduced by 10% compared to the year 2015.

4.2.1.3.3 Biomass and Limit Reference Points

As with all stock under the IOTC management mandate, and consistent with paragraph 2 and 3 of Resolution 15/10, the biomass limit reference point, B_{lim}, is set at 20% of unfished spawning biomass (i.e., $0.2B_0$), and the biomass target reference point, B_{targ}, is set at 40% of unfished spawning biomass (i.e., $0.4B_0$).

4.2.1.3.4 Setting of Annual Catch Limit

Annual catch limit of yellowfin tuna is derived from rules set out in IOTC Resolution 21/01 and Resolution 19/01. These rules are used to calculate the allocation for each CPC and the sum of these allocation is the overall TAC for the Indian Ocean.

4.2.1.3.5 Implementation of Catch Limit

Since 2017 the catch limit for yellowfin tuna has been implemented through an annual allocation scheme. National vessels must cease fishing when their individual limit is reached.

4.2.1.3.6 Additional Measures

Several additional measures have been adopted by the IOTC to support the rebuilding of the IOTC stock of yellowfin tuna. The measures include:

- Review of catch and effort data submitted by CPCs in accordance with Resolution 15/01 and Resolution 15/02 for possible inconsistencies. In cases where inconsistencies are detected, data used for catch limit calculations is to be based on the data reviewed, including possible estimates, by the Secretariat.
- Limit on the number of supply vessels that can support purse seine vessels with three supply vessels supporting not less than 10 purse seiners, all of the same flag State.
- No new or additional supply vessels are to be registered on the IOTC Record of Authorized Vessel.
- Purse seine vessels are not to be supported by more than one supply vessel of the same flag State at any point of time.
- Vessels are to be encouraged to phase out or convert gillnet fishing vessels to other gears.
- Gillnets are to be set at 2m depth from the surface in gillnet fisheries.
- Encourage the increase in observer coverage or field sampling in gillnet fishing vessels by 10% using alternative data collection methodologies (electronic or human) verified by the IOTC Scientific Committee.

4.2.2 Review of the Harvest Control Rules

Review of the HCRs will be done by the IOTC through the Management Strategy Evaluation review process. In the event that the estimated spawning biomass of any species falls below the limit reference point, the HCR will be reviewed, and consideration given to replacing it with an alternative HCR specifically designed to meet a rebuilding plan as advised by the Commission. In the meantime, the IOTC Scientific Committee work continues to refine the Management Strategy Evaluation (MSE) for the IOTC skipjack tuna fisheries with the objectives of, but not limited to, i) refining the operating model(s)/ used, ii) investigating alternative management procedures, and iii) refining performance statistics. Seychelles will closely participate and follow the process and update the management plan as require.

4.2.3 Additional Management Measures

Apart from implementing the measures as part of the HCRs and quota allocation, the Seychelles will comply with and implement other applicable IOTC CMMs for managing the stocks of target species in the tuna fisheries. These additional CMMs are detailed in **Table 6**. To improve the provision of scientific advice on HCRs, the Seychelles will continue to implement data collection

measures as per applicable IOTC resolutions, particularly those detailed in Resolution 15/01 *On the recording of catch and effort data by fishing vessels in the IOTC area of competence*, and Resolution 15/02 *on mandatory statistical requirements for IOTC Members and Cooperating Non-Contracting Parties (CPC's).*

Table 6. Additional Conservation and Management Measures in place for managing the stock of target species in the Indian Ocean Tuna Commission (IOTC) Area of Competence that are to be implemented by fishers and fishing vessel operators.

No.	Management Measures	Instrument
GMS1 Obligatory	All purse seine vessels to retain on board and land all bigeye tuna, skipjack tuna, and yellowfin tuna caught, except fish considered unfit for human consumption.	IOTC Res 19/05
GMS2 Obligatory	No bigeye tuna, skipjack tuna, yellowfin tuna and non-targeted species[3] caught by purse seine vessels may be discarded after the point in the set when the net is fully pursed, and more than one half of the net has been retrieved.	IOTC Res 19/05
GMS3 Obligatory	Fishing vessels, support and supply vessels are prohibited from using aircrafts and unmanned aerial vehicles as fishing aids.	IOTC Res 16/08
GMS4 Obligatory	All fishing (industrial and semi-industrial) vessels are required to keep a bound paper or electronic logbook to record data that includes, as a minimum requirement, the information and data in the logbook set forth in Annex I (Record once per trip), II (Record once per set/shot/operation) and III (Specifications for handline and trolling) of Resolution 15/01.	IOTC Res 15/01
GMS5 Obligatory	All fishing vessels are prohibited from intentionally fishing within one nautical mile of or interacting with a data buoy in the IOTC area of competence[4].	IOTC Res 11/02

4.3 Decision-Making Framework

Decision making with regards to key target stocks in the tuna fisheries will be based on the IOTC Management Strategy Evaluation process aimed at improving the provision of scientific advice on HCRs. The IOTC decision making framework is based on the implementation of the precautionary approach as per Resolution 15/10 *on target and limit reference points and a decision framework*. Agreed interim and target reference points for the main target species are set and agreed as per **Table 7.** The IOTC decision making framework is based on two core components:

i) keeping the stocks at, or above, the target reference point (B_{TARGET}) and well above the limit reference point (B_{LIM}) at levels not less than those capable of producing maximum sustainable yield (MSY), and

ii) in the event that the stock falls below the target reference point, reduce fishing mortality to prevent the stock from breaching the limit reference point and implement a rebuilding plan to return the stock to the green zone of the Kobe Plot.

[3] Include: other tunas, rainbow runner, dolphinfish, triggerfish, billfish, wahoo, and barracuda.
[4] Includes, but is not limited to, encircling the buoy with fishing gear; tying up to or attaching the vessel, or any fishing gear, part or portion of the vessel, to a data buoy or its mooring; or cutting a data buoy anchor line.

Table 7. Target and limit reference points for the main stocks targeted as part of the tuna fisheries in the Indian Ocean Commission (IOTC) Area of Competence as rest by IOTC Resolution 15/10 on target and limit reference points and a decision framework.

Stock	Target Reference Point	Limit Reference Point
Albacore tuna **Yellowfin tuna** **Swordfish**	$B_{TARGET} = B_{MSY}$ $F_{TARGET} = F_{MSY}$	$B_{LIM} = 0.40\ B_{MSY}\ (0.2B_0)$ $F_{LIM} = 1.40\ F_{MSY}$
Bigeye tuna	$B_{TARGET} = B_{MSY}$ $F_{TARGET} = F_{MSY}$	$B_{LIM} = 0.50\ B_{MSY}\ (0.25B_0)$ $F_{LIM} = 1.30\ F_{MSY}$
Skipjack tuna	$B_{TARGET} = B_{MSY}$ $F_{TARGET} = F_{MSY}$	$B_{LIM} = 0.40\ B_{MSY\ (}(0.2B_0)$ $F_{LIM} = 1.50\ F_{MSY}$

Tuna stocks are highly migratory and UNCLOS requires coastal States and fishing States to cooperate directly or through appropriate international organizations with a view to ensuring conservation and promoting optimum utilization throughout the region, both within and beyond the exclusive economic zones. Therefore, Seychelles must implement all applicable IOTC CMMs and to that extent will not have a separate decision-making framework from that of the IOTC.

It will thus implement decisions on harvest strategy, including HCRs and species-specific catch limits agreed at the IOTC level. When required, it will consider other national initiatives and international obligations concerning the protection of fish stocks, the marine environment and other species affected by the tuna fisheries and could include additional management measures over those adopted by the IOTC. Seychelles will continue to collaborate with like-minded states towards achieving sustainability of the Indian Ocean tuna fisheries and optimizing socio-economic benefits from tuna resources.

The Seychelles will follow and actively engage in the MSE process as per **Strategy S2.1.4** on *identification and designation of representatives to actively participate in the IOTC Management Strategy Evaluation process*. Clear national objectives on what the country would like to achieve as part of this process will be discussed with relevant stakeholders and set in advance.

5. ECOSYSTEM MANAGEMENT STRATEGIES

This management plan takes into account that licensed vessels are required by law to comply with applicable IOTC conservation and management measures and all applicable laws of Seychelles. The Fisheries Act (2014) require vessel owners and operators to adhere to all terms and conditions of their license. The management plan applies the ecosystem approach to fisheries management and considers National Plan of Actions (NPOAs) that are under implementation (NPOA sharks), under preparation (NPOA IUU) or scheduled for drafting (NPOA Seabirds and NPOA Turtles). It also applies the precautionary approach, as per the requirement of the UN Fish Stock Agreement (UNFSA), that require States to be more cautious when information is uncertain. In implementing the precautionary approach, Seychelles must improve decision-making and information-sharing and develop certain data collection and research programmes, adopt plans, and apply or take into account certain scientifically based factors and measures. The factors and measures are stated in article 6(3) of UNFSA and include implementing improved techniques for dealing with risk and uncertainty; applying the guidelines for the precautionary approach [in annex II of UNFSA] and determining stock-specific reference points and actions to take in case they are exceeded; taking into account specified uncertainties and other specified information; developing data collection and research programmes to assess the impact of fishing on non-target and associated dependent species and their environment.

5.1 Non-Target Species

Non-target species are those that are incidentally captured while fishing for a target species. In the Indian Ocean industrial and small-scale tropical tuna fisheries, these include minor tuna species (e.g., bullet and frigate tunas), Spanish mackerels, oil fish, kawakawa, other bony fishes (e.g., dolphin fish, rainbow runner, triggerfish). It also includes undersized or juvenile individuals of target species, species that are incidentally affected by interacting with fishing equipment in the fishery but are not taken, and components of target species that have no commercial value, such as those that are damaged, or are rejected based on size, for example, due to factors such as possible high heavy metal content of certain large individuals.

5.1.1 Management Strategy

The Seychelles approach to addressing fisheries impacts on non-target species taken as part of the tuna fisheries will rely on the implementation of national laws and CMMs targeted at this issue identified in applicable IOTC Resolutions. The IOTC CMMs related to non-target species for implementation by fishers and fishing vessel operators are detailed in **Table 8**. These CMMs are being domesticated in local laws through the Fisheries and Aquaculture Bill and Regulations.

Table 8. Conservation and Management Measures in place for limiting the impacts of tuna fishing on non-target species in the Indian Ocean Tuna Commission (IOTC) Area of Competence that are to be implemented either by fishers, fishing vessel operators or the Seychelles fisheries administration.

No.	Management Measures	Instrument
NTM1 Obligatory	All purse seine vessels to retain on board and then land, to the extent practicable, other tunas, rainbow runner, dolphinfish, triggerfish, billfish, wahoo, and barracuda, except fish considered unfit for human consumption and/or species which are prohibited from retention,	IOTC Res 19/05

	consumption, or trade through domestic legislations and international obligations. [5]	
NTM2 Obligatory	All fishing vessels are required to take all reasonable steps to ensure the safe release of non-targeted species taken alive, to the extent possible, while taking into consideration the safety of the crew.[5]	IOTC Res 19/05
NTM3 Obligatory	All fishing vessels are required to retain on board and then land all dead non-targeted species except those considered unfit for human consumption and/or those prohibited from retention through domestic legislations and international obligations.[5]	IOTC Res 19/05
NTM4 Obligatory	All fishing vessels are prohibited from retaining on board, trans-shipping and landing any Indian Ocean Striped Marlin, Black Marlin, Blue Marlin, and Indo Pacific Sailfish smaller than 60 cm Lower Jaw Fork Length (LJFL) and are required to return and caught individual immediately to the sea in a manner that maximizes post-release survival potential without compromising the safety of any crew member.	IOTC Res 18/05
NTM5 Obligatory	Vessels catching Striped Marlin, Black Marlin, Blue Marlin, and Indo-pacific Sailfish in the IOTC Area of Competence are required to record their catch in accordance with the requirements of Resolution 15/01[6] on the recording of catch and effort data by fishing vessels in the IOTC area of competence.	IOTC Res 18/05
NTM6 Obligatory	All fishing vessels are prohibited from using large-scale driftnets[5] in the entire IOTC area of competence.	IOTC Res 17/07
NTM7 Obligatory	DFADs equipped with artificial lights encountered by fishing vessels operating in the IOTC area of competence, should as far as possible be removed and brought back to port.	IOTC Res 16/07
NTM8 Obligatory	Fishing vessels and other vessels including support, supply and auxiliary vessels are prohibited from using, installing, or operating surface or submerged artificial lights for the purpose of aggregating tuna and tuna-like species beyond territorial waters.	IOTC Res 16/07
NTM9 Obligatory	Fishing vessels are prohibited from intentionally conducting fishing activities around or near any vessel or DFAD equipped with artificial lights for the purpose of attracting tuna and tuna-like species under the mandate of the IOTC and in the IOTC area of competence.	IOTC Res 16/07
NTM10 Obligatory	Seychelles is required to periodically assess whether additional measures should be adopted and implemented to ensure that large-scale driftnets are not used on the high seas in the IOTC area of competence.	IOTC Res 12/12

5.1.2 Other Considerations

The tuna fisheries will always be associated with the catch of non-target species. Non-target species have important economic value and makes important contribution to Seychelles food security and trade. While in the past most of the non-target fish were discarded at sea to make space for target species, recent developments have created a market for these species and have encouraged their trade. The increase in the number of local fish processors have created a demand for bycatch from the purse seine fishery. Part of this bycatch is bought by local fish processors from purse seine vessels and are cleaned, cut, packaged and sold in local supermarkets for human consumption. The other part of the catch undergoes secondary processing to make products such as salted fish, smoked fish, fish burgers and fish balls that are also sold on the local market, while certain amount is sold locally as bait and pet food. The largest part of the bycatch is sorted and exported frozen to other countries, mostly on the African continent or to Asia. The

[5] "Large-scale driftnets" are defined as gillnets or other nets or a combination of nets that are more than 2.5 kilometres in length whose purpose is to enmesh, entrap, or entangle fish by drifting on the surface of, or in, the water column.
[6] Or any resolutions superseding it.

start of operation of the central common cold store (CCCS) with a 12,600-t storage capacity that offers facility for sorting, sizing, and grading of fish has created the infrastructure necessary for trading in non-target species. The planned development of six new fish processing plants on Zone 14 is expected to create a demand of 169 t per day when fully operational. Part of this demand will be for non-target species. The Seychelles will need to find balance between mitigating capture of non-target species and the development of its non-target species processing industry. While there are already CMMs in place to mitigate capture of non-target species, such as reduction in the number of DFADs, prohibition from retaining certain species of sharks, and call for the implementation of good practices for the release of various ETP species. Additional emphasis will need to be put on monitoring the demand and catch of non-target species, and if it increases significantly, to put in place measures (unilaterally or through the IOTC) to control catch.

5.2 Endangered, Threatened, and Protected Species (ETP)

These are species that are designated as endangered, threatened, and or protected under an international agreement or by a relevant regional fisheries management organisation, defined as one in which Seychelles is a member.

For the purpose of this Management Plan, they include species that their population are considered at risk by The International Union for Conservation of Nature (IUCN), and or the Seychelles authorities. An endangered species is one that has been classified by the IUCN as very likely to become extinct in their known native ranges in the near future. The IUCN defines a threatened species as one that is likely to become endangered within the foreseeable future, throughout all or a significant portion of its range. Protected species are those that are legally protected under any Seychelles legislation.

ETP species relevant to the Seychelles tuna fisheries include: Mobulid rays, blue shark, oceanic whitetip shark, whale shark, thresher sharks, cetaceans, marine turtles, and seabirds.

5.2.1 Management Strategy

The Seychelles will enforce local legislations for the conservation of ETP species affected by tuna fisheries that are in existence and as they are adopted. Existing legislations concerning the protection of ETP species include:

- **Wild Animals (Whale Shark) Protection Regulation (2003):** It declares the whale shark as protected throughout Seychelles waters and specifies that no person shall kill or take a whale shark.
- **Wild Animals (Turtles) Protection Regulation (1994):** It declares all species of marine turtles as protected throughout the Seychelles. It specifies that no person shall disturb, catch, injure, fish for, kill, sell, purchase, receive or possess any turtle. It also prohibits the possession, expose for sale, sale, purchase, receive any turtle eggs, shells, meat, flesh, calipee or finished turtle shell products.
- **Wild Birds Protection Regulations (1966):** It declares all birds protected throughout Seychelles during the whole year, except for a few introduced species, and those praying on seabirds' eggs and young chicks at listed seabird nesting sites.
- **Fisheries Act (2014):** Prohibits the killing, chasing, and taking of any marine mammal.

As many local legislations for the protection of ETP species are brief, the conservation of ETP species will be strengthened through the implementation of relevant IOTC CMMs detailed in **Table 9**, which also specifies whether the measure is obligatory or recommended. These CMMs are being domesticated in local legislations through the Fisheries and Aquaculture Bill and Regulations.

Several actions are identified in the **Implementation Plan** as part of **Strategy S1.2.1** to mitigate impacts of fisheries on ETP species and by-catch. In addition, actions identified in **Strategy S1.2.2** on reducing ghost fishing and the environmental impacts of abandoned, loss and discarded fishing gears (ALDFGDs), in **Strategy S1.2.3** on increasing recovery of Drifting Fish Aggregating Devices (DFADs) before they create impacts on islands and reefs, in **Strategy S1.2.4** on eliminating the disposal of waste at sea and in **Strategy S1.2.5** on improving knowledge and understanding of the nature of fishery impacts on ecosystems and the environment will also contribute to the conservation of ETP species in the Seychelles tuna fisheries.

Table 9. Indian Ocean Tuna Commission (IOTC) conservation and management measures (CMMs) for the conservation of endangered, threatened, and protected species in the IOTC Area of Competence.

No.	Management Measures	Instrument
Measures for protection of Mobulid rays		
ETP1 Obligatory	All fishing vessels are prohibited from intentionally setting any gear type for targeted fishing of Mobulid rays, if the animal is sighted prior to commencement of the set.	IOTC Res 19/03
ETP2 Obligatory	All fishing vessels are prohibited from retaining onboard, transhipping, landing, storing, any part or whole carcass of Mobulid rays[7].	IOTC Res 19/03
ETP3 Obligatory	All fishing vessels are required to promptly release alive and unharmed, to the extent practicable, mobulid rays as soon as they are seen in the net, on the hook, or on the deck, and to do it in a manner that will result in the least possible harm to the individuals captured, including by complying with live handling procedures[8].	IOTC Res 19/03
ETP4 Obligatory	All recreational and sport fishing vessels are required to release alive all caught mobulid rays and are prohibited from retaining onboard, transhipping, landing, storing, selling, or offering for sale any part or whole carcass of mobulid rays.	IOTC Res 19/03
ETP5 Obligatory	All fishing vessels are required to surrender the whole mobulid ray to the responsible governmental authorities, or other competent authority, or discard them at the point of landing in instances when Mobulid rays are unintentionally caught by and frozen as part of a purse seine vessel's operation.	IOTC Res 19/03
ETP6 Obligatory	All fishing vessels are required to report information on the accidental catch of mobulid rays that are unintentionally caught by artisanal fishing to the responsible governmental authorities, or other competent authority, at the point of landing.	IOTC Res 19/03
ETP7 Recommended	Seychelles is to endeavour to ensure that fishermen are aware of and use proper mitigation, identification, handling and releasing techniques and keep on board all necessary equipment for the safe	IOTC Res 19/03

[7] Does not apply to fishing vessels carrying out subsistence fishery, defined as a fishery where the fish caught are consumed directly by the families of the fishers rather than being bought by middle (wo)men and sold at the next larger market, per the FAO Guidelines for the routine collection of capture fishery data. FAO Fisheries Technical Paper. No. 382. Rome, FAO. 1999. 113p.
[8] Annex 1 of Resolution 19/03.

No.	Management Measures	Instrument
	release of cetaceans before the guidelines mentioned in paragraph 6 of IOTC Resolution 23/06 are endorsed.	
ETP8 Recommended	Seychelles is encouraged to investigate at-vessel and post-release mortality in mobulids including, but not exclusively, the application of satellite tagging programs.	IOTC Res 19/03
Measures for the conservation of sharks		
ETP9 Obligatory	Fishermen are required to fully utilise entire catches of sharks (all parts except head, guts, and skins), except species prohibited by the IOTC.	IOTC Res 17/05
ETP10 Obligatory	Fishing vessels are prohibited from landing, retaining on-board, transhipping, and carrying of shark fins which are not naturally attached to fresh shark carcass until the first point of landing.	IOTC Res 17/05
ETP11 Obligatory	Fishing vessels are prohibited from having on board shark fins that total more than 5% of the weight of frozen sharks on board, up to the first point of landing.	IOTC Res 17/05
ETP12 Obligatory	It is prohibited to purchase, offer for sale and sale of shark fins which have been removed on-board, retained on-board, transhipped, or landed, in contravention to Resolution 17/05 on conservation of sharks caught in association with fisheries managed by IOTC.	IOTC Res 17/05
ETP13 Recommended	In fisheries in which sharks are unwanted species, fishing vessels are encouraged to release live sharks, to the extent possible, especially juveniles and pregnant sharks that are caught incidentally and are not used for food and/or subsistence.	IOTC Res 17/05
Measures for conservation of blue sharks		
ETP14 Obligatory	All fishing vessels catching blue shark in association with IOTC fisheries in the IOTC area are required to record their catch in accordance with the requirements set out in the Resolution 15/01 on the recording of catch and effort data by fishing vessels in the IOTC area of competence or any Resolution superseding it.	IOTC Res 18/02
Measures for the conservation of oceanic whitetip shark		
ETP15 Obligatory	All Seychelles fishing vessels authorised to fish for tuna or tuna-like species managed by the IOTC on the high seas, are prohibited to retain onboard, tranship, land, or store any part or whole carcass of oceanic whitetip sharks.	IOTC Res 13/06
ETP16 Obligatory	All Seychelles fishing vessels authorised to fish for tuna and tuna-like species managed by the IOTC on the high seas are required to promptly release unharmed, to the extent practicable, oceanic whitetip sharks when brought alongside for taking onboard the vessel.	IOTC Res 13/06
ETP17 Recommended	Seychelles fishers are encouraged to release oceanic whitetip sharks if recognised on the line before bringing them onboard the vessels.	IOTC Res 13/06
Measures for the conservation of thresher sharks		
ETP18 Obligatory	All fishing vessels are prohibited from retaining on board, transhipping, landing, storing, selling, or offering for sale any part or whole carcass of thresher sharks of all the species of the family Alopiidae.	IOTC Res 12/09
ETP19 Obligatory	All fishing vessels are required to promptly release unharmed, to the extent practicable, thresher sharks when brought along side for taking on board the vessel.	IOTC Res 12/09
ETP20 Recommended	Seychelles fishers are encouraged to record and report incidental catches as well as live releases of thresher sharks.	IOTC Res 12/09
ETP21 Obligatory	Recreational and sport fishers are required to release alive, and are prohibited from retaining on board, transhipping, landing, storing, selling, or offering for sale all thresher sharks of all the species of the family Alopiidae.	IOTC Res 12/09

No.	Management Measures	Instrument
Measures for the conservation of whale sharks		
ETP22 Obligatory	All purse seine fishing vessels are prohibited from intentionally setting a purse seine net around a whale shark in the IOTC area of competence, if the animal is sighted prior to the commencement of the set.	IOTC Res 13/05
ETP23	The master of a vessel is required to take reasonable steps to ensure the safe release of whale shark if a whale shark is unintentionally encircled in a purse seine net.	IOTC Res 13/05
Measures for the conservation of cetaceans.		
ETP24 Obligatory	All fishing vessels are prohibited from intentionally setting a purse seine net around a cetacean in the IOTC area of competence, if the animal is sighted prior to the commencement of the set.	IOTC Res 23/06
ETP25 Obligatory	The master of a vessel is required to take reasonable steps to ensure the safe release of a cetacean if a cetacean is unintentionally encircled in a purse seine net, or captured or entangled in the gillnets	IOTC Res 23/06
ETP26 Obligatory	The master of a vessel is required to report incidents of cetaceans being unintentionally encircled in a purse seine net, or captured or entangled in the gillnets, or interactions with cetaceans with other gear types, to the SFA with the following information: i) The species (if known) ii) The number of individuals iii) A short description of the interaction, including details of how and why the interaction occurred (if possible). iv) The location of the encirclement. v) The steps taken to ensure safe release. vi) An assessment of the life status of the animal on release, including whether the cetacean was released alive but subsequently died.	IOTC Res 23/06
ETP27 Recommended	Vessels operating in artisanal fisheries are encouraged to immediately release any cetacean caught to the extent possible and report the information to SFA with the following information: i) The species (if known) ii) The number of individuals iii) A short description of the interaction, including details of how and why the interaction occurred (if possible). iv) The location of the encirclement. v) The steps taken to ensure safe release. vi) An assessment of the life status of the animal on release, including whether the cetacean was released alive but subsequently died. or in accordance with IOTC Resolution 15/01 and 15/02 (or any subsequent revisions).	IOTC Res 23/06
ETP28 Obligatory	Operators of fishing vessels are required to only use non-entangling material and designs for the construction of drifting Fish Aggregating Devices (DFADs) to reduce the incidence of entanglement.	IOTC Res 23/06
Measures for the conservation of seabirds		
ETP29 Obligatory	In the area south of 25 degrees South latitude, all Seychelles longline vessels are required to use at least two of the following three mitigation measures: i) Night setting with minimum deck lighting ii) Bird-scaring lines (Tori lines) iii) Line weighting	IOTC Res 23/07

No.	Management Measures	Instrument
	or, alternatively, use hook-shielding devices (as per the specification in Table 2 of Resolution 23/07) as a stand-alone measure and to ensure conformity to the minimum technical standards for these measures, including additional specifications for the design and deployment of bird scaring lines as detailed in Annex 1 of IOTC Resolution 23/07.	
ETP30 Obligatory	When operating in an area of competence of a relevant RFMO, including Seychelles waters, all Seychelles longline vessels are required to implement the same seabird mitigation measures used when operating in the area south of 25 degrees South latitude.	New measure – Fish Reg.
ETP31 Obligatory	The operator of any fishing vessel in Seychelles waters, or of any Seychelles registered vessel in areas beyond national jurisdiction are required to make such reports of incidental bycatch of seabirds as may be required by the SFA.	New measure – Fish Reg.
Measures for the conservation of marine turtles		
ETP32 Obligatory	It is prohibited for any person, including, the operator of any fishing vessel in Seychelles waters or of any Seychelles registered vessel within areas beyond national jurisdiction, to disturb, catch, injure, engage in fishing for, killing, buying, selling, receiving, or possessing any marine turtle or any of their products or parts.	New measure – Fish Reg
ETP33 Obligatory	Fishermen on vessels targeting species covered by the IOTC Agreement are required to bring aboard, if practicable, any captured marine turtle that is comatose or inactive as soon as possible and foster its recovery, including aiding in its resuscitation, before safely returning it to the water.	IOTC Res 12/04
ETP34 Obligatory	Operators of gillnet vessels fishing for species covered by the IOTC Agreement are required to record all incidents involving marine turtles during fishing operations in their logbooks[9] and report such incidents to the appropriate authorities.	IOTC Res 12/04
ETP35 Obligatory	Operators of longline vessels fishing for species covered by the IOTC Agreement are required to carry line cutters and de-hookers to facilitate the appropriate handling and prompt release of marine turtles caught or entangled, and that they do so in accordance with IOTC Guidelines[10].	IOTC Res 12/04
ETP36 Recommended	Operators of longline vessels fishing for species covered by the IOTC Agreement are encouraged to use whole finfish bait.	IOTC Res 12/04
ETP37 Obligatory	Operators of all longline vessels fishing for species covered by the IOTC Agreement are required to record all incidents involving marine turtles during fishing operations in their logbooks[9] and report such incidents to the appropriate authorities.	IOTC Res 12/04
ETP38 Obligatory	Operators of purse seine vessels fishing for species covered by the IOTC Agreement are to avoid encirclement of marine turtles, and if a marine turtle is encircled or entangled, take practicable measures to safely release it.	IOTC Res 12/04
ETP39 Obligatory	Operators of purse seine vessels fishing for species covered by the IOTC Agreement are required to release all marine turtles observed entangled in fish aggregating devices (FADs) or other fishing gear.	IOTC Res 12/04
ETP40 Obligatory	If a marine turtle is entangled in the net, operators of purse seine vessels are required to stop net roll as soon as the turtle comes out of the water; disentangle the turtle without injuring it before resuming	IOTC Res 12/04

[9] This information should include, where possible, details on species, location of capture, conditions, actions taken on board and location of release.
[10] In the IOTC Marine Turtle Identification Cards.

No.	Management Measures	Instrument
	the net roll; and to the extent practicable, assist the recovery of the turtle before returning it to the water.	
ETP41 Obligatory	Operators of purse seine vessels are required to carry and employ dip nets, when appropriate, to handle marine turtles.	IOTC Res 12/04
ETP38 Recommended	Purse seine vessel operators are encouraged to adopt FAD designs that reduce the incidence of entanglement of marine turtles according to international standards.	IOTC Res 12/04
ETP42 Obligatory	Operators of purse seine vessels are required to record all incidents involving marine turtles during fishing operations in their logbooks and report such incidents to the appropriate authorities.	IOTC Res 12/04

5.2.2 Other Considerations

The majority of IOTC CMMs in place in tuna fisheries for the conservation of ETP species have been in place for over five years. An important measure in documenting the impact of the fisheries on ETP species is the scientific observer programme. While the programme has been successfully implemented in the purse seine fishery with over 90% of fishing trips covered, it is yet to be implemented in other types of tuna fisheries. The Seychelles National Report to the IOTC Scientific Committee for the year 2022 indicates, at least for the industrial longline fisheries for which data is published, that the catch of ETP species and interactions with fishing remains high. Of particular concern is the high catch of sharks and the high percentage of these that die in the fishery. Data from the purse seine fishery presented in the Seychelles report seems to come solely from onboard observers, even though all Seychelles purse seiners have EMS onboard for the purpose of recording and monitoring catch and interactions with ETP species. There is thus a need to improve analysis and reporting of ETP species interactions from EMS programmes in the purse seine fishery. Effort also needs to be extended to the artisanal fishery in terms of awareness on ETP species, good practice for handling, and on retention and non-retention species[11]. Additional effort in the artisanal fishery needs to be focused on the collection of required data according to the IOTC standards. In that same spirit, the 25th Session of the IOTC Scientific Committee recommended the Working Party on Ecosystems and Bycatch (WPEB) to revise the list of sharks, rays and Endangered, Threatened and Protected (ETP) species included in Appendix II of IOTC Resolution 15/01 to ensure that all species under broad categories such as hammerhead sharks (Sphyrna spp.) are reported separately by species. Climate change will surely have adverse impacts on many ETP species, target species, ecosystems, and habitats and should be considered in all management advice.

5.3 Ecosystem and Habitats

Ecosystem and habitat impacts of tuna fishing can result from the overfishing of target stocks, the catching of non-target species and habitat damages during fishing operations, from ALDFGDs and from the dumping of waste at sea (Ahusan & Adam, 2021; Gilman et al., 2021; Goñi, 1998; Leroy et al., 2013). Overfishing can reduce the abundance and diversity of tuna stocks and disrupt the food webs and the ecological balance among species. The catching of non-target species such as other finfishes, dolphins, sharks, rays, turtles, and seabirds can reduce the population of these species and affect the ecosystem functions and services they provide. Damage to habitats can result from fishing operations, e.g., resulting from the impacts and entanglement of fishing gears such as nets and longlines on the seafloor when fishing over seamounts, knolls and guyots.

[11] Possibly in collaboration with the Department of Environment.

Ecosystems and habitat damages from ALDFGDs can persist for many years and can result in ghost fishing, and destruction of habitats as a result of physical impacts, smothering and abrasion. Ecosystem impacts of tuna fishing in the Indian Ocean have received an increased amount of attention locally over the last couple of years, especially from environmental NGOs that have been documenting the stranding of fishing gears in shallow marine habitats such as on coral reefs, lagoons and beaches and associated biodiversity impacts (Balderson & Martin, 2015; Martin, 2020). The FAD Watch programme[12], which has been ongoing since 2016, has been trying to mitigate the effect of dFADs stranding on marine ecosystems and habitats through dFADs interception to prevent stranding and the recovery of stranded FADs for proper disposal, reuse, or recycling.

5.3.1 Management Strategy

As part of the ecosystem approach to fisheries management that the Seychelles has adopted, this fishery management plan must ensure that the application of CMMs put in place to reduce ecosystem and habitat impacts in the fisheries are monitored and regularly evaluated at the local and regional level. An important part of Seychelles response includes the update and implementation of Fisheries Improvement Programmes (FIPs) by its fleets and the Seychelles FAD Management Plan (**Appendix B**) and the update and enforcement of fishing license and Certificate of Authorisation (CoA) conditions. Ongoing initiatives such as FAD Watch, the use of eco-FADs, and the export of old purse seine nets for recycling facilitated by purse seine vessel operators and other partners should be continued, strengthened, broadened and upscaled as required.

At the legislative level, measures that are being implemented to mitigate the ecosystem and habitat impacts of tuna fisheries have been mainly through fishing exclusion in the form of designation of protected areas and in the creation of zones where fishing by industrial vessels is prohibited. The Fisheries and Aquaculture Bill and Regulations is introducing new measures to better legislate against fishing activities that affects ecosystems and habitats, and to make it easier to identify and track fishing gears that are most at risk to causing ecosystem and habitat impacts. Fisheries and Aquaculture Bill and Regulations is also domesticating all IOTC CMMs concerned with reducing the ecosystem and habitat impacts of tuna fisheries. **Table 10** provide details of these IOTC CMMs that are to be implemented by fishers and fishing vessel operators while **Table 11** are CMMs that are to be implemented by the Seychelles fisheries administration. Both tables specifies whether the measure is obligatory or recommended. At the time of the finalisation of this management plan, the Seychelles was in the process of preparing the Fisheries (Drifting aggregating device management) Regulations with the aim of better controlling the design, construction, deployment, and retrieval of dFADs in order to reduce their impacts on marine and coastal ecosystems. Both the Gazetted Fisheries and Aquaculture Bill (2023) and the draft Fisheries (Drifting aggregating device management) Regulations contains articles for all dFADs deployed or redeployed within the Seychelles EEZ, or in areas beyond Seychelles jurisdiction by Seychelles' vessels, to be constructed from fully biodegradable and non-entangling materials[13]. This aligns with IOTC Resolution 19/02 concerning Procedure on a fish aggregating device (FADS) management plan. The **Implementation Plan** identifies priority actions for implementation over the next 5 years to address the issue of fisheries impacts on ecosystems and

[12] FAD Watch is a collaborative programme with the participation of the Seychelles Fishing Authority (SFA), Sustainable Indian Ocean Tuna Initiative (SIOTI), and the Spanish Association of Tuna Freezers (AGAC).
[13] With the exception of the electronic equipment and plastic-based floatation components.

habitats as part of **Strategy S1.2.1** on mitigating the impacts of fisheries on ETP species and by-catch; **Strategy S1.2.2** on reducing ghost fishing and the environmental impacts of abandoned, loss and discarded fishing gears and devices (ALDFGDs), **Strategy S1.2.3** on increasing recovery of Drifting Fish Aggregating Devices (DFADs) before they create impacts on islands and reefs, **Strategy S1.2.4** on eliminating the disposal of waste at sea and **Strategy S1.2.5** on improving knowledge and understanding of the nature of fishery impacts on ecosystems and the environment.

Table 10. Conservation and Management Measures in place for the conservation of ecosystems and habitats in the Indian Ocean Tuna Commission (IOTC) Area of Competence that are to be implemented by fishers and fishing vessel operators.

No.	Management Measures	Instrument
Prohibited zones		
EHS1 Obligatory	Industrial vessels are prohibited from fishing within the Industrial Fisheries Exclusion Zones.	Fisheries regulations
EHS2 Obligatory	Industrial vessels are prohibited from fishing within the Marine National Parks and Sustainable Use zones, apart from the Amirantes to Fortune Bank Sustainable Use Zone.	MSP Allowable Activities.
Management of Fish Aggregating Devices (FADs)		
EHS3 Obligatory	Seychelles vessels must use only AFADs that are permanently marked with a Unique National Identification (UNI) number that identifies either the CPC or the vessel(s) that the AFAD belongs to (which ever applicable) until a scheme to operationalise the FAO Voluntary Guidelines on the Marking of Fishing Gear (VGMFG) is developed. The UNI number must be clearly and permanently marked on the buoy of the AFAD.	IOTC Res 23/01
EHS4 Obligatory	Seychelles vessels deploying new AFADs or replacing existing ones are required to consider the nature and profile of the sea bottom when choosing a site and, where possible, avoid sites with steep slopes to minimise the risk of AFAD loss.	IOTC Res 23/01
EHS5 Obligatory	Vessel operators must ensure that the upper floatation of AFADs is suitable for offshore, high current deployments by using designs which are streamlined to reduce drag and resistance to currents and waves.	IOTC Res 23/01
EHS6 Obligatory	Vessel operators must ensure that only non-entangling and non-mesh materials are used in the sub-surface aggregates of AFADs.	IOTC Res 23/01
EHS7 Obligatory	Only purse seiners and associated supply or support vessels are allowed to deploy DFADs.	IOTC Res 19/02
EHS8 Obligatory	All DFADs must be deployed with an instrumented buoy;[14] and it is prohibited to deploy a DFAD with any other buoys, such as radio buoys, not meeting the definition of an instrumented buoy.	IOTC Res 19/02
EHS9 Obligatory	The maximum number of operational buoys followed by any purse seine vessel at any one time is limited to 300.	IOTC Res 19/02
EHS10 Obligatory	The maximum of instrumented buoys that may be acquired annually for each purse seine vessel is limited to 500.	IOTC Res 19/02
EHS11 Obligatory	Purse seine vessels are prohibited from having more than 500 instrumented buoys (buoy in stock and operational buoy) at any time.	IOTC Res 19/02
EHS12 Obligatory	An instrumented buoy is to be made operational only when physically present on board the purse-seine vessel to which it belongs or its associated supply or support vessel.	IOTC Res 19/02

[14] Instrumented buoy means a buoy with a clearly marked with a unique reference number allowing identification of its owner and equipped with a satellite tracking system to monitor its position.

No.	Management Measures	Instrument
EHS13 Obligatory	The operationalisation of instrumented buoy is to be recorded in the appropriate logbook, specifying the instrumented buoy unique identification number and the date, time, and geographical coordinates of its deployment.	IOTC Res 19/02
EHS14 Obligatory	All Seychelles purse seine vessels, supply or support vessels are required to declare to the relevant authorities the number of instrumented buoys onboard, including each unique identifier of the instrumented buoy before and after each fishing trip.	IOTC Res 19/02
EHS15 Obligatory	An instrumented buoy can only be reactivated once it has been brought back to port, either by the vessel tracking the buoy/ associated supply or support vessel or by another authorized vessel.	IOTC Res 19/02
EHS16 Obligatory	All Seychelles vessels fishing on DFADs are required to annually submit the number of operational buoys followed by vessel, lost, and transferred (total number of DFADs tagged at sea, by deploying an instrumented buoy on a log or another vessel DFAD already in the water) by 1° by 1° grid area and month strata and DFAD type under the confidentiality rules set by Resolution 12/02 (or any subsequent superseding Resolution).	IOTC Res 19/02
EHS17 Obligatory	All Seychelles purse seine vessels fishing on FADs, including supply vessels, are required to record fishing activities in association with FADs using the specific data elements of IOTC Resolution 19/02[15].	IOTC Res 19/02
EHS18 Obligatory	All fishing vessels must use non-entangling designs and materials in the construction of FADs[16].	IOTC Res 19/02
EHS 19 Obligatory	Instrumented buoys attached to DFADs must contain a clearly visible, physical, unique reference number marking (ID provided by the manufacturer of the instrumented buoy) and the vessel unique IOTC registration number.	IOTC Res 19/02
EHS20 Obligatory	Fishing vessels must report information on all active FADs to the IOTC Secretariat daily.	IOTC Res 19/02

Table 11. Conservation and Management Measures in place for the conservation of ecosystems and habitats in the Indian Ocean Tuna Commission (IOTC) Area of Competence that are to be implemented by the Seychelles Fishing Authority.

No.	Management Measures	Instrument
EHS21 Obligatory	Annually submit a Management Plans for the use of FADs to the IOTC. [17]	IOTC Res 19/02
EHS22 Obligatory	Ensure that the Seychelles management plans for the use of FADs include initiatives or surveys to investigate, and to the extent possible minimise the capture of small bigeye tuna and yellowfin tuna and non-target species associated with fishing on FADs, and guidelines to prevent, to the extent possible, the loss or abandonment of FADs.	IOTC Res 19/02
EHS23 Recommended	Encourage Seychelles fishing vessels to use natural or biodegradable materials in FAD construction to reduce the amount of synthetic marine debris.	IOTC Res 19/02
EHS24 Recommended	Encourage Seychelles fishing vessels to remove from the water, retain onboard and only dispose of in port, all traditional FADs encountered.	IOTC Res 19/02
EHS25 Recommended	Conduct trials using biodegradable materials to facilitate the transition to the use of only biodegradable material for DFADS construction by flagged vessels.	IOTC Res 19/02

[15] Detailed in Annex III (DFAD) and Annex IV (AFAD) of Resolution 19/02 in the section of the "FAD-logbook".
[16] Outlined in Annex V of Resolution 19/02.
[17] If there are no changes to the plan, the IOTC can be notified and the previously submitted plan can remain in force.

No.	Management Measures	Instrument
EHS26 Obligatory	Develop an AFAD Management Plan[18].	IOTC Res 23/01
EHS27 Obligatory	Maintain a register of deployed, lost, abandoned, and discarded AFADs and report this data to the IOTC Executive Secretary in its annual Implementation Report.	IOTC Res 23/01
EHS28 Obligatory	Conduct inspections at sea to ensure that AFADs are clearly and permanently marked with UNI number[19].	IOTC Res 23/01
EHS29 Obligatory	Encourage vessel operators to construct AFADs from materials that will ensure increased longevity so that they continue to retain their integrity for the longest lifespan possible.	IOTC Res 23/01
EHS30 Obligatory	Ensure that Seychelles vessel operators construct sub-surface aggregators from bio-degradable materials in instances where these aggregators are attached to the mooring line of AFADs.	IOTC Res 23/01

[18] In accordance with the Guidelines in Annex I of Resolution 23/01 and to be submitted to the IOTC Executive Secretary by 1 January 2024.
[19] If there is limited capacity to undertake at sea inspections, port inspections may be implemented to ensure that the AFADs deployed are constructed and marked as per the requirements specified in Resolution 23/01.

6. ECONOMIC AND SOCIAL CONSIDERATIONS

Economic and social objectives of the Seychelles tuna fishery were previously only considered as part of the Seychelles Tuna Industry Development Framework that was developed in parallel to this Management Plan. At the request of stakeholders, pertinent proposed actions concerning the fishery that appears in the Development Framework have now also been brought into this Management Plan. This section provides an overview of the strategies and priority actions which appear in the Implementation Plan for addressing identified economic and social considerations.

6.1 Economic Considerations

In 2022, the Seychelles industrial fleets and the small-scale longline caught a total of 132,613 Mt of
tuna and tuna like species from the Western Indian Ocean with a value of approximately USD 265 million (~ SCR 3,600 million) at the first point of sale. Out of this 17,589 Mt, around 13% of the catch, was landed in Seychelles and was used to supply the local market, and for export as whole fish or value-added products. This was supplemented by an additional 42,410 Mt of fish from foreign vessels. In that same year, the Seychelles reported sales of SCR 4,496 million in fish and fish products, but this does not appear to capture the sale of fish by industrial vessels that are not landed in Seychelles. The industrial fleet making licensed to fish in Seychelles waters and vessels making use of Port Victoria reported expenditures in Seychelles of SCR 2,950 million for the year. There are however additional economic contributions that the tuna fishery makes into the Seychelles economy that are not being captured which therefore grossly underestimate the real value of the Seychelles tuna fishery and industry. Much of the value is created by the Seychelles purse seine fleet and the foreign purse seine fleet that make use of Port Victoria and the Indian Ocean Tuna Canning Factory. Catch by the small-scale longline account for approximately 1.6% of the Seychelles catch and export by other fish processors excluding the IOT account for approximately 7.2% of export value. There have been reports of economic under performance of the small-scale longline fleet and an almost total replacement of the Seychellois crew with foreign crew, leading to leakages in revenue.

6.2 Management Strategy

The overarching goal of this Management Plan concerning the economic contribution of the tuna fishery to the Seychelles economy is to "*Enhance the tuna fisheries value chain for the benefit of all stakeholders*". Under this goal there is only one operational objective "**Objective 3.1:** Optimize revenue from tuna fisheries." The **Implementation Plan** identifies the strategies to be pursued and priority actions for implementation over the next five years to enhance the economic contributions of the tuna fishery to the Seychelles economy. A total of eight different strategies are recommended, each addressing particular areas where concerns have been raised. Details of proposed actions under each strategy can be found in the **Implementation Plan.**

- **Strategy 3.1.1:** Improve access to economic data and make use of economic data in decision making.
- **Strategy 3.1.2:** Promote investment in the tuna industry.
- **Strategy 3.1.3:** Improve financing options and encourage Seychellois investments in tuna fishery and fish processing.
- **Strategy 3.1.4:** Ensure optimal economic gains from fishing access arrangements.

- **Strategy 3.1.5:** Derive maximum socio-economic benefits from the use of IOTC annual catch allocations.
- **Strategy 3.1.6:** Improve the quantity, quality and value of landed tuna from the semi-industrial longline fishery.
- **Strategy 3.1.7:** Improve, branding, labelling, marketing and sale of Seychelles tuna products.
- **Strategy 3.1.8:** Ensure that Port Victoria retains its competitive advantage.

6.3 Social Considerations

There are multiple social issues that impact the Seychelles tuna fishery. Some of these issues are addressed through this Management Plan. However, many of the issues are not specific to the fisheries sector only and have to be addressed through other channels. One of the major issues is the need for greater involvement of Seychellois in the tuna fishery and in the tuna industry. Local Seychellois are needed as investors in fishing vessels and as employees working in the business. As such, there is a need to build the interest of Seychellois to invest in the sector and to build human capacity to fill labour gaps. Discussions with the public tends to suggest that many Seychellois are ill informed about the Seychelles tuna fishery, the functioning of the marine environment and how the fisheries sector works, which points to the need to further build on ocean literacy and the understanding of the tuna fishing sector among the population so that they are more informed and can more effectively contribute to discussions, policies and strategies for addressing concerns in the tuna fishery. Personal safety while working in the tuna fishery and industry is a topic that is still not receiving enough attention though there has been several high-profile accidents and incidents that have occurred in the last couple of years. There is a need for the tuna fishing community to openly discuss about safety concerns in the tuna fishery and fishing industry and to put in place stringent measures to mitigate the accidents and incidents.

6.4 Management Strategy

The overarching goal of this Management Plan concerning the contribution of the tuna fishery and industry to social development of the Seychelles is to "*Ensure that the tuna fisheries contribute to socio-economic development and empowerment of the Seychellois nation*." Under this goal there are four operational objectives, each with between one and three recommended strategies. The strategies are listed below under each operational objective. Details of proposed actions under each strategy can be found in the **Implementation Plan.**

Objective 4.1: Increase Seychellois stakeholders' representation in the harvesting and processing sub-sector.

- **Strategy 4.1.1:** Improve training certification for careers across the tuna fishing industry.
- **Strategy 4.1.2:** Build interest and local capacity in value addition.

Objective 4.2: Increase Ocean literacy and understanding of the tuna fishing sector among the population.

- **Strategy 4.2.1:** Use communication tools and the media to raise awareness about tuna fishing.
- **Strategy 4.2.2:** Integrate knowledge on tuna fishing in formal education and educational campaigns.

- **Strategy 4.2.3:** Encourage dialogues on the Seychelles tuna fishery and its costs and benefits.

Objective 4.3: Improve safety in the tuna fishing industry.

- **Strategy 4.3.1:** Ensure that safety issues are openly discussed, and mitigation actions are implemented to address them.

Objective 4.4: Industry actors become stewards of the tuna resources and the marine environment on which the fishery depends.

- **Strategy 4.4.1:** Encourage operators to report suspected cases of violations of fishing conditions and IUU fishing.
- **Strategy 4.4.2:** Encourage industry actors to implement initiatives to improve quality of the marine environment, fish stocks, living conditions onboard fishing vessels and fishing industry-related jobs.

The strategies listed above are proposed for addressing social and economic concerns and those for addressing resource sustainability issues identified under **Section Five** are supported by a range of proposed strategies and actions for improving tuna fisheries governance detailed in Section 11.2 of the Implementation Plan on Effective Fisheries Governance

7. STOCK ASSESSMENT, FISHERY MONITORING AND RESEARCH

7.1 Stock Assessments

7.1.1 Current Status of Target Stock(s)

The Seychelles does not undertake stock assessments for any of the species under the scope of this plan. Instead, it relies on stock assessments undertaken by the IOTC. Seychelles contribution to stock assessment efforts is made through the collection and submission of data from its fishing fleets to the IOTC. Seychelles scientists also participate in IOTC Data Preparatory and Stock assessment meetings and contribute to the elaboration of scientific advice.

Table 12 below provides a summary of the status of the Indian Ocean tuna stocks under the IOTC management mandate as at the end of the second quarter of 2023. Of the 15 species, five were classified as not overfished and not subject to overfishing. These include the albacore tuna, skipjack tuna, swordfish, kawakawa and the Indo-Pacific king mackerel. Two of the tropical tunas (bigeye and yellowfin), the blue marlin, striped marlin, longtail tuna and narrow-barred Spanish mackerel were overfished and subject to overfishing, whereas the status of the other four species (black marlin, Indo-Pacific sailfish, bullet tuna, frigate tuna) were classified as uncertain, mostly due to uncertainty in catch data and insufficient knowledge of the species biology and productivity.

Table 12. Summary of stock status of tuna and tuna-like species under the IOTC management mandate as of the end of June 2023. Source: IOTC stock status dashboard (accessed 30/06/2023).

Common name	Binomial name	Stock status		Last assessment
		Biomass	Fishing mortality	
Albacore	*Thunnus alalunga*	not overfished	not subject to overfishing	2022
Bigeye tuna	*Thunnus obesus*	Overfished	Subject to overfishing	2022
Skipjack tuna	*Katsuwonus pelamis*	not overfished	not subject to overfishing	2023
Yellowfin tuna	*Thunnus albacares*	Overfished	Subject to overfishing	2021
Swordfish	*Xiphias gladius*	not overfished	not subject to overfishing	2023
Black marlin	*Istiompax indica*	Uncertain	Uncertain	2021
Blue marlin	*Makaira nigricans*	Overfished	Subject to overfishing	2019
Striped marlin	*Kajikia audax*	Overfished	Subject to overfishing	2021
Indo-Pacific sailfish	*Istiophorus platypterus*	Uncertain	Uncertain	2019
Bullet tuna	*Auxis rochei*	Uncertain	Uncertain	2021
Frigate tuna	*Auxis thazard*	Uncertain	Uncertain	2021
Kawakawa	*Euthynnus affinis*	not overfished	not subject to overfishing	2021
Longtail tuna	*Thunnus tonggol*	Overfished	Subject to overfishing	2020
Indo-Pacific king mackerel	*Scomberomorus guttatus*	not overfished	not subject to overfishing	2021

Narrow-barred Spanish mackerel	*Scomberomorus commerson*	Overfished	Subject to overfishing	2020

A summary of the stock status of the four temperate and tropical tunas and the four other species that are classified as overfished and subject to overfishing is provided below.

- **Yellowfin tuna:** The Indian Ocean yellowfin tuna stock was first classified as overfished and subject to overfishing in 2015. The last stock assessment undertaken by the IOTC in 2021, found the stock status to have remained unchanged. MSY was calculated to be 349,000 t (80% CI: 286,000 – 412,000 t). Overall catch in 2021 was 416,235 t. Spawning biomass in 2020 was estimated to be 31% on average of the unfished (1950) levels. The IOTC reports that spawning biomass estimates have been declining over time, and particularly since 2011, and that overall trend in average weigh shows a clear and steady decrease in the size of fish caught since the beginning of the 1990s. The spawning biomass in 2020 was estimated to be 87% of the level that supports the maximum sustainable yield (SB_{2020}/SB_{MSY} = 0.87), and fishing mortality was estimated to be 32% higher than F_{MSY} (F_{2020}/F_{MSY} = 1.32). The probability of the stock being in the red Kobe quadrant in 2020 was estimated to be at 68%. The implementation of IOTC resolutions *On an Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna Stock in the IOTC Area of Competence* by some contracting parties and cooperating non-contracting parties (CPCs) is yet to provide any positive sign that the stock of yellowfin is recovering[20].

- **Bigeye tuna:** A stock assessment for bigeye tuna in the IOTC Area of Competence undertaken in 2022 determined the stock of bigeye to be overfished and subject to overfishing. MSY was calculated to be 96,000 t (80% CI: (83,000 – 108,000 t). Overall catch in 2021 was 94,803 t. Spawning biomass in 2021 was estimated to be 25% of the unfished levels (1950) and 90% of the level that can support MSY. Fishing mortality was estimated to be 43% higher than F_{MSY} (F_{2021}/F_{MSY} = 1.43). To return the stock to a state where it is not overfished or subject to overfishing, Resolution 23/04 "*On establishing catch limits for bigeye tuna in the IOTC Area of Competence*" was adopted in the 27th Annual Session in 2023. The resolution adopted a Total Allowable Catch (TAC) of 80,583 t, which is 15% (the pre-set maximum decrease under the Management Procedure (MP)) below the 2021 catch, for the year 2024 and 2025 in accordance with the MP established by Resolution 22/03 *"On a management procedure for bigeye tuna in the IOTC area of competence"* but noted that the stock status is more pessimistic than implied by the 15% decrease of TAC. The IOTC Scientific Committee reviewed for exceptional circumstances and determined that there was no risk to the stock that such TAC level was adopted.

- **Albacore tuna:** Stock assessment was undertaken for albacore tuna in 2022 to update the assessment of 2019. The stock was determined as not overfished and not subject to overfishing. Fishing mortality in 2020 was estimated to be at 68% of the level of F_{MSY} (F_{2020}/F_{MSY} = 0.68) and biomass was estimated to be 56% above the SB_{MSY} level. IOTC projections indicate that current catch appears to be sustainable in the short term but cautioned that the projections are based on model assumptions that may be associated with high levels of uncertainty.

[20] It should be noted that IOTC stock assessments are subject to a peer-review process. Peer reviews have identified several issues with the yellowfin tuna stock assessments, which could have consequences on future stock assessments and the stock status outlook. The next stock assessment will be in 2024.

- **Skipjack:** The last stock assessment (2023) for skipjack tuna undertaken for the IOTC Area of Competence indicated that the stock is not overfished and not subject to overfishing. MSY was calculated to be 584,774 t (80% CI: (512,228 – 686,071 t). Overall catch in 2022 was 666,408 t. Spawning biomass in 2022 was estimated to be 53% of the unfished levels (1950) and 230% of the level that can support MSY. Fishing mortality was estimated to be 49% of the level that can support MSY (F_{2022}/F_{MSY} = 0.49). Total catches in 2022 were 30% larger than the resulting catch limit from the skipjack HCR for the period 2021-2023 (513,572 t). The increase in abundance despite catches exceeding the recommended limits was primarily driven by an increase in recent recruitment estimated to be well above the long-term average that was supported by favourable environmental conditions (IOTC, 2023). Climate model predictions suggest that the positive productivity phase will end by the start of 2024 resulting in a period of lower productivity. Management advice highlighted the need for the IOTC to ensure that catches of skipjack tuna do not exceed agreed limit, as occurred in recent years.

- **Blue marlin:** Stock assessment undertaken in 2022 determined the stock to be overfished and subject to overfishing (B_{2020}/B_{MSY} = 0.73, F_{2020}/F_{MSY} =1.13). To return the blue marlin stock in the green zone of the Kobe Plot by 2027 ($F_{2027} < {}_{FMSY}$ and $B_{2027} > B_{MSY}$) with at least a 60% chance, the IOTC have recommended that the catch is reduced by 20% compared to 2020 catch (7,126 t), to a maximum value of approximately 5,700 t. However, there are no allocation scheme in place to implement the catch limit.

- **Striped marlin:** Stock assessment undertaken in 2021 determined the stock to be overfished and subject to overfishing. The IOTC indicated that the stock of the Indian Ocean striped marlin has likely been below B_{MSY} since the late 90's and the stock biomass is currently estimated at 12% of the unfished biomass. The outlook for this species is pessimistic, and the IOTC has recommended a substantial decrease in fishing mortality to ensure a reasonable chance of stock recovery in the foreseeable future.

- **Longtail tuna:** Longtail tunas are rarely taken by Seychelles flagged vessels or purse seine and industrial longline vessels licensed to fish in Seychelles waters. Stock assessment undertaken in 2020 determined the stock be overfished and subject to overfishing. The catch in 2021 was above the estimated MSY and the exploitation rate has been increasing over the last few years, as a result of the declining abundance.

- **Narrow-barred Spanish mackerel:** Narrow-barred Spanish mackerels are rarely taken by Seychelles flagged vessels or purse seine and industrial longline vessels licensed to fish in Seychelles waters. Stock assessment undertaken in 2020 determined the stock be overfished and subject to overfishing. Catches since 2012 and recent average catches for 2015-2019 have been above or close to the current MSY estimate of 157,760 t in recent years.

7.1.2 Stock Assessment Methodologies

Stock assessments for the 15 species under the IOTC management mandate are usually undertaken every three years by the relevant IOTC working parties. The assessments make use of fishing location, catch, effort, size frequency data provided by IOTC members as well as data from other sources such as tagging and research programmes, and from published scientific studies. Data used in assessments and analyses of status and trends are reviewed as part of the annual scientific peer review of IOTC stock assessments held prior to development of final stock assessment reports and summaries for IOTC Annual Meetings.

Different types of stock assessment models are used by the IOTC depending on data availability, data confidence and availability of information on the species biology and stock productivity. Methodologies that were used for the latest stock assessments and are likely to be used for the next assessment are as follows:

- **Temperate and tropical tunas and swordfish:** Assessed using data rich, fully integrated Stock Synthesis III (SS3) model. The model uses four types of data: catch, size frequency, tagging and CPUE indices. The model can be configured to account for various uncertainties and data assumptions such as gear selectivity, natural mortality, growth parameters, stock recruitment relationship, data weighing, among others. Sometimes results are crossed checked with alternative ASPIC surplus production model and JABBA Bayesian models.

- **Indo-Pacific sailfish, Indo-Pacific king mackerel, frigate tuna, bullet tuna:** Assessed using data poor stock assessment techniques using the C-MSY model that relies on catch data only and an alternative model using the Stock Reduction Analysis (SRA) techniques. Catch series data is highly uncertain as is information on aspects of the species biology, productivity, and fisheries. Non-bill fish species were also assessed using Length-Based Spawning Potential Ratio (LB-SPR) models.

- **Striped marlin and black marlin:** Assessed using the JABBA Bayesian state-space production model (age-aggregated).

- **Narrow barred Spanish mackerel, longtail tuna, kawakawa:** Assessed using data limited Optimised Catch-Only Method (OCOM).

The IOTC schedule of stock assessment for the different species is provided in **Table 13**. The stock status in this management plan will be updated as results of new stock assessments are published.

Table 13. The schedule of IOTC stock assessments for the year 2024 - 2027 for the 15 species under its management mandate. Source: IOTC stock status dashboard. Accessed: 14/03/2024.

Common name	Binomial name	2024	2025	2026	2027
Albacore	*Thunnus alalunga*		*X*		
Bigeye tuna	*Thunnus obesus*		*X*		
Skipjack tuna	*Katsuwonus pelamis*			*X*	
Yellowfin tuna	*Thunnus albacares*	*X*			*X*
Swordfish	*Xiphias gladius*			*X*	
Black marlin	*Istiompax indica*	*X*			*X*
Blue marlin	*Makaira nigricans*		*X*		
Striped marlin	*Kajikia audax*	*X*			*X*
Indo-Pacific sailfish	*Istiophorus platypterus*		*X*		
Bullet tuna	*Auxis rochei*	*X*			*X*
Frigate tuna	*Auxis thazard*	*X*			*X*
Kawakawa	*Euthynnus affinis*			*X*	
Longtail tuna	*Thunnus tonggol*			*X*	

Indo-Pacific king mackerel	*Scomberomorus guttatus*	*X*			*X*
Narrow-barred Spanish mackerel	*Scomberomorus commerson*			*X*	

7.2 Fisheries-Dependent Monitoring and Reporting

SFA have programmes in place to collect tuna fisheries data from the purse seine, industrial longline, small-scale longline and artisanal handline fisheries. As yet, there is no programme for collection of data from the sport fishery. The SFA, however, regularly monitors catch landed in sport fishing competitions. Economic data relating to local expenses made by industrial fishing vessels is provided to the SFA on an annual basis by the vessel agents. The system in place to monitor catch and effort from different tuna fisheries are detailed below. The SFA and the Department of Fisheries regularly commission specific studies to address data gaps and to provide management advice.

7.2.1 Purse Seine Fishery Catch and Effort Monitoring

A combination of strategies is used to monitor catch and effort of Seychelles vessels in the purse seine fishery. This includes capturing data from vessel logbooks, landing, and transhipment declarations, well plans and biological sampling during landing and transhipment. Logbooks containing record of the vessel's daily activities must be completed by the Master of fishing and supply vessels and submitted to the SFA using the e-logbook THEMIS fisheries monitoring software as part of the Electronic Reporting System (ERS). This applies to all fishing vessels operating within areas under Seychelles jurisdiction. On days when no fishing is taking place, vessels are required to submit a blank logbook stating reason for not fishing. The Seychelles administration is amending the law and licensing conditions to incorporate the use of the eLogbook as a requirement.

Seychelles has also been operating a national observer scheme since 2014. The purpose of the scheme is to monitor and collect data on fishing activities, including catch composition, bycatch, and fishing effort. It contributes to efforts to ensure that the fishing is conducted in a sustainable and responsible manner. Seychelles far exceeds the minimum observer coverage of 5% of number of sets. In 2022, 96% of the days at sea were observed by onboard observers. Since 2022, the Seychelles has also been implementing an Electronic Monitoring System (EMS) on its purse seiners to complement data gathered via the human observer programme. An EMS Unit within the MCS Division of SFA is responsible for reviewing video footage from the EMS programme. All Seychelles purse seiners are participating in the EMS programme.

Landing and transhipment information are recorded on transhipment declaration forms submitted by vessel agents or vessel operators. These provide details of the unloaded catch during each operation. Well plans contain information on where catches from each set are stored on the vessel. They are extremely important for the selection of wells to be sampled in the port sampling program.

The estimation of good nominal catch estimates by species and size is more challenging in the purse seine fishery due to the multispecies nature of the fishery and fish being brought on board and transferred into storage wells in large volumes. As estimates of catch by species by skippers are done from small samples, the estimates are not always accurate. There is also a tendency to classify landings into commercial categories, solely according to the sizes of individual rather

than according to both size and species. For example, fish < 5kg often contains small yellowfin and bigeye as well as skipjacks but are often declared only as skipjack.

The port sampling program is used to improve the accuracy of catch statistics for sound stock assessment. The program simultaneously estimates species composition (by counting and identifying each species) and the length frequency distribution (by measuring individual fish) of the catch. Wells that are sampled as part of the port sampling programme are selected by fisheries technicians based on the vessel logbooks and well plans according to established protocols. The wells sampled are those containing catch exclusively made in association with FADs or from free schools and are from the same zone and season. Well sampling priorities are set depending on zones and season previously covered. The final decision on which well to sample is made on site depending on which vessel or wells being unloaded at that time.

Following data capture, the data is verified, and data entry errors are corrected. Activity positions declared in the logbooks are the validated against VMS positions. Data capture, verification and validation are all carried out using a specialised software developed for the purse seine fishery. Following the verification and validation procedures, sampling data is used to correct the species composition declared in the logbooks. A raising factor is then computed by dividing the total landed/transhipped catches by the catches declared on the logbook per trip. The raising factor is then applied to the logbook declaration to obtain the total catch for the fishery by geographical locations.

It is to be noted that the SFA port sampling team also sample Spanish and French purse seine vessels as part of the sampling programme under a service contract with the French IRD and Spanish IPD.

7.2.2 Industrial Longline Fishery Catch and Effort Monitoring

The main source of data used to monitor catch from the industrial longline fisheries come from logbooks, landings and transhipment declarations and length frequency forms. Similar to the purse seine fishery, logbooks containing record of the vessel's daily activities have to be completed by the Master of fishing vessels and submitted electronically to the SFA by all fishing vessels operating within areas under Seychelles jurisdiction. At sea transhipments must be undertaken in accordance with the IOTC Resolution 22/02 on Establishing a Programme for Transhipment by Large-Scale Fishing Vessels and monitored on carrier vessels according to the IOTC Regional Observer Scheme (ROS) (IOTC Resolution 22/04). Transhipment records for Seychelles vessels must be transmitted to the SFA and the IOTC Secretariat by the receiving carrier vessel (RCV) within 24 hours of the completion of the transhipment and a transhipment declaration submitted at least 48 hours to the FICQU for landing in Port Victoria. Transhipment records are transmitted to the SFA from other Authorities (ports) where transhipment occurs.

A sampling protocol (self-reporting) to collect data on the size distribution of the different species (tuna, billfish, and sharks) caught by Seychelles vessels has been ongoing since 2007 in collaboration with Deep-Sea Fisheries of Taiwan. Sampling is carried out on the vessel by crew members who measure the first 30 fish per each set hauls and record on a sampling form that is submitted to the SFA by email on a weekly basis. The data recorded include vessel details, date, position, and species measurements. The measurement type varies by species and are as follows:

- Tuna: Dorsal Fork Length (DFL)
- Billfishes: Lower maxillary Fork length (LMFL)
- Sharks: Total length

There is however no programme in place to independently validate submitted data. Following data capture, a series of verifications are conducted on the data to exclude possible data capture errors. Geographical locations of fishing activities reported by the Master of the vessels are validated using VMS data. The data is then processed to obtain the final estimated catches for the fishery.

The estimated weight of the fish on the logbook is mostly reported for when the fish has been processed on board (e.g., headed, and gutted or gilled). The whole weight of the fish landed is estimated using conversion factor established and approved by the Indian Ocean Tuna Commission. There is no observer programme on industrial longline vessels, but Seychelles is investigating the possibility of implementing EMS.

7.2.3 Small-Scale Longline Fishery Catch and Effort Monitoring

The small-scale longline fishery is monitored through a logbook system. Logbooks are distributed by SFA to all skippers of small-scale longliners and are collected by fisheries statistical technicians upon the arrivals of the vessel from its fishing trip. The logbook provides most of the fishing trip general information, and the day-by-day catch and effort information. Landing forms from fish processors and fish mongers are also collected for each trip.

Following data capture, a series of verifications are conducted on the data to exclude all possible data capture errors. Furthermore, the geographical locations of fishing activities reported data by the skipper is validated using VMS data. With VMS data available, the positions declared on logbook is crosschecked to eliminate data entry errors or to identify positions that that may have been falsely declared on the logbook.

The estimated weight of the fish on the logbook is mostly reported for when the fish has been processed on board (e.g., headed, and gutted or gilled). The whole weight of the fish landed is estimated using conversion factor established and approved by the Indian Ocean Tuna Commission. The estimated catches reported on the logbook is then raised to the total landed catches which provides the final estimated catch for the fishery. There is also a sampling programme in place at the landing sites to collect length frequency data. There is no observer programme for the small-scale longline fishery.

7.2.4 Artisanal Fishery Catch and Effort Monitoring

The artisanal fishery is monitored through a Catch Assessment Survey (CAS) stratified geographically and by boat and gear type. The survey is supplemented by data collected from fish processing companies involved in the processing and trade of catch from the artisanal fisheries. Sampling is undertaken six days per week and covers the main inner granitic islands of Mahé, Praslin and La Digue, where more than 99% of the population resides.

The islands are divided in seven strata based on the location of landing sites. Nested within the strata are 39 landing sites, divided into 12 primary and 27 secondary landing sites. Five different forms are completed by Fisheries Technicians implementing the CAS:

- Weekly record form: Collect information of the activities for all vessels at a landing site.

- Trip and Effort Form: Collect trip and effort information. Completed through interviews with fishermen.
- Catch sampling form: Collect catch and effort information for each boat sampled.
- Sales form: Collect fish price data.
- Biological sampling form: Collect length frequency data.

Field data are then captured in the Allegro database and are used to reconstruct a monthly activity calendar for each vessel using information on vessel activity recorded by technicians on site and through VMS. Vessels fishing trips data are then consolidated in a summary file and are used to estimate total catch and effort through data extrapolation in which sample catch and effort data are extrapolated to the total reconstructed fishing trips to obtain an estimate of total Catches, effort, and species composition by vessel type, landing sites, gear type and month.

7.2.5 Reporting

Reporting of catch and effort information from the four fisheries is done using three main outlets which includes the SFA Annual Statistical Report, the SFA online Fisheries Information Management System (FIMS) and the SFA Annual Report. In addition, the Seychelles also submits data and three mandatory reports annually to the IOTC. The reports include the National Report to the Scientific Committee, the Implementation Report and the Compliance Questionnaire. These reports, apart from the compliance questionnaire, are published on the SFA website. The Seychelles also have data submission and reporting obligations to the IOTC as per various IOTC resolutions summarised in **Table 14**. Data submission and reporting to the IOTC is done using the IOTC's Electronic Monitoring and Reporting Information System (e-MARIS).

Table 14. Data and reporting requirements for the Seychelles to the Indian Ocean Tuna Commission based on Conservation and Management Measures in place for the management of tuna resources in the in the Indian Ocean Tuna Commission (IOTC) Area of Competence.

No.	Management Measures	Instrument
Data and reporting requirements according to recording of catch and effort data requirements.		
DRM1 Obligatory	Provide all the data required by Resolution 15/01 for any given year to the IOTC Secretariat by June 30th of the following year on an aggregated basis.	IOTC Res 15/01
DRM2 Obligatory	Submit data on fish size, catch and effort for all species under the IOTC management and the most commonly caught elasmobranch species.	15/01
Data and reporting requirements according to IOTC mandatory statistical reporting requirements		
DRM3 Obligatory	Provide information on total catch, catch and effort and fish size according to details provided in IOTC Resolution 15/02 and timelines specified in paragraph 7 of the Resolution.	IOTC Res 15/02
Data and reporting requirements on AFAD management plans		
DRM4 Obligatory	Submit to the IOTC through the Annual Report of Implementation progress made on AFAD management plans, including, if necessary, reviews of the previously submitted management plans.	IOTC Res 23/01
DRM5 Obligatory	Report to the IOTC information on new AFADs deployed within the EEZ (date of deployment, GPS position and the UNI number) within 21 days of deployment of the AFADs.	IOTC Res 23/01
DRM6 Obligatory	Maintain a register of deployed, lost, abandoned, and discarded AFADs and report the data to the IOTC Executive Secretary in the annual Implementation Report.	IOTC Res 23/01

No.	Management Measures	Instrument
DRM7 Obligatory	Communicate the number and outcome of inspections (at sea or in port) to the IOTC in the Annual Implementation Report.	IOTC Res 23/01
DRM8 Obligatory	Submit the data elements provided in Annex II of Resolution 23/01 to the IOTC Executive Secretary, consistent with the IOTC standards for the provision of catch and effort data.	IOTC Res 23/01
Data and reporting requirements on FAD management plans		
DRM9 Obligatory	Submit to the IOTC, 60 days before the Annual Meeting, a report on the progress of the management plans of FADs, including, if necessary, reviews of the initially submitted Management Plans, and including reviews of the application of the principles set out in Annex III of Resolution 19/02.	IOTC Res 19/02
DRM10 Obligatory	Submit data elements prescribed in Annex III (Data collection for DFADs) and Annex IV (Data collection for AFADs) of Resolution 19/02 to the Commission, consistent with the IOTC standards for the provision of catch and effort data.	IOTC Res 19/02
Data and reporting requirements on large-scale driftnets		
DRM11 Obligatory	Include in Annual Reports of implementation submitted to the IOTC Secretariat a summary of monitoring, control, and surveillance actions related to large-scale driftnet fishing in the IOTC area of competence.	IOTC Res 12/12
Data and reporting requirements on Mobulid rays		
DRM12 Obligatory	Report to the IOTC Secretariat the information and data collected on interactions (i.e., number of discards and releases) with mobulid rays by vessels through logbooks and/or through observer programs.	IOTC Res 19/03
Data and reporting requirements on sharks		
DRM13 Obligatory	Report data on catches of sharks to the IOTC secretariat no later than 30 June of the following year[21], including all available historical data, estimates and life status of discards (dead or alive) and size frequencies.	IOTC Res 17/05
DRM14 Obligatory	Undertake research to: • identify ways to make fishing gears more selective, where appropriate, including research into the effectiveness of prohibiting wire leaders; • Improve knowledge on key biological/ecological parameters, life-history and behavioural traits, migration patterns of key shark species; • Identify key shark mating, pupping and nursery areas; and improve handling practices for live sharks to maximise post-release survival.	IOTC Res 17/05
Data and reporting requirements on blue shark		
DRM15 Obligatory	Implement data collection programmes that ensure improved reporting of accurate blue shark catch, effort, size, and discard data to IOTC in full accordance with the Resolution 15/02 on the Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs).	IOTC Res 18/02
DRM16 Obligatory	Include in the Seychelles national Annual Reports to the Scientific Committee information on the actions they have taken domestically to monitor catches of blue sharks.	IOTC Res 18/02

[21] In accordance with IOTC data reporting requirements and procedures in Resolution 15/02 mandatory statistical requirements for IOTC Members and Cooperating Non-Contracting Parties (CPC's) (or any subsequent superseding resolution).

No.	Management Measures	Instrument
DRM17 Recommended	Undertake scientific research on blue shark that would provide information on key biological/ecological/behavioural characteristics, life-history, migrations, post-release survival and guidelines for safe release and identification of nursery grounds, as well as improving fishing practices.	IOTC Res 18/02
Data and reporting requirements on oceanic whitetip shark		
DRM18 Obligatory	Submit data for oceanic whitetip sharks, as required by IOTC data reporting procedures.	IOTC Res 13/06
DRM19 Recommended	Implement research on oceanic whitetip sharks taken in the IOTC area of competence, where possible, in order to identify potential nursery areas.	IOTC Res 13/06
Data and reporting requirements on thresher sharks		
DRM20 Recommended	Where possible, implement research on sharks of the species Alopias spp, in the Convention area in order to identify potential nursery areas.	IOTC Res 12/09
DRM21 Obligatory	Seychelles is required to submit data on species of the family Alopiidae, as required by IOTC data reporting procedures.	IOTC Res 12/09
Data and reporting requirements on whale shark		
DRM22 Obligatory	Report to the IOTC Secretariat instances in which whale sharks have been encircled by the purse seine nets of flagged vessels.	IOTC Res 13/05
Data and reporting requirements on cetaceans		
DRM23 Recommended	Report the information and data collected under paragraph 3(b) and paragraph 4 of the IOTC Resolution 23/06, through logbooks, or when an observer is onboard through observer programs, and provide to the IOTC Secretariat by 30 June of the following year and according to the timelines specified in Resolution 15/02 (or any subsequent revision).	IOTC Res 23/06
DRM24 Recommended	Use an Electronic Monitoring System (EMS) to enhance the data collection required by IOTC Resolution 23/06.	IOTC Res 23/06
DRM25 Recommended	Report, in accordance with Article X of the IOTC Agreement, any instances in which cetaceans have been encircled or caught by the purse seine nets or entangled in gillnets or in Fish Aggregating Devices of their flagged vessels.	IOTC Res 23/06
Data and reporting requirements on seabirds		
DRM26 Obligatory	Report seabird incidental bycatch through logbooks, including details of species, if possible.	IOTC Res 23/07
DRM27 Obligatory	Record data on seabird incidental bycatch by species, notably through scientific observers in accordance with IOTC Resolution 22/04 and report these annually. Observers are required, to the extent possible, take photographs of seabirds caught by fishing vessels and transmit them to national seabird experts or to the IOTC Secretariat, for confirmation of identification.	IOTC Res 23/07
DRM28 Obligatory	Provide to the IOTC as part of the Seychelles Annual report to the IOTC information on it is implementing measure on the conservation of seabirds in longline fisheries.	IOTC Res 23/07
Data and reporting requirements on marine turtles		
DRM29 Obligatory	Collect (including through logbooks and observer programs) and provide the IOTC Secretariat all data on flag vessels interactions with marine turtles[22], including the level of logbook or observer coverage and an estimation of total mortality of marine turtles incidentally caught in the fisheries.	IOTC Res 12/04

[22] No later than 30 June of the following year in accordance with Resolution 15/02.

No.	Management Measures	Instrument
DRM30 Obligatory	Report to the IOTC Scientific Committee information on successful mitigation measures and other impacts on marine turtles in the IOTC area, such as the deterioration of nesting sites and swallowing of marine debris.	IOTC Res 12/04
DRM31 Obligatory	Seychelles is required to report to the Commission in the annual implementation report progress of implementation of the FAO Guidelines and Resolution 12/04.	IOTC Res 12/04
DRM32 Recommended	Where appropriate, undertake research trials of circle hooks, use of whole finfish for bait, alternative FAD designs, alternative handling techniques, gillnet design and fishing practices and other mitigation methods which may improve the mitigation of adverse effects on marine turtles and report the results of the trials to the IOTC Scientific Committee, at least 30 days in advance of the annual meetings of the Scientific Committee.	IOTC Res 12/04
DRM33 Recommended	Collaborate with the IOSEA and consider the IOSEA MoU including the provisions of the Conservation and Management Plan in the implementation of bycatch mitigation measures for marine turtles.	IOTC Res 12/04
Data and reporting requirements on billfish		
DRM34 Obligatory	Implement a data collection programmes to ensure accurate reporting of Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish catches, released alive and/or discarded, together with effort, size and discard data to IOTC in accordance with the Resolution 15/02 on the Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs).	IOTC Res 18/05
DRM35 Obligatory	Include in the Seychelles Annual Reports to the Scientific Committee information on the actions taken domestically to monitor catches and to manage fisheries for sustainable exploitation and conservation of Striped Marlin, Black Marlin, Blue Marlin, and Indo-pacific Sailfish.	IOTC Res 18/05

7.3 Bycatch, ETP Species and Other Surveys

Data on non-target catch in the purse seine fishery is collected through logbook records, landing, and transhipment declaration and as part of the biological sampling programme implemented in Port Victoria during landing and transhipment. An observer programme is in place on Seychelles' purse seine vessels which use onboard observers and EMS to monitor setting and hauling activities, estimate the size and species composition of the catch, monitor the catch of non-target species, and discards at sea, paying particular attention to ETP species.

In the industrial longline fisheries, bycatch and ETP species are monitored throughout logbook records, and landing and transhipment declarations. Bycatch is also monitored as part of the self-sampling programme that record size frequency data on the first 30 fish caught per each set hauls. There are three Seychelles industrial longline vessels that are equipped with sensors and cameras to record setting and hauling activities as part of a pilot project. An action has been identified as part of this plan to prepare and implement a plan for all Seychelles industrial longline vessels to achieve 100% observer coverage (onboard or through EMS).

Industrial fishing vessels are obligated to record and declare all interactions with ETP, including releases and discards whether the animal is dead or alive.

Information on by-catch is published as part of the annual Fisheries Statistical Report. This information is also published in the annual Seychelles national report to the Scientific Committee of the IOTC, which also contains details of interactions with, declared catches of ETP species.

This fishery management plan has a strategy (**S1.2.1)** to mitigate impacts of fisheries on Endangered, Threatened and protected (ETP) species and by-catch and another (**S1.3.1)** to raise awareness on fish handling and fishing conditions requirements for target stocks and bycatch. Under each strategy there are a number of priority actions that are identified in the **Implementation Plan.**

7.4 Other Relevant Research

The SFA undertakes research on tuna and tuna fisheries in collaboration with other research institutes working on tuna fisheries like the French Institut de Recherche pour le Développement (IRD), the Spanish AZTI Tecnalia and IOTC due to limited experience of the research staff in tuna related research and often high cost and complex logistics involved. Over the last decade the SFA has collaborated on a wide range of tuna related research issues, including on species biology (Zudaire et al., 2021), contamination (Munschy et al., 2020, 2023; Wu et al., 2021), species behaviour in association with FADs (Govinden et al., 2021), change in fishing behaviour (Chassot et al., 2019), data verification (Nieblas et al., 2019), and others.

The **Implementation Plan** contain actions, under several strategies, to undertake research on key topics to inform the management of the Seychelles tuna fisheries, including on improving understanding of fisheries impact on biodiversity and ecosystems, reducing incidences of abandoned, lost, discarded fishing gears and devices (ALDFGDs) and bycatch mitigation. To support the implementation of research projects the **Implementation Plan** also contain actions to build staff capacity for data collection and research (SFA staff, onboard observers, etc) and to annually compile and disseminate information on major research findings and implications for tuna fisheries to stakeholders in the fisheries sector in easily digestible formats. The need to establish links to, and share research findings with, current and proposed resource management initiatives is also identified.

8. COMPLIANCE AND MONITORING

8.1 Objectives and Approach

The main objective of fisheries monitoring, control, and surveillance (MCS) is to support the successful implementation of the agreed fisheries management policies, plans and strategies by ensuring compliance with fishing conditions, management measures, national fisheries legislation and regional and international obligations through effective flag State, coastal State, and port State controls.

The SFA will adopt a holistic approach to MCS that will cover areas of major compliance risk before fishing licences (including authorisations and permits) are issued, during fishing, at landing and post-landing. SFA will build upon existing MCS elements by addressing the capability gaps identified in previous assessments and by stakeholders during the drafting of this management plan. MCS efforts will be prioritised according to a risk-based approach and will be detailed in a risk-based MCS Strategy and implementation schedule, that will be developed within the first six months of this plan being operational. As part of the strategy MCS efforts will be extended to all fleets, commensurate with the identified level of risks and available human, financial and technical resources.

The MCS Strategy will be built on three main elements, that align with other compliance and enforcement initiative in areas under Seychelles jurisdiction.

- **MCS Element 1: Set conditions for effective MCS.** This element will focus on:
  - Strengthening and regularly updating fisheries regulations and license terms and conditions.
  - Ensuring preparedness of SFA for implementing the new MCS requirements in the Fisheries and Aquaculture Bill and Regulations through knowledge of the provisions and agreement on procedures and responsibilities for implementation.
  - Regularly reviewing, strengthening, and updating legislation.
  - Ensuring license conditions implement the new legislation, and that they are regularly reviewed and updated as needed.
  - Ensuring that there are institutional arrangements in place between SFA and other law enforcement agencies (e.g., marine police, NISCC, SCG, Air Wing, Regional MCS programmes) to plan, coordinate and implement MCS activities.
  - Developing regional collaboration in maritime MCS.
  - Articulating roles and responsibilities of different Ministries, Department and Agencies (MDAs) involved in maritime MCS.
  - Capacity enforcement of SFA staff involved in the implementation of MCS activities.
  - Making available appropriate infrastructure, tools, and processes for effective and efficient MCS.
  - Messaging and communications to raise awareness to deter illicit activities.

- **MCS Element 2: Improve awareness of fisheries activities across areas of interest.** This element will focus on:
  - Strengthening observation of fishing activities on board Seychelles and foreign vessels in areas under Seychelles jurisdiction.

- Improving regional integration and collaboration in maritime domain awareness.
- Increasing level of observation of landing and transhipment activities in local and foreign ports.
- Making use of remote observation tools and analyses to improve understanding of fishing activities and detect illegal activities.

- **MCS Element 3: Enable effective compliance and enforcement.** This element will focus on:
  - Promoting compliance through effective messaging and communications and reward systems.
  - Improving regional integration and collaboration in compliance and enforcement activities.
  - Increasing the level of checks, queries and verification of fishing vessels activities and submitted data.
  - Ensuring that MCS activities are prioritised according to identified risks levels and spatial-temporal hot spots.
  - Applying MCS measures to all fleets based on identified risks.
  - Penalising cases of severe non-adherence to regulations and license conditions in a manner that is commensurate with the severity of the offence committed.
  - Regular and transparent reporting on an objective set of compliance indicators and legal actions undertaken.

The MCS strategies that will be employed at different stages of fishing include:

- **Pre-fishing:**
  - Undertaking due diligence on vessels and owners/operators before granting licenses and permits to fish in Seychelles waters, and authorisations to fish in Areas Beyond National Jurisdiction (ABNJ), especially to (a) apply the standards in the draft Fisheries and Aquaculture Bill , (b) ensure the completeness of required information and the authenticity of submitted documentations, including on legal and beneficial ownership, (c) verify whether the vessel or owner/operator has been involved in any IUU fishing in the past and whether it has satisfied the legal and or administrative requirements, or (d) check if the vessel features on the IUU Vessels List of any Regional Fisheries Management Organisations (RFMOs).
  - The due diligence will consider the relevant requirements of the draft Fisheries and Aquaculture Bill, including the applications, standards for pre-approval of vessel registration, pre-licensing and pre-registration inspection, standards for grant or renewal of licenses and grounds for denial.

- **During fishing:**
  - Making increasing use of technology to monitor fishing activities (e.g. EMS, VMS, AIS, ERS (as applicable)) in line with requirements in the draft Fisheries and Aquaculture Bill and Regulations.
  - Ensuring 100% implementation of reporting requirements for all vessels licensed to fish in Seychelles waters while operating within areas under Seychelles jurisdiction.

- Increasing observation coverage and the percentage of fishing trips with onboard observers.
- Enhancing analyses of observer data from EMS.
- Ensuring adherence to catch limits for relevant species adopted by IOTC.
- Making use of ERS to facilitate reporting by vessel operators.
- Undertaking sea and air patrol based on identified risks, especially in identified IUU hotspots.
- Making use of unscheduled and haphazard sea and air patrol opportunities afforded through cooperation with other agencies.
- Improving reporting on IUU fishing activities by available sources such as licensed vessels and coastal communities.

- **During request to access ports:**
  - Continuing to make use of the IOTC e-PSM application as a minimum risk assessment procedure for assessing risks prior to allowing a vessel into port and implement advance request for port entry.
  - Integrating /coordinating fisheries related port State measures with the broader system of port State controls.
  - Integrating port State measures with other measures to prevent, deter and eliminate IUU fishing and fishing related activities.

- **During landing:**
  - Enhancing monitoring of landing and transhipment to exceed the 5% IOTC requirement.
  - Improving checks relating to catch composition and tonnage, areas fished, retention of prohibited species and bycatch and compliance with requirements relating to sharks.
  - Increasing inspection of records, including communication device operation and logbooks.
  - Making use of technologies, such as sensors and cameras, on port to observe transhipment and landing activities.

- **Post-landing:**
  - Cross-checking logbooks information with other data sources (e.g. VMS, port sampling data, landing, and transhipment declarations).
  - Undertaking market checks on the sale of controlled species.

8.2 Planning

8.2.1 Risk Assessment

Risk assessment and planning will be done according to the ISO31000 Risk Management framework. A risk based MCS Strategy and implementation schedule will be developed. The Strategy will identify areas of high risk at different stages in the fishing operations to inform the prioritisation of interventions. It will also identify clear measurable indicators of compliance that can be firmly monitored over time as well as staffing and training needs and the novel approaches to MCS. In support of the detection and identification of high risk IUU fishing activities the MCS Strategy will also identify responsibilities and processes, such as liaison with the MCS operations at regional fisheries organizations (IOTC, SIOFA, SWIOFC), MCS programmes at SADC and IOC,

MCS operations in other States and with other national agencies involved in monitoring and enforcing fisheries, as well as the implementation of the IOTC e-PSM system.

The main risks of systematic non-compliance in the fishery are related to activities during fishing, landing, and transhipment. They include:

- **Unlicensed vessels and fishing activities:** Unlicenced vessels fishing illegally in Seychelles waters have been apprehended in the past. The degree of occurrence of fishing by such unlicensed vessels is not known. IOTC resolutions prohibits the use of certain gears (e.g., large-scale drift nets) and certain fishing activities (e.g., use of unmanned aerial vehicles, shark finning, etc). Surveillance will be tailored to detect unlicenced vessels, the use of illegal fishing gears and detection of illegal fishing activities.

- **Non-, under and misreporting:** The nature of the tuna fisheries with lots of vessels in operation and making use of different ports for landing, and transhipment at sea being allowed for certain fleets, increases the complexity of having accurate catch reporting. Non, under and misreporting is believed to be an issue for target, by-catch and ETP species. This represents a major threat to marine ecosystems, a disruption for the seafood market, and an unfair disadvantage for responsible fishermen. Deliberate non, under and misreporting of fishing activities can be considered as a form of unreported fishing, which is one of the three categories of illegal, unreported and unregulated (IUU) fishing.

- **Illegal transhipments:** All transhipment of fish must be undertaken at a designated port. Transhipment at sea is allowed on the High Seas under the IOTC Programme of transhipment at sea by industrial longline vessels. All transhipments at sea must be observed and be in accordance with the IOTC's Regional Observer Scheme (IOTC Resolution 22/04). The master of the fishing vessel is required to submit a transhipment declaration report to the IOTC Secretariat and the SFA upon completion of the transhipment.

- **Illegal discards:** IOTC Resolution 19/05 bans the discard of target and non-target species unless they are not fit for human consumption.

- **Improper handling of ETP species:** There are IOTC obligations in place and measures in the draft Fisheries and Aquaculture Bill and Regulations for the handling of ETP species before release to maximise their probability of survival. It is believed that such obligations are not always being adhered to. Strategies will be tailored to document instances of improper handling of ETP species, encouraging the use of appropriate guidelines and best practices and enforcing legal requirements.

- **Lack of scientific observers:** As of yet, there are no onboard observers or EMS on the industrial longline and small-scale longline fleet. This affects verification of catch, effort, and other scientific data that is required to improve fisheries management.

8.2.2 Recurrent Planning

A national 5-year risk based MCS Strategy, its associated schedule of implementation and Performance Evaluation Framework (PEF) will be finalised within the first six months of this

management plan being approved for implementation. The MCS Strategy, schedule of implementation and PEF will cover all national fisheries, and the PEF will have both effort and impact indicators. The preparation of the MCS Strategy will be led by the MCS Department of the SFA and will align with MCS priorities detailed in the Seychelles Fisheries Sector Policy and Strategy 2019 and SFA's Strategic Plan (2022-2027).

Funding for the implementation of the MCS Strategy will come principally from the sectoral support programme under the EU/Seychelles Sustainable Fisheries Partnership Agreement (SFPA) and from the SFA's recurrent budget. The SFA will investigate cost recovery measures within the fishery to fund implementation. A financial analysis will be undertaken, and options generated for funding the implementation of the plan and the MCS Strategy to reduce dependency on the EU sectoral support fund. The Strategy's annual schedule of implementation will be adjusted, as required, and finalised during the first half of the preceding year to facilitate integration in the annual work plan and budget of other MDAs involved in implementation. Surveillance and enforcement related activities will be planned, as appropriate and necessary, in conjunction with other concerned MDAs such as the SPA, NISCC, SCG, Air Wing, Marine Police and SMSA.

The effectiveness of the MCS Strategy efforts and impacts will be assessed twice during the lifetime of this plan, during the mid-term review and at the end of the implementation period. All assessments will be measured against the effort and impact indicators of the PEF. Mid-term review results will be used to adjust the Strategy and schedule of implementation. End of implementation period review will be used to inform the next iteration of the Strategy.

8.2.3 Deterrence of Non-Compliance

Deterrence of non-compliance against national legislation, regulations and fishing license conditions will be done through improved education and awareness of national fisheries and environmental regulations, RFMO obligations, license conditions, Codes of Best Practice and guidelines using a variety of messaging and communication tools and methods. This will be done in parallel with increased level of checks and scrutiny of fishing activities using a mixture of in-person, electronic monitoring, and remote observations. Automation will be built into the checking and verification of fishing activity patterns and submitted data. Seychelles will be more strategic in its approach to curb Illegal, Unreported and Unregulated (IUU) Fishing through the preparation of a National Plan of Action to Prevent, Deter and Eliminate IUU Fishing. Non-compliance may be penalised through sanctions that are proportionate and deterrent, including suspension and revocation of license and legal prosecution for serious offences, as guided by the draft Fisheries and Aquaculture Bill.

8.3 Roles and Responsibilities in Compliance

Overall responsibility for compliance will remain with the MCS Department of the SFA. The MCS will be responsible for the preparation of the MCS Strategy and its accompanying implementation schedule and PEF. The MCS Department will be responsible for coordinating with other MDAs involved in maritime surveillance and law enforcement in the preparation of the MCS Strategy and for annual planning, budgeting, and implementation. MCS Department officers will take the lead role in the implementation of the MCS Strategy, unless otherwise identified. The MCS Department will work with other MCS implementation partners, which include:

- **Seychelles Police (including Marine Police):** responsible for the charging and preparation of case files against perpetrators. The Marine Police also contributes to near-shore patrols and general enforcement of maritime laws and regulations.

- **NISCC:** responsible for Maritime Domain Awareness of activities taking place within and around areas under Seychelles jurisdiction and the coordination of surveillance activities.

- **Seychelles Coast Guard:** responsible for providing maritime assets such as patrol vessels and armed personnel for patrols and operations at sea.

- **Air Wing:** responsible for provision of aerial assets such as patrol aircraft for patrols.

- **SPA:** controlling access to and from Seychelles ports.

- **SMSA:** flagging of industrial fishing vessels and licensing of hire craft vessels.

- **IDC:** logistical support in the Seychelles outer islands.

There is already an inter-agency MCS agreement between the SFA and some of the above agencies. It is recommended that the current agreement be broadened to include all participating agencies. The MCS agreement should clearly identify the roles and responsibilities of each agency and on a mechanism to agree on MCS procedures.

9. FISHERY PERFORMANCE EVALUATION

9.1 Monitoring and Evaluation

Monitoring and evaluation of the plan's progress will be undertaken on an annual basis. The annual monitoring and evaluation will be undertaken by the SFA, or an appointed third party, in consultation with stakeholders. Monitoring and evaluation should be guided by the **Monitoring and Evaluation Plan**. Results from annual monitoring and evaluation should contribute to the preparation of the annual work plan derived from the **Implementation Plan.**

9.2 Review Process

The review process of the Tuna Fishery Management Plan is fundamental in ensuring its effectiveness, adaptability, and alignment with evolving scientific knowledge, socio-economic considerations, and regulatory frameworks.

The Plan should undergo a comprehensive review during its fifth year of implementation before its five-year revision. Interim reviews may be conducted as deemed necessary based on emerging issues, significant changes in the fishery dynamics, or regulatory mandates. The review process should incorporate meaningful engagement with stakeholders representing various interests, including representatives of industrial, semi-industrial, artisanal, sports and recreational fishers, environmental organisations, scientific institutions, local communities, government agencies, and other relevant stakeholders.

A comprehensive scientific assessment of the tuna fishery should be undertaken as part of the review process. This assessment should encompass the evaluation of stock status, ecosystem impacts, fishery dynamics, bycatch rates, socio-economic indicators, and other relevant factors. The effectiveness and performance of existing management measures should be rigorously evaluated and should include an assessment of compliance levels, enforcement mechanisms, economic impacts, ecological outcomes, and social implications of the measures. Management measures subject to review may include, but are not limited to, catch quotas, fishing gear regulations, area closures, seasonal restrictions, bycatch mitigation measures, and monitoring programs. The review process should embrace an adaptive management approach, wherein adjustments to the Tuna Fishery Management Plan are made based on the outcomes of the scientific assessment, stakeholder input, and evaluation of management measures.

The findings, conclusions, and recommendations arising from the review process should be documented in a comprehensive review report. The review report should summarize the key outcomes of the scientific assessment, stakeholder consultations, evaluation of management measures, and proposed adaptive management actions. Lessons learned from the review and from annual monitoring and evaluation, stakeholder feedback, and scientific advancements should inform future iterations of the management plan, fostering adaptive governance and resilience in the face of changing environmental and socio-economic conditions.

9.3 Fisheries Management Plan Revision and Update

The process to update this management plan should begin at the start of the plan's fifth year of implementation. The early start is recommended so that there is no lag between the end of this plan and the start of the other, and to provide ample time to fit into the annual budget exercise. The update of the plan should be done in consultation with stakeholders and should make use of findings from reviews undertaken and from annual monitoring and evaluation of the **Implementation Plan.** If required, background information in the management plan can be updated during the implementation period to include emerging information such as on the stock status of target and bycatch species, new regulations and conservation management measures introduced, and new harvest strategies and harvest control rules as they are adopted or revised by the SFA and or IOTC.

10. RESOURCES REQUIRED TO IMPLEMENT THE PLAN

10.1 Approach

10.1.1 Human Resources

Overall responsibility for coordinating the implementation of this management plan will rest with the Fisheries Resource Management and Technical Coordination Department of the SFA. This management plan recommends that a structure is set up in the SFA, preferably within this department, to work on the tuna fisheries and industry and to support the work of the Tuna Fisheries Co-management Committee.

Under **Objective O2.2** on [*Strengthen governance of tuna fisheries and implementation of the management plan*], several strategies and actions are proposed to ensure that the required human resources are available for the plan's implementation. These strategies are targeted at different areas where human resources are required.

Strategy S2.2.1 proposes the use of a cooperative co-management approach involving stakeholders to provide oversight of the plan's implementation. The proposed TFCM will have representation from key stakeholders and will ensure that the key issues from the fisheries are known and discussed from early on.

Strategy S2.2.2 is focused on clarifying the roles and responsibilities and ensure accountability for implementation of the management plan. Key actions as part of this strategy include discussing and agreeing on roles and responsibilities for implementation of the management plan with implementation partners, the signing of a Memorandum of Understandings with implementation partners to formalise roles and responsibilities, and communicating the targets, roles, and responsibilities for the management plan implementation to stakeholders. This strategy will thus partition responsibilities for the implementation of the plan among SFA and the other implementation partners.

Strategy S2.2.3 is targeted at ensuring adequate infrastructure and institutional arrangements are in place to implement the management plan. Key actions proposed under this strategy is the undertaking of an assessment of the structure, human capacity, and training needs of national fisheries administration (SFA and DoF) to implement the management plan. It is recommended that based on the assessment that the structure is revised, if required, and that priority posts are filled.

10.1.2 Financial Resources

The implementation of this plan will be funded principally through the SFA's recurrent revenues that it obtains from the payment of fishing licenses and permits and other types of fees and rent that it charges. This will be supplemented by funding from the sectoral support programme under the EU/Seychelles Fisheries Partnership Agreement.

10.2 Cost Sharing and Recovery

At the start of the preceding year, an implementation budget will be prepared based on the annual work plan agreed with other implementation partners. Each implementation partner will cover

its own cost of operations. The SFA may contribute to the cost borne by other implementation partners, to cover, partially or in full, such as cost air and sea patrols.

As part of **Strategy S2.2.5** [*Ensure adequate financing for implementation of the plan, including cost recovery*] in the **Implementation Plan**, the SFA will identify and implement cost recovery measures within the fishery and will identify and secure external donor funding to support the implementation of this management plan.

11. IMPLEMENTATION PLAN

11.1 Resource Sustainability

Goal 1 - Resource Sustainability: Contribute to regional efforts to ensure the long-term sustainability of the Indian Ocean's tuna stocks and the ecological wellbeing of the environment.			**Implementation schedule**					**Lead organisation**
Objectives	**Strategies**	**Proposed actions**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	
O1.1: All tuna stocks are fished in accordance with domestic laws, IOTC CMMs applicable to Seychelles and international best practices.	**S1.1.1:** Implement harvest strategies and catch limits adopted nationally and by the IOTC.	Integrate IOTC harvest strategies and catch limits in the tuna fishery management plan as they are adopted.						SFA
		Meet and when required, exceed minimum monitoring targets set by the IOTC across all fleets.						SFA
		Use the SFA FIMS to visualize and monitor catch per species against Individual Fishing Quotas (IFQs) for the industrial and small-scale longline fishing fleets.						SFA
		Undertake biennial assessment of Seychelles tuna fisheries against nationally determined reference points and performance indicators.						SFA
		Keep track of productivity of the stock along with environmental, climate change, and catchability indicators.						SFA
	S1.1.2: Communicate to stakeholders on the status of fish stocks and management measures	Use appropriate media to disseminate information on stock status, catch and quota utilization.						SFA
		Prepare and disseminate annual report on catch and effort per fleet licenced to fish in Seychelles waters.						SFA

	in place on a regular basis.	Communicate information about the fishery to the public in a layman's language through SFA annual reports and other communications.						SFA/DoF
O1.2: Adverse environment and ecosystem impacts resulting from tuna fisheries are minimized, avoided and prevented.	**S1.2.1:** Mitigate impacts of fisheries on Endangered, Threatened and protected (ETP) species and by-catch.	Annually update and communicate conservation and management measures in place to mitigate impacts on ETP species and by-catch to all operators in the fishery, including providing information on what are obligations and what are recommendations.						SFA
		Achieve minimum 5% observer coverage (onboard and electronic) of fishing operations/sets across relevant fleets.						SFA
		Prepare a plan for all Seychelles industrial longline vessels to achieve 100% observer coverage (onboard or through EMS).						SFA
		Implement the prepared plan on achieving 100% observer coverage (onboard or through EMS) on Seychelles industrial longline vessels.						SFA
		Adopt fleet specific code of best practices for handling of by-catch.						SFA/DoF
		Require all vessels to implement measures to reduce incidental by-catch and interaction with ETP species in line with IOTC resolutions and local laws						SFA/DoF
		Collect, collate, and report data on catch and interactions of ETP species according to IOTC standards.						SFA
		Identify existing but unapplied by-catch mitigation measures and investigate their potential for application.						SFA
		Undertake research on by-catch mitigation measures in instances where existing measures are ineffective or absent.						SFA and research partners
		Revise the NPOA Sharks.						SFA and DoE

		Implement the NPOA Shark.						SFA and DoE
		Prepare NPOA Turtles.						SFA and DoE
		Implement the NPOA Turtles and FAO Guideline to reduce sea turtle mortality in fishing operations.						SFA and DoE
		Prepare NPOA Seabirds.						SFA and DoE
		Implement NPOA Seabirds.						SFA and DoE
		Undertake biennial assessment of implementation effectiveness of the code of best practices for handling of by-catch for each fleet and communicate the results to industry.						SFA
	S1.2.2: Reduce ghost fishing and the environmental impacts of abandoned, lost, and discarded fishing gears and devices (ALDFGDs).	Set up scheme to encourage marking and tracking of fishing gears in small-scale longline and industrial fisheries.						SFA, DoF
		Research on and implement management strategies to reduce incidences of ALDFGDs.						SFA
		Adopt and promote guidelines for avoiding gear loss to fishing operators.						SFA, DoF
		Increase ground checks on FADs to ensure the use of non-entangling materials and designs.						SFA
		Undertake checks on FADs at sea to ensure the use of non-entangling materials and designs.						SFA
		Promote the use of biodegradable materials in FAD construction.						SFA, DoF
		Investigate options to incentivize the use of biodegradable and non-entangling materials with the fishing industry.						SFA, DoF
		Investigate options to fund the recovery of ALDFGDs with the fishing industry.						SFA, DoF
		Develop a polluter pay programme for removal of ALDFGDs.						DoF
		Update the Drifting FADs Management Plan. .						SFA

	S1.2.3: Increase recovery of Drifting Fish Aggregating Devices (FADs) before they create impacts on islands and reefs.	Implement the Drifting FADs Management Plan, and update it as required.						SFA, DoF
		Strengthen programmes to monitor and intercept DFADs before they get stranded.						SFA, DoF, PS operators, islands management
		Set up scheme to share real-time or near real-time data with partners involved in DFADs retrieval to facilitate DFADs removal before they get stranded.						SFA, DoF, PS operators,
		Require Seychelles vessels to provide near real-time data on the location of all active DFADs, and for foreign vessels to provide data on all active DFADs in areas under Seychelles jurisdiction.						SFA
	S1.2.4: Eliminate disposal of waste at sea.	Identify weaknesses and gaps for addressing solid waste storage and disposal by Seychelles' fishing vessels and implement a programme to address them.						SFA/ SMSA
		Prepare and submit an IOTC Resolution on Mitigation of Marine Pollution in the IOTC Area of Competence.						DoF
		Integrate adherence to MARPOL convention in the license condition of all industrial and small-scale longline vessels.						SFA
		Require vessels to keep a log of fishing gear waste and "other" waste and submit log to authorities after each fishing trip.						SFA
		Include inspection of waste on inspection checklist for vessels in port.						SFA
		Implement an awareness campaign targeted at local fishermen to promote better storage of waste at sea and disposal on land.						SFA

	S1.2.5: Improve knowledge and understanding of the nature of fishery impacts on ecosystems and the environment.	In consultation with stakeholders, identify priority issues concerning the environmental impacts of fisheries, collate information on them and disseminate.						SFA, DoF
		Fund and implement research on priority issues on fishery impacts on the environment.						SFA, research partners
		Communicate research findings to stakeholders in easily digestible formats.						SFA, research partners
O1.3: Fisheries practices are improved to meet international best practices.	**S1.3.1:** Raise awareness on fish handling and fishing conditions requirements for target stocks and bycatch.	Design and implement a communication campaign on fishing conditions requirements for target stocks and bycatch.						SFA
		Adopt a guideline and communicate best practices for handling target stocks and bycatch.						SFA
		Assess the level of adherence to the guideline for the handling target stocks and bycatch.						SFA
		Revise the communication campaign as necessary.						SFA
	S1.3.2: Promote Fisheries Improvement Projects (FIPs) integration into various tuna fishing fleets and certification of fisheries.	Review, update and implement requirements on gear specifications and integrate in license conditions.						SFA, DoF
		Consult with industry and identify fishery improvements actions that needs to be implemented by fleets and processors and encourage their adoption.						SFA
		Encourage fleets to participate in FIPs and promote fisheries sustainability certification.						SFA
		Support all fleet components to aim for certification of international standards.						SFA
		Link FIPs with branding and markets.						SFA, vessel operators, processors

		Investigate possible additional support for certified fleets.						SFA, DoF

11.2 Effective Fisheries Governance

Goal 2: Effective Fisheries Governance: Strengthen the governance and management of Seychelles' tuna fisheries.			**Implementation schedule**					**Lead organisation**
Objectives	**Strategies**	**Actions**	**2024**	**2025**	**2026**	**2027**	**2028**	
O2.1: Position Seychelles as a leading country for the responsible management of the Indian Ocean tuna stocks.	**S2.1.1:** Take leading roles in regional efforts promoting the effective management and sustainability of the Indian Ocean Tuna fisheries.	Establish national multi-stakeholder group on tuna fisheries to provide advice and guidance on tuna fisheries-related issues.						DoF
		Build internal expertise related to fisheries and fisheries management and governance.						DoF, SFA
		Identify issues affecting the management of the Indian Ocean tuna fisheries and sponsor /co-sponsor IOTC resolutions to redress them.						DoF, SFA
		Develop a strategy for engaging regional CPCs and those with which Seychelles have partnership agreements.						DoF
		Partner with like-minded CPCs to increase visibility of issues affecting management of the tuna stocks at IOTC level.						DoF
		Organise regional events (workshops, meetings, exchanges) focused on regional tuna fisheries governance and management.						DoF, SFA
		Consult and proactively prepare for international engagements on tuna fisheries.						DoF

		Promote the adoption of additional national conservation and management measures compared to IOTC minimum requirements where appropriate.						SFA
	2.1.2: Improve implementation of IOTC resolutions.	Domesticate IOTC resolutions for national implementation into national regulations or other legal instruments.						DoF
		Annually update new IOTC conservation and management measures into the Tuna Fisheries Management Plan.						DoF
		Setup dashboard to visualise and track level of implementation.						
		Implement and monitor implementation of all IOTC obligations.						DoF
	S2.1.3: Improve adherence to IOTC, SWIOFC and FAO reporting requirements.	Prepare annual reporting schedule and set clear timelines and approval procedures for drafts and final versions.						SFA
		Review reporting standards for all reports and put in place controls to ensure there are no contradictions among reports.						SFA
		Recruit, train, and mentor staff involved in international reporting.						SFA
		Assign roles and responsibilities to staff involved in reports preparation.						SFA
		Integrate reporting duties into the KPIs of relevant staff.						SFA
	S2.1.4: Identify and designate representatives to actively participate in the IOTC Management Strategy Evaluation process.	Designate experts and set clear national objectives to be achieved as part of the process.						DoF. SFA
		Actively participate and contribute to the IOTC Management Strategy Evaluation process.						DoF. SFA

O2.2: Strengthen governance of tuna fisheries and implementation of the management plan.	**S2.2.1:** Make use of a cooperative co-management approach involving stakeholders to provide oversight of the plan's implementation.	Prepare the Terms of Reference for a Tuna Fisheries Co-management Committee.						SFA
		Identify mechanism for selection of members to form part of the committee.						SFA
		Prepare annual meeting schedules and organise meetings of the co-management committee.						SFA
		Identify implementation priorities from the implementation plan.						SFA
	S2.2.2: Clarify roles and responsibilities and ensure accountability for implementation of the management plan.	Discuss and agree on roles and responsibilities for implementation of the management plan with implementation partners.						SFA, DoF, NISCC, SCG. Air Wing,
		Sign Memorandum of Understandings with implementation partners to formalise roles and responsibilities.						SFA
		Communicate targets, roles, and responsibilities for the management plan implementation to stakeholders.						SFA
		Prepare annual report on management plan implementation.						SFA
		Regularly update stakeholders on progress being made on the management plan implementation.						SFA
	S2.2.3: Ensure adequate infrastructure and institutional arrangements are in place to implement the management plan.	Undertake an assessment of the structure, human capacity, and training needs of national fisheries administration (SFA and DoF), and key implementation partners, to implement the management plan.						DoF, SFA
		Based on the assessment (above) revise the structure and fill priority posts.						DoF, SFA
		Set up a structure within the SFA to work on the tuna fisheries and industry and to support the work of the Tuna Fisheries Co-management Committee.						SFA

		Prepare inter-agencies annual schedule of implementation.						SFA, DoF, NISCC, SCG, Air Wing
		Integrate annual schedule of implementation in institutional work plans.						SFA, DoF, NISCC, SCG, Air Wing
		Identify and procure tools and set up processes within the national fisheries administration to improve efficiency.						DoF, SFA
	S2.2.4: Ensure that fisheries administration staff are adequately trained to deliver on the plan's implementation needs.	Prepare individual training plans for key fisheries administration staff involved in the plan's implementation.						SFA, DoF
		Identify training organizations to deliver identified trainings.						SFA, DoF
		Develop scholarship programs and match interested parties with opportunities.						SFA, DoF
		Prepare and execute a fisheries administration capacity retention plan.						SFA, DoF
	S2.2.5: Ensure adequate financing for implementation of the plan, including cost recovery.	Prepare annual budget for management plan's implementation based on implementing MDAs (SFA, DoF, SCG, Air Wing, etc.) responsibilities.						SFA, DoF, NISCC, SCG, Air Wing
		Compile and analyse data on direct revenues from tuna fisheries to fisheries administration, and their distribution to tuna fisheries management efforts.						SFA
		Identify and implement cost recovery measures within the fishery.						SFA
		Undertake an analysis and identify options for funding the implementation of this management plan and the MCS Strategy to reduce reliance on the EU sectoral support.						SFA

		Identify and secure external donor funding to support management plan implementation.						SFA, DoF, international partners
	S2.2.6: Ensure that the management plan is adaptive, and its performance is regularly assessed.	Undertake a mid-term review of the plan and modify the implementation plan as required.						SFA
		Evaluate the performance of the plan at the end of its lifespan using its Performance Measurement Framework.						SFA
		Make use of finding of the plan's performance to inform the drafting of the next iteration.						SFA
O2.3: Fishing quotas allocated to the Seychelles through the IOTC are equitably shared.	**S2.3.1:** Establish a scheme for catch allocation and transfer.	Develop an appropriate set of criteria and indicators upon which to base quota allocations.						SFA, DoF
		Investigate scenarios to inform the choices of fleet and vessel (IFQ) quota allocation.						SFA, DoF
		In consultation with stakeholders formulate procedures for allocation and transfer of fleet and Individual Fishing Quotas (IFQs).						SFA, DoF, vessel operators, stakeholders
	S2.3.2: Annually allocate fishing quotas based on quota allocation and transfer scheme.	Allocate fishing quotas given by the IOTC to tuna fisheries sub-sectors and vessels based on the allocation scheme in place.						SFA, DoF
		Undertake quarterly review of IFQ use.						SFA, DoF
		Re-allocate resources through established protocols in the quota allocation scheme.						SFA, DoF
O2.4: Enhance research, data collection, data analyses and use	**S2.4.1:** Improve the quality of data collected from different fleets and	Review data requirements for implementation of the management plan.						SFA
		Identify the primary shortcomings with the data collection system.						SFA

of research results to inform evidence-based decision making.	meet all IOTC data-related obligations.	Prepare and execute plan to address identified shortcomings with data collection system.						SFA
		Increase coverage of data collection programme to include sports and recreational fisheries						SFA
		Build staff capacity for data collection and research (SFA staff, onboard observers, etc)						SFA
		Involve and train fishers in data collection.						SFA
		Investigate options for outsourcing of data collection, analyses, and reporting.						SFA
		Update and or develop data collection and reporting tools as required.						SFA
		Integrate data from fishers monitoring into the data framework.						SFA
		Annually submit required data to the IOTC according to required standards.						SFA
		Undertake biennial independent audits of data collection and reporting systems (e.g., catch sampling, EMS, VMS, etc).						SFA
	S2.4.2: Actively participate and contribute to IOTC, international and industry initiatives and programmes on stock assessments and related research activities.	Build capacity of relevant SFA staff to understand and contribute to stock assessment initiatives.						SFA
		Actively follow and participate in IOTC stock assessments.						SFA
		Initiate and participate in research activities on tuna fisheries.						SFA
	S2.4.3: Make use of research results in management and	Develop science to policy interface to enhance communication of results from science to Ministries, Departments and Agencies (MDAs) and to the community.						SFA, DoF

	development of fisheries policies and strategies.	Integrate a "Request for Advice" mechanism from fisheries experts in the development of all fisheries strategies and policies.						DoF
		Annually compile and disseminate information on major research findings and possible implications for tuna fisheries.						SFA
O2.5: Enforce and increase compliance with legislation and license conditions by all fishing vessels owners and operators.	**S2.5.1:** Promote compliance through education and awareness and deter violations of legislation and license conditions.	Prepare NPOA IUU.						SFA
		Prepare a risk based MCS Strategy and schedule of implementation.						SFA
		Integrate measures to promote compliance in the MCS Strategy and schedule of implementation.						SFA
		Align the MCS Strategy and schedule of implementation with the NPOA-IUU.						SFA
		Undertake a study and come up with proposals for the implementation of compliance performance bonds and reward system.						SFA
		Apply MCS and enforcement measures to all fleets based on the risk based MCS Strategy and schedule of implementation.						SFA
		Work with regional and sub-regional partners to develop or strengthen sub-regional and regional fisheries patrol and observer programmes.						DoF, Department of Foreign Affairs
		Increase level of checks, queries and verification of fishing vessels activities and submitted data.						SFA
		Link compliance to the fuel incentive and other benefits in the artisanal and small-scale longline fisheries.						SFA
		Introduce, update, develop or adopt monitoring and reporting tools as required.						SFA

		Establish reciprocated agreements for transhipment and landing inspections of Industrial Longline vessels in foreign ports.						DoF
		Increase inspection of vessels, transhipment, and landing in local and foreign ports.						SFA
		Implement public relations campaign to increase awareness, understanding and support for implementing the new Fisheries and Aquaculture Bill and Regulations						DoF
		Make use of the SFA FIMS to report on MCS and enforcement issues.						DoF
	S2.5.2: Ensure compliance with flag State, port State and coastal State requirements for all fleets.	Include compliance with flag State, port State and coastal State requirements in accordance with international and regional standards, in the risk based MCS Strategy.						SFA
		Implement inspection plan on port State and coastal State requirements as per the MCS Strategy and schedule of implementation.						SFA
		Coordinate and work with IOTC CPCs to improve level of inspections of vessels, with a priority on suspected IUU vessels.						SFA
O2.6: Apply transparency standards to the management of the tuna fisheries and reduce conflicts among users.	**S2.6.1:** Improve transparency and standardization across the sector.	Adhere to FiTI standards and continue to make use of the annual FiTI report and the FiTI report preparation process to highlight, scrutinise and address transparency-related issues in the tuna fisheries.						DoF, SFA
		Increase dissemination of the SFA Annual Reports, Annual Fisheries Statistical Reports, and technical reports related to the tuna fisheries.						SFA
		Enhance the use of the SFA and MOFBE websites as means of increasing public access to information on the tuna fisheries.						SFA, MOFBE

	S2.6.2: Mitigate conflicts between and among tuna fisheries sectors and sub-sectors.	Promote the development and use of Code of Conduct for undertaking of fishing activities across all tuna fisheries.						SFA
		Establish a mechanism for reporting of conflicts between and among operators.						SFA
		Encourage tuna fisheries sub-sectors to form groupings and elect representatives to represent them on the co-management committee.						SFA
		Organize annual meeting(s)/workshop(s) to discuss issues in the tuna fisheries and possible solutions.						SFA
	S2.6.3: Align conservation and management measures in the tuna fisheries with other resource management and conservation measures.	Research, document and establish links with other marine resources management initiatives.						SFA
		Fisheries administration actively participates in, contribute to and share knowledge with relevant initiatives (e.g., SMSP, CBD, CITES, CMS, BBNJ, MARPOL).						SFA

11.3 Economic Contribution

Goal 3: Economic Contribution: Enhance the tuna fisheries value chain for the benefit of all stakeholders.			**Implementation schedule**					**Lead organisation**
Objectives	**Strategies**	**Actions**	**2024**	**2025**	**2026**	**2027**	**2028**	
O3.1: Optimize revenue from tuna fisheries.	**S3.1.1:** Improve access to economic data and make use of economic data in decision making.	Improve collection of economic data along the fishery value chain, including from all fleets operating in the fishery.						DoF, SFA
		Train Seychellois economic analysts to conduct industry and value chain analyses and projections.						ANHRD
		Feedback results of analyses and projections into the decision-making framework.						SFA, DoF
		Annually publish a report on the Seychelles tuna fishery and the socio-economic benefits it provides.						SFA
	3.1.2: Promote investment in the tuna industry.	Identify priority areas requiring investment and advertise opportunities locally and internationally.						DoF
		Identify support and incentives that can be provided to encourage investments.						SFA
		Facilitate access to land for land-based investments.						SFA
	3.1.3: Improve financing options and encourage Seychellois investments in tuna fishery and fish processing.	Research and establish a framework to incentivize domestic investment in tuna fishing and tuna processing industry.						DoF, SFA
		Investigate required changes and support that needs to be given to the local semi-industrial longline fleet to improve economic performance.						SFA
		Promote financing initiatives developed in the Blue Economy Roadmap including the Seed Capital Grant Scheme, Small business start-up loan, Fisheries Development Fund, Blue Bond financing, etc.						SFA

		Develop Zone 14 Fish Processing Zone.						SFA
		Provide long-term assurances to investors on access to quota.						DoF
		Promote the use of renewable energy in the fish processing and value addition sub-sectors as means of reducing costs of operations.						SFA
		Put in place measures to support the development of tuna cottage industry value addition.						DoF, SFA
	S3.1.4: Ensure optimal economic gains from fishing access arrangements.	Regularly review fees for licenses, permits, authorisations and services and adjust as required.						DoF, SFA
	S3.1.5: Derive maximum socio-economic benefits from the use of IOTC annual catch allocations.	Undertake a study to quantify the social and economic contribution of each fleet component to the Seychelles.						SFA
		Provide economic data to guide proposed actions under Strategy S2.3.1 on establishing a scheme for catch allocation and transfer.						DoF, SFA
	S3.1.6: Improve the quantity, quality, and value of landed tuna from the semi-industrial longline fishery.	Provide trainings in fishing techniques and the use of oceanographic data for improved targeting of tuna.						SFA
		Explore alternative fishing techniques such as deep line fishing to catch deeper level tuna where migration patterns are less affected by surface level anomalies.						SFA, Industry
		Adopt, refine, and enforce international guidelines (e.g., FAO manual of good hygiene practise for fishing boats and fish landing sites for small scale fisheries) for fish handling, landing sites etc.						SFA, Industry
		Collaborate with the Fish Inspection and Quality Control Unit (FIQCU) of the Seychelles Bureau of Standards (SBS) to inspect catch and quality control catch at landing.						SFA, FIQCU

		Create understanding of the importance of immediate cold storage of catch.						SFA
		Train crew in onboard personal hygiene and fish handling techniques and gutting.						SFA, Industry
		Providing training in fish grading.						SFA, Industry
	S3.1.7: Improve branding, labelling, marketing and sale of Seychelles tuna products.	Further research into the development of a high-quality Seychelles tuna brand and label.						SFA
		Research and apply for Sustainability and food safety system certification (FSSC) as part of the marketing strategy.						SFA
		Undertake research on demand and sale potential of national and international markets for different grades of tuna and tuna products.						DoF, SFA
		Increase marketing of Seychelles tuna products through identified channels.						SFA
		Establish and fully utilise links with fish importers in major international markets for sale of Seychelles tuna and tuna products.						Industry
		Establish networks with the local tourism sector for the promotion and sale of tuna and tuna products (e.g. hotels, restaurants, ship chandlers, yacht operators).						Industry
		Develop local fish auction house for wholesale of fish.						Industry, SFA
		Research and if required, implement with the support of the industry an electronic system for ordering fish that can be used by domestic and international markets.						SFA, Industry
		Ensure delivery mechanisms are in place to supply consistent, quality products to established international and local markets.						Industry

		Implement local communication campaign on tuna and tuna products and where they can be purchased.						SFA, Industry
		Promote the development of businesses that makes use of tuna which does not meet the standards for human consumption.						SFA, Industry
	S3.1.8: Ensure that Port Victoria retains its competitive advantage**.**	Continually improve the quality of services offered to tuna fishing and carrier vessels in Port Victoria.						SPA, Industry
		Build on existing strategy to attract industrial longline vessels to Port Victoria.						SFA, SPA
		Investigate the needs of the different fleets while in port and develop a strategy for meeting the identified needs.						SFA, SPA
		Compare and where required, adjust port and service duties to align with or improve competitiveness with other ports in the region.						SPA

11.4 Social Development

Goal 4: Social Development: Ensure that the tuna fisheries contribute to socio-economic development and empowerment of the Seychellois nation.			**Implementation schedule**					**Lead organisation**
Objectives	**Strategies**	**Actions**	**2024**	**2025**	**2026**	**2027**	**2028**	
O4.1: Increase Seychellois stakeholders' representation in the harvesting and processing sub-sector.	**S4.1.1:** Improve training certification for careers across the tuna fishing industry.	Undertake biennial assessment of labour requirement in the domestic fisheries sector.						SFA, DoF
		Research and implement measures to make employment in the fishery sector more attractive for locals.						DoF, SFA
		Based on the labour assessment offer short courses, diplomas, or practical skills to Seychellois to fill employment gaps.						ANHRD
		Set up a scholarship programme to build capacity in various field related to fisheries and to develop specialized skills.						SFA, DoF
		Design and implement an apprenticeship program in collaboration with industry actors to get youths to join the tuna fishing industry.						SFA
		Train guides working in big game sport fishery.						
	S4.1.2: Build interest and local capacity in value addition**.**	Identify a range of fish processing activities and value-added products that can be implemented by local businesses.						SFA
		Organise training in tuna products value addition and encourage development of tuna cottage industry.						SFA
		Develop a policy for the development and promotion of local fish processing and tuna cottage industry.						DoF
O4.2: Increase Ocean literacy and	**S4.2.1:** Use communication tools and the media to raise	Develop educational materials such as brochures, pamphlets, web pages, television and radio programmes that explain the tuna fishing industry, including its history, management,						SFA

understanding of the tuna fishing sector among the population.	awareness about tuna fishing.	stakeholders, importance, value, economic contributions, impacts, and sustainability issues.						
		Collaborate with journalists and media outlets to produce articles, documentaries, and news segments that highlight different aspects of the tuna fishing industry, from fishing techniques to market trends to the importance of conservation.						SFA
		Collaborate with actors working in conservation and in the tuna industry on awareness campaigns, initiatives, and events to promote responsible tuna fishing.						SFA
	S4.2.2: Integrate knowledge on tuna fishing in formal education and educational campaigns.	Educate consumers about sustainable seafood choices, including certified sustainable tuna products and responsible fishing practices.						SFA
		Work with educational institutions to integrate topics related to tuna fishing, marine conservation, and sustainable seafood into school curricula at various levels.						SFA
	S4.2.3: Encourage dialogues on the Seychelles tuna fishery and its costs and benefits.	Organize public events, workshops, and television shows where experts can speak about tuna fishing, sustainable practices, and conservation efforts.						SFA
		Utilize social media platforms to share informative content, infographics, and videos about tuna fishing, encourage discussions and engage with followers to answer questions and provide further insights.						SFA
		Work with tuna fishermen and industry stakeholders to facilitate dialogue, share knowledge, and promote the use of best practices across the fishing industry.						SFA
O4.3: Improve safety in the tuna fishing industry.	**S4.3.1:** Ensure that safety issues are openly discussed, and mitigation actions are	Foster a culture of safety within the industry by promoting open communication, reporting of safety concerns, and encouraging proactive safety measures among crew members and vessel operators.						SFA, SMSA

	implemented to address them.	Encourage collaboration and information sharing among industry stakeholders, including fishermen, vessel owners, industry associations, and government agencies, to identify and address safety risks and implement best practices.						SFA, SMSA
		Provide training for fishermen on safety protocols, emergency procedures, and proper equipment use.						SFA, SMSA
		Ensure that fishing vessels take steps to satisfactorily identify, communicate and mitigate risks onboard.						SFA, SMSA
		Ensure that fishing vessels have clear standard operating procedures for dealing with accident at sea and in port.						SFA, SMSA
		Ensure that safety inspections of fishing vessels are undertaken according to schedule.						SFA, SMSA
		Ensure that fishing vessel meet safety standards according to their class and that they are equipped with necessary safety equipment.						SFA, SMSA
		Encourage fishing vessel operators to invest in modern safety equipment and technology to improve crew safety.						SFA, SMSA
		Work with the SMSA, SPA and other concerned stakeholders to strictly enforce adherence to safety regulations and standards.						SFA
O4.4: Industry actors become stewards of the tuna resources and the marine environment on which the fishery depends.	**S4.4.1:** Encourage operators to report suspected cases of violations of fishing conditions and IUU fishing.	Implement educational campaigns to encourage fishers and other stakeholders to report suspected violations of fishing conditions or illegal vessels to the authorities.						SFA
		Give recognition to operators and fishers that regularly report suspected violations of fishing conditions or illegal vessels to the authorities.						DoF, SFA
	S4.4.2: Encourage industry actors to	Provide recognition to operators and businesses involved in sustainability and social initiatives.						SFA

	implement initiatives to improve quality of the marine environment, fish stocks, living conditions onboard fishing vessels and fishing industry-related jobs.	Provide support and incentives to operators and businesses supporting local value addition, Seychellois jobs and capacity building of Seychellois.						SFA

12. MONITORING AND EVALUATION PLAN

12.1 Resource Sustainability

Objectives/Strategies/Actions	Indicator(s)/Target(s)	Performance period
O1.1: All tuna stocks are fished in accordance with domestic laws, IOTC CMMs applicable to Seychelles and international best practices.	Number of times catch limits have been exceeded.	Mid-term. End of term.
S1.1.1: Implement harvest strategies and catch limits adopted by the IOTC.	% of IOTC harvest strategies and catch limits under implementation.	Mid-term. End of term.
Integrate IOTC harvest strategies and catch limits in the Tuna Fishery Management Plan as they are adopted.	All IOTC harvest strategies integrated within the management plan within a year of adoption.	Annually. From Year 1.
Meet and exceed catch, effort and fish size monitoring targets set by the IOTC across all fleets.	IOTC minimum monitoring targets exceeded.	Annually. From Year 1.
Use the SFA FIMS to visualize and monitor catch per species against Individual Fishing Quotas (IFQs) for the industrial and small-scale longline fishing fleets.	Operational and up to date IFQ tracking in FIMS.	Annually. From Year 1.
Undertake biennial assessment of Seychelles tuna fisheries against nationally determined reference points and performance indicators	Availability of biennial fishery assessment reports.	By end of Year 3 and Year 5.
Keep track of productivity of the stock along with environmental, climate change, and catchability indicators.	Frequently updated table keeping track of core environmental, climate change, and catchability indicators	Annually. From Year 2.
S1.1.2: Communicate to stakeholders on the status of fish stocks and management measures in place on a regular basis.	Total number of communications on fish stock status issued by the SFA.	Mid-term. End of term.
Use appropriate media to disseminate information on stock status, catch and quota utilization.	Continuously available public information on stock status, catch and quota utilization.	Annually. From Year 1.

Prepare and disseminate biannual and annual report on catch and effort per fleet licenced to fish in Seychelles waters.	Availability of biannual and annual reports on catch and effort per fleet.	Annually. From Year 1.
Communicate information about the fishery to the public in a layman's language through SFA annual reports and other communications.	At least 2 annual public communication about the fishery.	Annually. From Year 1.
O1.2: Adverse environment and ecosystem impacts resulting from tuna fisheries are minimized, avoided, and prevented.	Level of perception of stakeholders on the environmental impacts of tuna fisheries.	Mid-term. End of term.
S1.2.1: Mitigate impacts of fisheries on Endangered, Threatened and protected (ETP) species and by-catch.	Reduce incidences of dead ETP species reported from the fishery and communicated in Seychelles Compliance Reports to the IOTC.	Mid-term. End of term.
Annually update and communicate conservation and management measures in place to mitigate impacts on ETP species and by-catch to all operators in the fishery, including providing information on what are obligations and what are recommendations.	Copies of annual circular on CMMs sent to all fishery operators.	Annually. From Year 1.
Achieve minimum 5% observer coverage (onboard and electronic) of fishing operations/sets across relevant fleets.	Exceed the minimum 5% required observer coverage on relevant fleets.	Annually. From Year 3.
Prepare a plan for all Seychelles industrial longline vessels to achieve 100% observer coverage (onboard or through EMS).	Approved plan to achieve 100% observer coverage on Seychelles industrial longline vessels.	One off. By Year 3.
Implement the prepared plan on achieving 100% observer coverage (onboard or through EMS) on Seychelles industrial longline vessels.	More than 75% of identified annual tasks in the plan under implementation.	Annually. From Year 3.
Adopt fleet specific code of best practices for handling of by-catch.	Availability of at least two fleet specific codes of best practices.	One off. By Year 3.

Require all vessels to implement measures to reduce incidental by-catch and interaction with ETP species in line with IOTC resolutions.	Availability of reports on actions from logbooks implemented by vessels.	Annually. From Year 1.
Collect, collate, and report data on catch and interactions of ETP species according to IOTC standards.	IOTC feedback on annual Compliance reports.	Annually. From Year 1.
Identify existing but unapplied by-catch mitigation measures and investigate their potential for application.	Report on by-catch mitigation measures and potential for application.	One off. By Year 3.
Undertake research on by-catch mitigation measures in instances where existing measures are ineffective or absent.	At least one research project implemented on by-catch mitigation measures IF existing measures are ineffective or absent.	From Year 3 to Year 5.
Revise the NPOA Sharks.	NPOA Sharks revised and validated by stakeholders.	By Year 3.
Implement the NPOA Sharks.	Annual NPOA Sharks implementation report.	From Year 3.
Prepare NPOA Turtles.	NPOA Turtle prepared and validated by stakeholders.	By Year 3.
Implement the NPOA Turtles.	Annual NPOA Turtles implementation report.	From Year 3.
Prepare NPOA Seabirds.	NPOA Seabirds prepared and validated by stakeholders.	By Year 3.
Implement NPOA Seabirds.	Annual NPOA Seabirds implementation report.	From Year 3.
Undertake biennial assessment of implementation effectiveness of the code of best practices for handling of by-catch for each fleet and communicate the results to industry.	Availability of biennial assessment report.	Biennially. In Year 3 and Year 5.
S1.2.2: Reduce ghost fishing and the environmental impacts of abandoned, lost, and discarded fishing gears (ALDFGDs).	Reduce incidence of reported ghost fishing.	Mid-term. End of term.
Set up scheme to encourage marking and tracking of fishing gears in small-scale longline and industrial fisheries.	Scheme launched and operational.	One off. By Year 4.
Research on and implement management strategies to reduce incidences of ALDFGDs.	Report on management strategies to reduce incidences of ALDFGDs.	Annually. From Year 3.

Adopt and promote guidelines for avoiding gear loss to fishing operators.	Promotional materials on guidelines to avoid loss of fishing gears.	Annually. From Year 3.
Increase ground checks on FADs to ensure the use of non-entangling materials and designs.	Increase on number of ground checks undertaken compared to reference year 2022.	Annually. From Year 2.
Undertake checks on FADs at sea to ensure the use of non-entangling materials and designs.	At least one campaign implemented per year.	Annually. From Year 2.
Promote the use of biodegradable materials in FAD construction.	Increase in number of awareness materials/ information session organized compared to reference year 2022.	Annually. From Year 1.
Investigate options to incentivize the use of biodegradable and non-entangling materials with the fishing industry.	List of options for incentivizing the use of biodegradable and non-entangling materials	One off. Year 3.
Investigation options for funding recovery of ALDFGDs with the fishing industry.	Report on options for funding recovery of ALDFGDs.	One off. In Year 3 and Year 4.
Develop a polluter pay programme for removal of ALDFGDs.	Penalty system in place for gear lost and damages.	One off. Between Year 4 and Year 5.
S1.2.3: Increase recovery of Drifting Fish Aggregating Devices (FADs) before they create impacts on islands and reefs.	Number of DFADs recovered and declared.	Mid-term. End of term.
Update the Drifting FADs Management Plan (Implement provisions in draft Bill s. 16 and Regulations (Reg 47, Tenth Schedule)	Availability of updated DFADs Management Plan.	One off. By Year 2.
Implement the Drifting FADs Management Plan, and update it as required.	Percentage of measures in DFAD Management Plan under implementation.	Annually. From Year 1.
Strengthen FAD Watch programme to monitor and intercept DFADs before they get stranded.	FAD Watch programme under implementation with additional partners.	Annually. From Year 1.
Set up scheme to share near real time data with managers of Seychelles outer islands for DFADS coming close to their islands.	Scheme set up and Seychelles outer islands receiving near real-time data on DFADs in their area.	One off. Year 2 and Year 3.

Require Seychelles vessels to provide near real-time data on the location of all active DFADs, and for foreign vessels to provide data on all active DFADs in areas under Seychelles jurisdiction.	Agreement signed between SFA and all purse seine operators to provide data on active DFADs.	Annually. From Year 2.
S1.2.4: Eliminate disposal of waste at sea.	Reduce incidence of fishing vessels disposing waste at sea.	Mid-term. End of term.
Identify weaknesses and gaps for addressing solid waste storage and disposal by Seychelles' fishing vessels and implement a programme to address them.	Report on weaknesses and gaps by the end of Year 3 and start of implementation by Year 5.	Annually. From Year 3.
Prepare and submit an IOTC Resolution on Mitigation of Marine Pollution in the IOTC Area of Competence.	Resolution on Mitigation of Marine Pollution in the IOTC Area of Competence drafted and submitted to IOTC.	One off. By Year 4.
Integrate adherence to MARPOL convention in the license condition of all industrial and small-scale longline vessels.	Articles in fishing license conditions on adherence to MARPOL convention.	One off. In Year 3 to Year 5.
Require vessels to keep a log of fishing gear waste and "other" waste and submit log to authorities after each fishing trip.	Report of vessels with and without log of fishing gear waste and other wastes.	Annually. From Year 3.
Include inspection of waste on inspection checklist for vessels in port.	Inspection checklist for fishing vessels in port updated to include inspection of waste.	One off. Between Year 3 and Year 4.
Implement an awareness campaign targeted at local fishermen to promote better storage of waste at sea and disposal on land.	Awareness campaign designed and launched.	One off. In Year 3 and Year 4.
S1.2.5: Improve knowledge and understanding of the nature of fishery impacts on ecosystems and the environment.	Increase in availability of data on fishery impacts on ecosystems and the environment from local research.	Mid-term. End of term.
Identify priority issues concerning the environmental impacts of fisheries, collate information on them and disseminate.	Availability of information on priority issues concerning environmental impacts of fisheries on the SFA website or in a report.	One off. In Year 2.
Fund and implement research on priority issues on fishery impacts on the environment.	At least one research project investigating fishery impact on the environment funded and under implementation.	Annually. From Year 2.

Communicate research findings to stakeholders in easily digestible formats.	Availability of information on research findings on the SFA website or availability of annual summary of new research findings.	Annually. From Year 2.
O1.3: Fisheries practices are improved to meet international best practices.	Level of assessment of fisheries practices being used compared to recommended international best practices.	Mid-term. End of term.
S1.3.1: Raise awareness on fish handling and fishing conditions requirements for target stocks and bycatch.	Number of communications issued by Seychelles fisheries administration on fish handling and fishing conditions requirements for target stocks and bycatch.	Mid-term. End of term.
Design and implement a communication campaign on fishing conditions requirements for target stocks and bycatch.	Report of implementation of education campaign on fishing conditions requirements for target stocks and bycatch.	Annually. From Year 2.
Adopt a guideline and communicate best practices for handling target stocks and bycatch.	Availability of communication materials on best practices for handling target stocks and bycatch.	Annually. From Year 2.
Assess the level of adherence to the guideline for the handling target stocks and bycatch.	Survey undertaken to assess adherence to guideline.	One off. In Year 5.
Revise the communication campaign as necessary.	Proof of changes made to communication campaign based on survey on adherence to guideline for the handling target stocks and bycatch	One off. In Year 5.
S1.3.2: Promote Fisheries Improvement Projects (FIPs) integration into various tuna fishing fleets and certification of fisheries.	Number of measures introduced compared to 2022 base year promoting Fisheries Improvement Projects (FIPs) integration.	Mid-term. End of term.
Review, update and implement requirements on gear specifications and integrate in license conditions.	At least one updated license conditions based on gear specifications.	One off. In Year 3.
Identify fishery improvements actions that needs to be implemented by fleets and encourage their adoption.	Communication to local fishing fleets on recommended fishery improvement actions for implementation.	Annually. From Year 3.
Encourage fleets to participate in FIPs and promote fisheries sustainability certification.	Availability of information issued by SFA on FIPs and fisheries sustainability certification.	Annually. From Year 1.

Support all fleet components to aim for certification of international standards.	Availability of information issued by SFA on international standards certification.	Annually. From Year 1.
Link FIPs with branding and markets.	Information on FIPs being used in fishery product branding and marketing campaign.	Annually. From Year 5.
Investigate possible additional support for certified fleets.	List of SFA approved possible additional support for certified fleets.	One off. In Year 3 and Year 4.

12.2 Effective Fisheries Governance

Objectives/Strategies/Actions	Indicator(s)/Target(s)	Performance period
O2.1: Position Seychelles as a leading country for the responsible management of the Indian Ocean tuna stocks.	Level of perception of stakeholders on the role that Seychelles is playing in the responsible management of the Indian Ocean tuna fisheries.	Mid-term. End of term.
S2.1.1: Take leading roles in regional efforts promoting the effective management and sustainability of the Indian Ocean Tuna fisheries.	Level of stakeholders' perception on whether Seychelles has taken a leading role in efforts promoting the effective management and sustainability of the Indian Ocean Tuna fisheries.	Mid-term. End of term.
Establish national multi-stakeholder group on tuna fisheries to provide advice and guidance on tuna fisheries-related issues.	Multi-stakeholders' group on tuna fisheries established.	One off. By the end of Year 1.
Build internal expertise related to fisheries and fisheries management and governance.	Number of training courses related to fisheries and fisheries management and governance attended by SFA and DoF staff.	Annually. From Year 1.
Identify issues affecting the management of the Indian Ocean tuna fisheries and sponsor /co-sponsor IOTC resolutions to redress them.	List of identified issues; No. IOTC resolutions sponsored and co-sponsored by Seychelles related to the issues.	Annually. From Year 1.
Develop a strategy for engaging regional CPCs and those with which Seychelles have partnership agreements.	Strategy developed and under implementation.	One off. In Year 1 and Year 2.
Partner with like-minded IOTC CPCs to increase visibility of issues affecting management of the tuna stocks at IOTC level.	Number of IOTC CPCs Seychelles is collaborating with on increasing visibility of issues affecting tuna stock management.	Annually. From Year 2.
Organise regional events (workshops, meetings, exchanges) focused on regional tuna fisheries governance and management.	Number of workshops organized.	Annually. From Year 2.

Consult and proactively prepare for international engagements on tuna fisheries.	Number of consultation meetings organized to discuss issues prior to attending international engagements on tuna fisheries.	Annually. From Year 1.
Promote the adoption of additional national conservation and management measures compared to IOTC minimum requirements where appropriate.	Number of additional national conservation and management measures integrated in the Tuna Fisheries Management Plan.	Annually. From Year 1.
2.1.2: Improve implementation of IOTC resolutions.	Level of implementation of IOTC resolutions reported in Seychelles reports to the IOTC.	Mid-term. End of term.
Domesticate IOTC resolutions for national implementation into national regulations or other legal instruments.	Number of IOTC resolutions that have been domesticated in national regulations and legal instruments compared to 2022 reference year.	Annually. From Year 1.
Annually update new IOTC conservation and management measures for national implementation into the Tuna Fisheries Management Plan.	Annual percentage of new measures for national implementation integrated in the Tuna Fisheries Management Plan.	Annually. From Year 1.
Setup dashboard to visualise and track level of implementation.	Dashboard set up and operational.	One off. Between Year 1 and Year 2.
Implement and monitor implementation of all IOTC obligations.	Annual number of actions implemented relating to each IOTC obligation.	Annually. From Year 1.
S2.1.3: Improve adherence to IOTC, SWIOFC and FAO reporting requirements.	Increase adherence score.	Mid-term. End of term.
Prepare annual reporting schedule and set clear timelines and approval procedures for drafts and final versions.	Availability of annual reporting schedule with clearly identified approval procedures and timelines for draft and final versions.	Annually. From Year 1.
Review reporting standards for all reports and put in place controls to ensure there are no contradictions among reports.	Reporting standards available and controls in place.	One off. Year 1 and Year 2.
Recruit, train, and mentor staff involved in international reporting.	Outline of programme set up to increase manpower and international competences of staff in international reporting.	Annually. From Year 1.

Assign roles and responsibilities to staff involved in reports preparation.	Availability of document outlining the roles and responsibilities of all involved in SFA international reporting.	Annually. From Year 1.
Integrate reporting duties into the KPIs of relevant staff.	All staff involved with international reporting duties have annual Key Performance Indicators (KPIs) linked to reporting.	Annually. From Year 1.
S2.1.4: Identify and designate representatives to actively participate in the IOTC Management Strategy Evaluation process.	Representatives designated and participating in the Management Strategy Evaluation process.	Mid-term. End of term.
Designate experts and set clear national objectives to be achieved as part of the process.	Experts designated and national objectives finalized.	Annually. From Year 1.
Actively participate and contribute to the IOTC Management Strategy Evaluation process.	At least 80% participation rate in organized meetings/ workshops on Management Strategy Evaluation process.	Annually. From Year 1.
O2.2: Strengthen governance of tuna fisheries and implementation of the management plan.	Level of stakeholders' perception on effectiveness of Seychelles tuna fisheries governance.	Mid-term. End of term.
S2.2.1: Make use of a cooperative co-management approach involving stakeholders to provide oversight of the plan's implementation.	Co-management structure in place and operational.	Mid-term. End of term.
Prepare the Terms of Reference for a Tuna Fisheries Co-management Committee.	Terms of Reference prepared and approved.	One off. By end of Year 1.
Identify mechanism for selection of members to form part of the committee.	Mechanism for selection of board members drafted.	One off. By end of Year 1.
Prepare annual meeting schedules and organise meetings of the co-management committee.	Availability of annual schedule of meetings.	Annually. From Year 1.
Identify implementation priorities from the implementation plan.	Annual list of implementation priorities from the Implementation Plan.	Annually. From Year 1.

S2.2.2: Clarify roles and responsibilities and ensure accountability for implementation of the management plan.	Roles and responsibilities of each management plan implementation partner detailed and publicised.	Mid-term. End of term.
Discuss and agree on roles and responsibilities for implementation of the management plan with implementation partners.	Roles and responsibilities of each management plan implementation partner discussed and agreed.	One off. Year 1.
Sign Memorandum of Understandings with implementation partners to formalise roles and responsibilities.	Signed MOU formalizing roles and responsibilities.	One off. Year 1.
Communicate targets, roles, and responsibilities for the management plan implementation to stakeholders.	Information on target, roles, and responsibilities for implementation of the management plan published on the SFA website.	One off. Year 1.
Prepare annual report on management plan implementation.	Availability of annual reports on management plan implementation.	Annually. From Year 2.
Regularly update stakeholders on progress being made on the management plan implementation.	Information published or circulated to stakeholders on the implementation of the management plan.	Annually. From Year 1.
S2.2.3: Ensure adequate infrastructure and institutional arrangements are in place to implement the management plan.	Level of perception on required infrastructure and institutional arrangements supporting implementation of the Tuna Fisheries Management Plan.	Mid-term. End of term.
Undertake an assessment of the structure, human capacity, and training needs of national fisheries administration (SFA and DoF) to implement the management plan.	Assessment completed. Report available.	One off. Year 1.
Based on the assessment (above) revise the structure and fill priority posts.	Evidence of change in organizational structure based on findings of the assessment report.	One off. Year 1 and Year 2.
Set up a structure within the SFA to work on the tuna fisheries and industry and to support the work of the Tuna Fisheries Co-management Committee.	Structure within SFA set up and working principally on tuna fisheries and industry issues.	One off. Year 1.

Prepare inter-agencies annual schedule of implementation.	Availability of inter-agencies annual schedule of implementation.	Annually. From Year 1.
Integrate annual schedule of implementation in institutional work plans.	Annual SFA institutional/ Departmental work plan with elements from the Implementation Plan of the Tuna Fisheries Management Plan integrated.	Annually. From Year 1.
Identify and procure tools and set up processes within the national fisheries administration to improve efficiency.	Efficiency tools identified and procured.	Between Year 1 and Year 3.
S2.2.4: Ensure that fisheries administration staff are adequately trained to deliver on the plan's implementation needs.	Number of fisheries administration staff trained in key areas to support management plan implementation.	Mid-term. End of term.
Prepare individual training plans for key fisheries administration staff involved in the plan's implementation.	Availability of individual training plan for each key fisheries administration staff involved in the plan's implementation.	Annually. From Year 1.
Identify training organizations to deliver identified trainings.	List of trainings required and available institutional options for training delivery.	Annually. From Year 1.
Develop scholarship programs and match interested parties with opportunities.	At least one scholarship program for the fishing industry developed and under implementation.	Annually. From Year 1.
Prepare and execute a fisheries administration capacity retention plan.	Fisheries administration capacity retention plan under implementation.	One off plan preparation between Year 1 and Year 2. Annually plan implementation from Year 3.
S2.2.5: Ensure adequate financing for implementation of the plan, including cost recovery.	Ratio of annual proposed and approved management plan implementation budget.	At least 50% of the total of requested annual budget approved.
Prepare annual budget for management plan's implementation based on implementing MDAs (SFA, DoF, SCG, Air Wing, etc.) responsibilities.	Availability of approved annual implementation plan budget.	Annually. From Year 1.

Compile and analyse data on direct revenues from tuna fisheries to fisheries administration, and their distribution to tuna fisheries management efforts.	Data on revenue from tuna fisheries to fisheries administration.	Annually. From Year 1.
Identify and implement cost recovery measures within the fishery.	No. of new cost recovery measures established compared to the 2022 reference year.	One off. Between Year 1 and Year 2.
Undertake an analysis and identify options for funding the implementation of this management plan and the MCS Strategy to reduce reliance on the EU sectoral support.	Availability of report on funding options that reduce reliance on the EU sectoral support.	One off. During Year 2.
Identify and secure external donor funding to support management plan implementation.	Amount of funding received in support of management plan implementation.	Annually. From Year 1.
S2.2.6: Ensure that the management plan is adaptive, and its performance is regularly assessed.	Number of times the management plan and/or its implementation plan has been reviewed and updated.	Mid-term. End of term.
Undertake a mid-term review of the plan and modify the implementation plan as required.	Mid-term review undertaken. Evaluation report available.	One off. During Year 3.
Evaluate the performance of the plan at the end of its lifespan using its Performance Measurement Framework.	End of implementation period evaluation undertaken. Evaluation report available.	One off. Year 6.
Make use of finding of the plan's performance to inform the drafting of the next iteration.	At least 80% of recommendations from the end of implementation period integrated in new iteration of the management plan.	One off. Year 6.
O2.3: Fishing quotas allocated to the Seychelles through the IOTC are equitably shared.	Fishing quota allocated through a structured scheme.	Mid-term. End of term.
S2.3.1: Establish a scheme for catch allocation and transfer.	Allocation and transfer scheme is in place by Year 3 of management plan implementation.	Mid-term.
Develop an appropriate set of criteria and indicators upon which to base quota allocations.	Criteria and indicators developed. Report available.	One off. Year 1.
Investigate scenarios to inform the choices of fleet and vessel (IFQ) quota allocation.	Scenarios investigated and used to inform IFQ allocation. Report available.	One off. Year 1.

In consultation with stakeholders formulate procedures for allocation and transfer of fleet and Individual Fishing Quotas (IFQs).	Procedures formulated in consultation with stakeholders Report available.	One off. During Year 1 and Year 2.
S2.3.2: Annually allocate fishing quotas based on quota allocation and transfer scheme.	Fishing quota allocated using allocation scheme in place.	Mid-term. End of term.
Allocate fishing quotas given by the IOTC to tuna fisheries sub-sectors and vessels based on the allocation scheme in place.	Fishing quota allocated annually according to scheme in place. List of fishing vessels and quota allocated published.	Annually. From Year 1.
Undertake quarterly review of IFQ use.	Availability of quarterly tables with IFQ allocation and % allocation used per species per vessel.	Annually. From Year 1.
Re-allocate resources through established protocols in the quota allocation scheme.	Amount of tuna resources reallocated through protocols in place.	Annually. From Year 3.
O2.4: Enhance research, data collection, data analyses and use of research results to inform evidence-based decision making.	Increase in use of research and monitoring data for decision making.	Mid-term. End of term.
S2.4.1: Improve the quality of data collected from different fleets and meet all IOTC data-related obligations.	Increase level of compliance of submitted data to IOTC standards.	Mid-term. End of term.
Review data requirements for implementation of the management plan.	Data requirement reviewed. Report outlining requirements available.	One off. Year 1.
Identify the primary shortcomings with the data collection system.	List of issues identified with data collection system.	One off. Year 1.
Prepare and execute plan to address identified shortcomings with data collection system.	At least 80% of identified shortcomings addressed. Final report available.	One off. During Year 1 and Year 2.
Increase coverage of data collection programme to include sports and recreational fisheries	Two new data collection programmes under implementation by end of Year5.	Annually. From Year 2.
Build staff capacity for data collection and research (SFA staff, onboard observers)	At least one annual training session organised for or attended by SFA staff and onboard observers.	Annually. From Year 1.

Involve and train fishers in data collection.	At least one training session organized to train fishers in data collection during the plan's implementation period.	Annually. From Year 1.
Investigate options for outsourcing of data collection, analyses, and reporting.	Options investigated for privatisation of data collection, analyses, and reporting. Report available.	One off. Year 1 and Year 2.
Update and or develop data collection and reporting tools as required.	At least 3 data collection and reporting tools developed or updated.	Annually. From Year 1.
Integrate data from fishers monitoring into data framework.	SFA data framework containing data from fishers monitoring.	Annually. From Year 1.
Annually submit required data to the IOTC according to required standards.	Annual communication to IOTC on data submission. Minimal negative feedback on Compliance Report.	Annually. From Year 1.
Undertake biennial independent audits of data collection and reporting systems (e.g., catch sampling, EMS, VMS, etc).	Biennial audits undertaken. Report available.	Biennially. In Year 3 and Year 5.
S2.4.2: Actively participate and contribute to IOTC, international and industry initiatives and programmes on stock assessments and related research activities.	Level of participation in IOTC and industry initiatives on stock assessments.	Mid-term. End of term.
Build capacity of relevant SFA staff to understand and contribute to stock assessment initiatives.	At least 5 training sessions attended by SFA staff on stock assessments during the 5-year implementation period.	Annually. From Year 1.
Actively follow and participate in IOTC stock assessments.	At least 80% participation rate in IOTC stock assessment related meetings/workshops.	Annually. From Year 1.
Initiate and participate in research activities on tuna fisheries.	SFA participation in at least 3 tuna and tuna fisheries related research projects.	Annually. From Year 1.
S2.4.3: Make use of research results in management and development of fisheries policies and strategies.	Number of new fisheries policies and strategies referring to recent research findings.	Mid-term. End of term.
Develop science to policy interface to enhance communication of results from science to Ministries, Departments and Agencies (MDAs) and to the community.	Science to policy interface developed and in use.	One off. Year 1 and Year 2.

Integrate a "Request for Advice" mechanism from fisheries experts in the development of all fisheries strategies and policies.	Policy document prepared on "Request for Advice" from fisheries experts in the development fisheries strategies and policies. Policy implemented.	Policy document preparation: one off in Year 1. Policy implementation: Annually from Year 2.
Annually compile and disseminate information on major research findings and possible implications for tuna fisheries.	Annual report on major research findings and implications for tuna fisheries.	Annually. From Year 1.
O2.5: Enforce and increase compliance with legislation and license conditions by all fishing vessels owners and operators.	Improved level of compliance in tuna fisheries.	Mid-term. End of term.
S2.5.1: Promote compliance through education and awareness and deter violations of legislation and license conditions.	Degree of change in compliance level resulting from implementation of education and awareness efforts.	Mid-term. End of term.
Prepare NPOA IUU.	NPOA IUU drafted and validated by stakeholders.	One off. Year 1.
Prepare a risk based MCS Strategy and schedule of implementation.	Availability of risk based MCS Strategy and schedule of implementation.	One off. Year 1.
Integrate measures to promote compliance in the MCS Strategy and schedule of implementation.	MCS Strategy with a section on "Promotion of Compliance".	One off. Year 1.
Integrate NPOA IUU into the MCS Strategy and schedule of implementation.	Evidence of input from NPOA IUU into the MCS Strategy and schedule of implementation.	One off. Year 1.
Undertake a study and come up with proposals for the implementation of compliance performance bonds and reward system.	Report on options for compliance performance bonds and reward system.	One off. Year 1 and Year 2.
Apply MCS and enforcement measures to all fleets based on the risk based MCS Strategy and schedule of implementation.	Evidence of implementation of MCS strategy across all fishing fleets.	Annually. From Year 1.
Work with regional and sub-regional partners to develop or strengthen sub-regional and regional fisheries patrol and observer programmes.	One regional observer programme developed or strengthened.	Annually. From Year 1.

Increase level of checks, queries and verification of fishing vessels activities and submitted data.	At least 10% increase in number of checks, queries and verification of fishing vessels activities and submitted data over the 2022 reference year.	Annually. From Year 1.
Link compliance to the fuel incentive and other benefits in the artisanal and small-scale longline fisheries.	Policy document on linking of compliance to fuel incentives and benefits for the artisanal and small-scale longline fisheries.	Policy document preparation: One off. Year 1. Policy implementation: Annually from Year 2.
Introduce, update, develop or adopt monitoring and reporting tools as required.	At least 2 reporting tools updated, developed, or adopted.	Annually. From Year 1.
Establish reciprocated agreements for transhipment and landing inspections of Industrial Longline vessels in foreign ports.	At least one reciprocated agreement signed.	Annually. From Year 1.
Increase inspection of vessels, transhipment, and landing in local and foreign ports.	5% of transhipment and landing in local and foreign ports inspected.	Annually. From Year 1.
Implement public relations campaign to increase awareness, understanding and support for implementing the new Fisheries and Aquaculture Bill and Regulations	Public implementation campaign on new Fisheries and Aquaculture Bill and Regulations implemented.	One off. Year 1 and Year 2.
Make use of the SFA FIMS to report on MCS and enforcement issues.	SFA FIMS containing information on MCS and enforcement issues in the tuna fisheries.	Annually. From Year 1.
S2.5.2: Ensure compliance with flag State, port State and coastal State requirements for all fleets.	Increase in level of compliance with flag State, port State and coastal State requirements across all tuna fishing fleets.	Mid-term. End of term.
Include compliance with flag State, port State and coastal State requirements in accordance with international and regional standards, in the risk based MCS Strategy.	MCS Plan containing section on compliance with flag State, port State and coastal State requirements.	One off. Year 1.
Implement inspection plan on port State and coastal State requirements as per the MCS Strategy and schedule of implementation.	No. annual inspection related to port State and coastal State requirements undertaken.	Annually. From Year 1.

Coordinate and work with IOTC CPCs to improve level of inspections of vessels, with a priority on suspected IUU vessels.	Annual number of Seychelles, foreign and suspected IUU vessels inspected.	Annually. From Year 1.
O2.6: Apply transparency standards to the management of the tuna fisheries and reduce conflicts among users.	Increase level of perception of transparency in the tuna fisheries sector.	Mid-term. End of term.
S2.6.1: Improve transparency and standardization across the sector.	Increase availability of public information on the tuna fisheries sector.	Mid-term. End of term.
Adhere to FiTI standards and continue to make use of the annual FiTI report and the FiTI report preparation process to highlight, scrutinise and address transparency-related issues in the tuna fisheries.	Availability of Seychelles annual report to the FiTI; level of adherence to FiTI standards related to tuna fisheries.	Annually. From Year 1.
Increase dissemination of the SFA Annual Reports, Annual Fisheries Statistical Reports, and technical reports related to the tuna fisheries.	Number of times the reports are downloaded from the SFA website. Increase in report download compared to 2022 reference year.	Annually. From Year 1.
Enhance the use of the SFA and MOFBE websites as means of increasing public access to information on the tuna fisheries.	Total number of articles and data sources on tuna fisheries on the websites. At least 50% increase compared to 2022 reference year.	Annually. From Year 1.
S2.6.2: Mitigate conflicts between and among tuna fisheries sectors and sub-sectors.	Decrease perception of level of conflicts based on survey.	Mid-term. End of term.
Promote the development and use of Code of Conduct for undertaking of fishing activities across all tuna fisheries.	Availability of Code of Conduct for undertaking tuna fishing activities.	One off. Year 1 and Year 2.
Establish a mechanism for reporting of conflicts between and among operators.	Reporting mechanism established and communicated to fishing operators.	One off. Year 1 and Year 2.
Encourage tuna fisheries sub-sectors to form groupings and elect representatives to represent them on the co-management committee.	Number of tuna fisheries sub-sector groups formed.	One off. Year 1 and Year 2.
Organize annual meeting(s)/workshop(s) to discuss issues in the tuna fisheries and possible solutions.	At least one annual tuna stakeholders' meetings/ workshop organized.	Annually. From Year 1.

S2.6.3: Align conservation and management measures in the tuna fisheries with other resource management and conservation measures.	Number of instances when there have been contradicting measures between those in tuna fisheries management and other resource management initiatives.	Mid-term. End of term.
Research, document and establish links with other marine resources management initiatives.	Number of marine resources management initiatives Seychelles fisheries administration are collaborating with.	Annually. From Year 1.
Fisheries administration actively participates in, contribute to and share knowledge with relevant initiatives (e.g., SMSP, CBD, CITES, CMS, BBNJ, MARPOL).	Fisheries administration staff participate and share information on tuna fisheries to at least 3 other resource management initiatives.	Annually. From Year 1.

12.3 Economic Contribution

Objectives/Strategies/Actions	Indicator(s)/Target(s)	Performance period
O3.1: Optimise revenue from tuna fisheries.	Increase in annual contribution of the tuna fisheries to national GDP	Mid-term. End of term.
S3.1.1: Improve access to economic data and make use of economic data in decision making.	General trend of increased availability of economic data from tuna fisheries and their use in decision making.	Mid-term. End of term.
Improve collection of economic data along the fishery value chain, including from all fleets operating in the fishery.	50% increase in the types of economic data that is regularly collected along the tuna fishery value chain.	Annually. From Year 3.
Train Seychellois economic analysts to conduct industry and value chain analyses and projections.	One Seychellois economic analyst trained, and one industry and value chain analysis conducted.	One off. Year 5.
Feedback results of analyses and projections into the decision-making framework.	Proof of results of analyses and projections being integrated in decision making framework.	One off. Year 5.
Annually publish a report on the Seychelles tuna fishery and the socio-economic benefits it provides.	Availability of annual socio-economic benefits reports.	Annually. From Year 3.
3.1.2: Promote investment in the tuna industry.	General trend of increase in investment in the Seychelles tuna industry.	Mid-term. End of term.
Identify priority areas requiring investment and advertise opportunities locally and internationally.	Published list of priority areas requiring investments; advertisement of available opportunities.	Annually. From Year 3.
Identify support and incentives that can be provided to encourage investments.	List of agreed support and incentives that can be provided to encourage investments in the Seychelles tuna industry.	One off. Year 5.
Facilitate access to land for land-based investments.	Availability of agreed protocols or procedures for granting access to land for land-based investments in the tuna industry.	One off. Year 5.
3.1.3: Improve financing options and encourage Seychellois investments in tuna fishery and fish processing.	Availability of better options for financing tuna fishery and fish processing and increasing trend in local private investment in the sector.	Mid-term. End of term.

Research and establish a framework to incentivize domestic investment in tuna fishing and tuna processing industry.	Availability of framework.	One off. Year 3.
Investigate required changes and support that needs to be given to the local semi-industrial longline fleet to improve economic performance.	Report on required changes and support for improving economic performance of the semi-industrial longline	One off. Year 2.
Promote financing initiatives developed in the Blue Economy Roadmap including the Seed Capital Grant Scheme, Small business start-up loan, Fisheries Development Fund, Blue Bond financing, etc.	Availability of at least one communication material promoting financing initiatives developed in the Blue Economy Roadmap.	Annually. From Year 2.
Develop Zone 14 Fish Processing Zone.	Construction have started on at least 10% of the plots in the Zone 14 Fish Processing Zone.	Annually. From Year 1.
Provide long-term assurances to investors on access to quota.	Quota allocation scheme in place and under implementation.	One off. Year 3.
Promote the use of renewable energy in the fish processing and value addition sub-sectors as means of reducing costs of operations.	At least one communication material produced and disseminated promoting the use of renewable energy in the fish processing and value addition sub-sectors.	Annually. From Year 2.
Put in place measures to support the development of tuna cottage industry value addition.	List of measures in place supporting the development of tuna cottage industry.	Annually. From Year 3.
S3.1.4: Ensure optimal economic gains from fishing access arrangements.	Increasing or stable revenue generation from fishing access arrangements.	Mid-term. End of term.
Regularly review fees for licenses, permits, authorisations and services and adjust as required.	At least one report produced on the review of fees for licenses, permits, authorisations and services.	Annually. From Year 2.
S3.1.5: Derive maximum socio-economic benefits from the use of IOTC annual catch allocations.	Increasing value of Seychelles catch from stocks with IOTC annual catch allocations.	Mid-term. End of term.
Undertake a study to quantify the social and economic contribution of each fleet component to the Seychelles.	Availability of study report on the social and economic contribution of each fleet component to the Seychelles.	One off. Year 2.

Provide economic data to guide proposed actions under Strategy S2.3.1 on establishing a scheme for catch allocation and transfer.	List of economic data used in decision-making concerning the catch allocation and transfer scheme.	Year 1 and Year 2.
S3.1.6: Improve the quantity, quality and value of landed tuna from the semi-industrial longline fishery.	Increasing catch and value of tuna landed in the semi-industrial longline fishery.	Mid-term. End of term.
Provide trainings in fishing techniques and the use of oceanographic data for improved targeting of tuna.	At least one training organised with fishers on fishing techniques and the use of oceanographic data for improved targeting of tuna.	Annually. From Year 3.
Explore alternative fishing techniques such as deep line fishing to catch deeper level tuna where migration patterns are less affected by surface level anomalies.	At least two research trips organised by industry in collaboration with the SFA to test alternative fishing techniques.	Year 4 and Year 5.
Adopt, refine, and enforce international guidelines (e.g., FAO manual of good hygiene practise for fishing boats and fish landing sites for small scale fisheries) for fish handling, landing sites etc.	Adoption of manual of good hygiene practise for fishing boats and fish landing sites in the small-scale fisheries.	One off. Year 5.
Collaborate with the Fish Inspection and Quality Control Unit (FIQCU) of the Seychelles Bureau of Standards (SBS) to inspect catch and quality control catch at landing.	At least 50% of all landings of semi-industrial vessels are inspected.	Annually. From Year 3.
Create understanding of the importance of immediate cold storage of catch.	At least two communication materials or activities organised aimed at creating understanding of the importance of immediate cold storage of catch.	One off. Year 5.
Train crew in onboard personal hygiene and fish handling techniques and gutting.	At least one training session organised on personal hygiene and fish handling techniques.	One off. Year 5.
Providing training in fish grading.	One training organised on fish grading.	One off. Year 5.
S3.1.7: Improve, branding, labelling, marketing and sale of Seychelles tuna products	Adoption of a Seychelles tuna label and increasing sale of Seychelles tuna products.	Mid-term. End of term.

Further research into the development of a high-quality Seychelles tuna brand and label.	Report on the development of a Seychelles tuna brand and label.	One off. Year 4.
Research and apply for Sustainability and food safety system certification (FSSC) as part of the marketing strategy.	At least one example of the Sustainability and food safety system certification (FSSC) being utilised as part of the marketing strategy.	One off. Year 4.
Undertake research on demand and sale potential of national and international markets for different grades of tuna and tuna products.	Report on sale potential for different grades of tuna and tuna products.	Annually. From Year 2.
Increase marketing of Seychelles tuna products through identified channels.	Number of marketing products/activities produced or organised.	Annually. From Year 2.
Establish and fully utilise links with fish importers in major international markets for sale of Seychelles tuna and tuna products.	Proof of links being established and utilised with fish importers in major international markets for the sale of Seychelles tuna and tuna products.	Annually. From Year 1.
Establish networks with the local tourism sector for the promotion and sale of tuna and tuna products (e.g. hotels, restaurants, ship chandlers, yacht operators).	Network established and functional.	Annually. From Year 1.
Develop local fish auction house for wholesale of fish.	Fish auction house in operation.	One off. Year 4.
Research and if required implement with the support of the industry an electronic system for ordering fish that can be used by domestic and international markets.	Report on investigation of the use of an electronic system for ordering fish.	One off. Year 4.
Ensure delivery mechanisms are in place to supply consistent, quality products to established international and local markets.	Supply of tuna products matching market demand.	Annually. From Year 3.
Implement local communication campaign on tuna and tuna products and where they can be purchased.	Communication campaign implemented and report on campaign delivery produced.	Annually. From Year 2.
Promote the development of businesses that makes use of tuna which does not meet the standards for human consumption.	At least one communication material produced to promote businesses making use of tuna not meeting the standards for human consumption.	Annually. From Year 3.

S3.1.8: Ensure that Port Victoria retains its competitive advantage**.**	Stable or increasing number of port calls by industrial tuna fishing vessels.	Mid-term. End of term.
Build on existing strategy to attract industrial longline vessels to Port Victoria.	Proof of additional measures being implemented to attract industrial longline vessels to Port Victoria.	Annually. From Year 1.
Investigate the needs of the different fleets while in port and develop a strategy for meeting the identified needs.	Surveys undertaken and a report produced on the need of different fishing fleets while in port; strategy developed for meeting the identified needs.	One off. Year 3.
Compare and where required adjust port and service duties to align with or improve competitiveness with other ports in the region.	At least one analysis undertaken, and duties revised to improve port competitiveness.	Annually. From Year 3.

12.4 Social Development

Objectives/Strategies/Actions	Indicator(s)/Target(s)	Performance period
O4.1: Increase Seychellois stakeholders' representation in the harvesting and processing sub-sectors.	Percentage increase in employments created in the tuna harvesting and processing sub-sectors.	Mid-term. End of term.
S4.1.1: Improve training certification for careers across the tuna fishing industry.	Increasing number of Seychellois being trained for careers in the tuna fishing industry.	Mid-term. End of term.
Undertake biennial assessment of labour requirement in the domestic fisheries sector.	Two reports on labour requirement in the domestic fisheries sector produced.	Year 2 and Year 4.
Research and implement measures to make employment in the fishery sector more attractive for locals.	One report produced on making employment in the fishery sector more attractive for locals; at least two measures implemented based on report recommendations.	Annually. From Year 2.
Based on the labour assessment offer short courses, diplomas, or practical skills to Seychellois to fill employment gaps.	At least two capacity building programmes under implementation with the objective of filling the employment gaps in the fisheries sector.	Annually. From Year 3.
Set up a scholarship programme to build capacity in various field related to fisheries and to develop specialized skills.	Fisheries scholarship programme set up and functioning.	Annually. From Year 3.
Design and implement an apprenticeship program in collaboration with industry actors to get youths to join the tuna fishing industry.	Apprenticeship programme designed and under implementation.	Annually. From Year 3.
Train guides working in big game sport fishery.	At least on training session organised for guides working in the big game sport fishery.	Annually. From Year 3.
S4.1.2: Build interest and local capacity in value addition**.**	General perception of local interest in value addition among industry actors.	Mid-term. End of term.
Identify a range of fish processing activities and value-added products that can be implemented by local businesses.	Dissemination of report on the range of fish processing activities and value-added products that can be implemented by local businesses.	One off. Year 2.

Organise training in tuna products value addition and encourage development of tuna cottage industry.	At least two training sessions on tuna products value addition organised.	Year 3 and Year 4.
Develop a policy for the development and promotion of local fish processing and tuna cottage industry.	Policy developed on the development and promotion of local fish processing and tuna cottage industry.	One off. Year 3.
O4.2: Increase Ocean literacy and understanding of the tuna fishing sector among the population.	Public perception of level of understanding of the Seychelles population with regards to the ocean and tuna fishing.	Mid-term. End of term.
S4.2.1: Use communication tools and the media to raise awareness about tuna fishing.	Increasing usage of communication tools and the media to raise awareness about tuna fishing.	Mid-term. End of term.
Develop educational materials such as brochures, pamphlets, web pages, television and radio programmes that explain the tuna fishing industry, including its history, management, stakeholders, importance, value, economic contributions, impacts and sustainability issues.	At least five different types of educational materials produced and used in the campaign to raise awareness about tuna fishing.	Annually. From Year 2.
Collaborate with journalists and media outlets to produce articles, documentaries, and news segments that highlight different aspects of the tuna fishing industry, from fishing techniques to market trends to the importance of conservation.	At least five pieces of media material produced, published or broadcasted in collaboration with journalists and media outlets highlighting different aspects of the tuna fishing industry.	Annually. From Year 1.
Collaborate with actors working in conservation and in the tuna industry on awareness campaigns, initiatives, and events to promote responsible tuna fishing.	Participation in at least five awareness campaign and initiatives promoting responsible tuna fishing with actors working in the conservation field and or the tuna industry.	Annually. From Year 1.
S4.2.2: Integrate knowledge on tuna fishing in formal education and educational campaigns.	Greater reference to tuna fishing and marine conservation in formal education and educational campaigns.	Mid-term. End of term.
Educate consumers about sustainable seafood choices, including certified sustainable tuna products and responsible fishing practices.	At least three communication materials produced and utilised in campaign on sustainable seafood choices.	Annually. From Year 1.

Work with educational institutions to integrate topics related to tuna fishing, marine conservation, and sustainable seafood into school curricula at various levels.	At least two sets of materials prepared in conjunction with educational institutions related to tuna fishing, marine conservation, and sustainable seafood for integration in school curricula.	Annually. From Year 1.
S4.2.3: Encourage dialogues on the Seychelles tuna fishery and its costs and benefits.	Increasing number of dialogues on the costs and benefits of the Seychelles tuna fishery.	Mid-term. End of term.
Organize public events, workshops, and television shows where experts can speak about tuna fishing, sustainable practices, and conservation efforts.	At least five public events, and communication sessions organised with experts discussing issues about tuna fishing, sustainable practices, and conservation efforts.	Annually. From Year 1.
Utilize social media platforms to share informative content, infographics, and videos about tuna fishing, encourage discussions and engage with followers to answer questions and provide further insights.	At least four social media posts produced per year to stimulate discussion about tuna fishing.	Annually. From Year 1.
Work with tuna fishermen and industry stakeholders to facilitate dialogue, share knowledge, and promote the use of best practices across the fishing industry.	At least two sessions organised with tuna fishermen and industry stakeholders with the objective of facilitating dialogue, sharing knowledge and promoting the use of best practices across the fishing industry.	Annually. From Year 1.
O4.3: Improve safety in the tuna fishing industry.	Perception of increasing level of safety in the industry by industry actors.	Mid-term. End of term.
S4.3.1: Ensure that safety issues are openly discussed, and mitigation actions are implemented to address them.	Increase attention being given to safety concerns within the tuna industry.	Mid-term. End of term.
Foster a culture of safety within the industry by promoting open communication, reporting of safety concerns, and encouraging proactive safety measures among crew members and vessel operators.	Number of initiatives/activities implemented focussed on increasing safety within the Seychelles tuna fishery.	Annually. From Year 2.
Encourage collaboration and information sharing among industry stakeholders, including fishermen, vessel owners, industry associations, and government	At least two sessions organised with tuna industry stakeholders to identify and address safety risks and implement best practices (e.g. during safety week).	Annually. From Year 2.

agencies, to identify and address safety risks and implement best practices.		
Provide training for fishermen on safety protocols, emergency procedures, and proper equipment use.	At least 3 training sessions organised for fishermen on safety protocols, emergency procedures, and proper equipment use.	Year 3 and Year 5.
Ensure that fishing vessels take steps to satisfactorily identify, communicate and mitigate risks onboard.	All relevant tuna fishing vessels communicate the steps that they have taken to satisfactorily identify, communicate and mitigate risks onboard.	Annually. From Year 3.
Ensure that fishing vessels have clear standard operating procedures for dealing with accident at sea and in port.	All relevant tuna fishing vessels have clear standard operating procedures for dealing with accident at sea and in port.	Annually. From Year 3.
Ensure that safety inspections of fishing vessels are undertaken according to schedule.	Safety inspections are undertaken according to schedule for at least 80% of relevant fishing vessels.	Annually. From Year 3.
Ensure that fishing vessel meet safety standards according to their class and that they are equipped with necessary safety equipment.	All tuna fishing vessels meet safety standards according to their class and are equipped with necessary safety equipment.	Annually. From Year 3.
Encourage fishing vessel operators to invest in modern safety equipment and technology to improve crew safety.	At least two actions implemented to encourage vessel operators to invest in modern safety equipment and technology to improve crew safety.	Annually. From Year 2.
Work with the SMSA, SPA and other concerned stakeholders to strictly enforce adherence to safety regulations and standards.	Joint sessions/activities organised involving SFA, SPA, SMSA and other concerned stakeholders	Annually. From Year 2.
O4.4: Industry actors become stewards of the tuna resources and the marine environment on which the fishery depends.	General increasing perception of industry actors acting as stewards of the tuna resources and the marine environment.	Mid-term. End of term.
S4.3.1: Encourage operators to report suspected cases of violations of fishing conditions and IUU fishing.	Number of communications targeted at encouraging the reporting of cases of fishing conditions violations and IUU fishing.	Mid-term. End of term.

Implement educational campaigns to encourage fishers and other stakeholders to report suspected violations of fishing conditions or illegal vessels to the authorities.	At least one educational campaign focussed on encouraging fishers and other stakeholders to report suspected violations of fishing conditions or illegal vessels to the authorities implemented.	Year 2 and Year 3.
Give recognition to operators and fishers that regularly report suspected violations of fishing conditions or illegal vessels to the authorities.	At least two instances of recognition being given to operators and fishers reporting violations of fishing conditions or illegal vessels to the authorities.	Annually. From Year 4.
S4.3.2: Encourage industry actors to implement initiatives to improve quality of the marine environment, fish stocks, living conditions onboard fishing vessels and fishing industry-related jobs.	Increase in the number of initiatives implemented to improve quality of the marine environment, fish stocks, living conditions onboard fishing vessels and fishing industry-related jobs.	Mid-term. End of term.
Provide recognition to operators and businesses involved in sustainability and social initiatives.	At least two instances where recognition are provided to operators and businesses involved in sustainability and social initiatives.	Annually. From Year 4.
Provide support and incentives to operators and businesses supporting local value addition, Seychellois jobs and capacity building of Seychellois.	At least two instances where recognition are provided to operators and businesses supporting local value addition, Seychellois jobs and capacity building of Seychellois.	Annually. From Year 4.

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14. APPENDICES

Appendix A - General Principles of the Fisheries Act

The general principles of the Fisheries Act are detailed in Section 5 of the Act that is reproduced below.

All functions, duties and responsibilities under this Act shall be exercised in a manner consistent with the following principles:

(a) all fisheries and aquaculture resources of Seychelles, as well as the environment in which they exist, are a natural asset and heritage of all its people, and shall be managed, developed and used sustainably for the benefit of present and future generations and so as to achieve sound ecological balance and socio-economic benefits including economic growth, human resource development and employment creation, consistent with national policy, plans and development objectives;
(b) conservation and management measures shall be based on the best technical knowledge and international practices as well as scientific evidence available to maintain or restore stocks at levels capable of producing sustainable yield, as qualified by relevant environmental and economic factors including fishing patterns, the interdependence of stocks and relevant international standards, also taking into account traditional knowledge of the resources and their habitat;
(c) conservation and management measures shall implement Seychelles' obligations and commitments under applicable international agreements, and, as appropriate, be based on applicable standards agreed at all levels of governance;
(d) the precautionary approach shall be applied to the management and development of the fisheries at a standard that is equal or superior to the standard provided under any applicable international instrument or agreement;
(e) an ecosystem approach shall be applied to the management and development of fisheries and aquaculture in order to promote the health of the general marine environment, and shall take into account climate change and relevant international commitments and global developments;
(f) activities and measures taken within the scope of this Act shall protect and enhance biodiversity;
(g) complete and accurate data and information concerning all activities and resources under the scope of this Act shall be required, collected and, as appropriate, shared in a timely manner;
(h) conservation and management measures shall be implemented and enforced through effective monitoring, control and surveillance;
(i) all activities under the scope of this Act shall eliminate or minimise:
    (i) wastes, bycatch, discards, regulatory discards, economic discards and catch by lost or abandoned gear;
    (ii) catch of non-target species;
    (iii) catch of critically endangered species; and
    (iv) pollution;

(j) development and use of selective, environmentally safe, and cost-effective gear and techniques shall be promoted;
(k) over-fishing and excess capacity shall be prevented or eliminated and levels of fishing effort managed so they do not exceed those commensurate with sustainable use of fishery resources;
(l) the interests of fishers using small-scale Class 1 vessels shall be taken into account, including their participation in management of their respective fisheries;
(m) the welfare of current and future generations shall be safeguarded, including through the recognition of special needs relating to gender equity and vulnerable groups;
(n) an understanding of and broad and accountable participation by stakeholders in the conservation, management, development, and sustainable use of fisheries resources shall be promoted to the extent practicable, including the principles of visibility, transparency, participation, and inclusivity in the decision-making process as well as relevant environmental awareness and capacity-building; and
(o) effective cooperation shall be pursued with other States and regional and intergovernmental organizations in matters under the scope of this Act.

Appendix B - Seychelles Drifting Fish Aggregating Device Management Plan 2020 – 2023.

SEYCHELLES DRIFTING FISH AGGREGATING DEVICE

MANAGEMENT PLAN

2022-2023

Seychelles Fishing Authority

PO BOX 449, Victoria, Mahé Seychelles

AUGUST 2020

NOTE: Information provided in the Seychelles Drifting Fish Aggregating Device Management Plan serves as a one-year bridge plan (2022 – 2023). It may be updated and revised during the bridge year period, at any time, to better include stakeholder feedback and align with Seychelles' Marine Spatial Plan Initiative processes. Many points in the plan are still relevant and hence will be extended over the period 2022 – 2023.


SEYCHELLES FISHING
AUTHORITY


FINIS·CORONAT·OPUS

Glossary

ANABAC: Asociación Nacional de Armadores de Buques Atuneros Congeladores

APR: Atún de Pesca Responsable

CMM: Conservation and Management Measures

COA: Certificate of Authorisation

CPC: Contracting Parties and Cooperating Non-Contracting Parties

DFAD: Drifting Fish Aggregating Device

EM: Electronic Monitoring

IOTC: Indian Ocean Tuna Commission

MoFA: Seychelles Ministry of Fisheries and Agriculture

MP: Management Plan

MSC: Marine Stewardship Council

MSP: Marine Spatial Planning

OCUP: Observateur Commun Unique et Permanent

OPAGAC: Organización de Productores de Atún Congelado

ORTHONGEL: Organisation française des producteurs de thon congelé et surgelé

SFA: Seychelles Fishing Authority

SIOTI: South-West Indian Ocean Tuna Initiative

WPEB: IOTC Working Party on Ecosystems and Bycatch

Definitions

Abandoned DFAD. DFAD left at sea without a buoy or with a buoy not capable of transmitting the position signal because of malfunction or deliberate deactivation.

Instrumented buoy. Buoy marked with a unique reference number allowing identification of its owner and equipped with a satellite tracking system to monitor its position.

Acquired DFAD. A DFAD originally deployed by a vessel whose buoy has been exchanged for one belonging to the new (acquiring) vessel.

Active buoy. Instrumented buoy having been activated, i.e., capable of transmitting data (e.g., GPS position) through satellite communication. The start of data transmission requires a switch-on procedure.

Activation. Action of registering an instrumented buoy to start the satellite communication service. The activation is made onboard with the buoy manufacturer software or upon request by email or telephone to a 24/7 support service.

Buoy. A buoy is an electronic tracking device attached to the floating object (FOB) that includes a GPS unit to track the device's movements and determine its location as well as other electronic components such as temperature sensor, conductivity sensor, voltmeter, echo sounder unit and data recording unit.

Buoy in stock: Buoy purchased by a fishing company, stored onboard but not yet activated.

Buoy owner. Any legal or natural person, entity, or branch, who is paying for the communication service for the buoy and/or who is authorized to receive information from the satellite buoy, as well as to request activation/deactivation.

Deactivation. Action of de-registering an instrumented buoy to stop the satellite communication service and stop the buoy transmission. The deactivation is made onboard with the buoy manufacturer software or upon request by email or telephone to a 24/7 support service.

DFAD. Human-made device which is deployed at sea to passively drift in near-surface ocean currents for the purpose of aggregating target tuna species for consequent capture. A DFAD is typically composed of a floating structure (e.g., bamboo or metal raft with buoyancy provided by buoys, corks, etc.) and of a submerged structure (made of old netting, canvass, ropes, etc.).

Lost DFAD. DFAD that can no longer be tracked because the information from the buoy attached is no longer transmitted for different potential reasons, e.g., beaching, sinking, etc.

Operational buoy. Active instrumented buoy transmitting data through satellite communication while drifting at sea.

Purchased buoy. Buoy purchased by a fishing company from a buoy manufacturer.

Reactivation. Action of registering a deactivated buoy that was previously activated to start a new satellite communication service and enable the buoy transmission. The reactivation is made onboard

with the buoy manufacturer software or upon request by email or telephone to a 24/7 support service after the buoy has been brought back to port.

Shared buoy. Buoy whose data are provided to more than one purse seiner vessel.

Switch on/off. Action of applying a magnet on the buoy to start/stop data transmission after activation.

Transmitting buoy. Active instrumented buoy that is transmitting data through satellite communication while at sea, onboard a vessel or on land.

Table 1: CECOFAD classification of Floating OBjects (FOBs)

Code	Description	Example	Type of impact
DFAD	Drifting FAD	Bamboo or metal raft	Fishing effort, habitat modification, pollution
AFAD	Anchored FAD	Anchored floating platform	Fishing effort, habitat modification, pollution
FALOG	Artificial log resulting from fishing activities	Nets, wreck, ropes	Fishing effort, pollution
HALOG	Artificial log resulting from other human activities	Wooden board, oil tank	Fishing effort, pollution
ANLOG	Natural log of animal origin	Dead whale	Fishing effort
VNLOG	Natural log of plant origin	Branches, palm leaf	Fishing effort

Table 2. CECOFAD classification of activities with FOBs and buoys

Code	Name	Description
FOB	Encounter	Random encounter (without fishing) of a FOB belonging to another vessel or not equipped with a buoy
	Visit	Visit (without fishing) of a FOB (known position, owned by the vessel)
	Deployment	Deployment of a FAD at sea
	Consolidation	Deployment of a FAD on a FOB (e.g. to enhance floatability)
	Retrieval	Retrieval of the FOB
	Fishing	Fishing set on the FOB
BUOY	Deployment	Deployment (tagging) of a buoy on a FOB already drifting at sea without buoy or deployment of a FAD equipped with a buoy
	Transfer	Replacement of the buoy owned by another vessel by a buoy of the vessel
	Retrieval	Retrieval of the buoy on a FOB drifting at sea
	Loss	Loss of the buoy/end of transmission

Background

In 2012, the Indian Ocean Tuna Commission (IOTC) adopted the Resolution 12/08 which called upon all Contracting Parties and Cooperating Non-Contracting Parties (CPCs) having vessels fishing on Drifting Fish Aggregating Devices (DFADs) to develop management plans (MPs) for the use of DFADs by their purse seine fleets by the end of 2013. The overarching objective of the IOTC Resolution 12/08 and subsequent Resolution 13/08, was to improve the collection and reporting of data on DFAD-related activities as from January 2015.

Following the Resolution 13/08, the Seychelles implemented in 2015 a DFAD-MP that included four main components:

(1) Collecting data on buoy identifier, buoy ownership, DFAD design and components, and operations involving both the floating object and the buoy,

(2) Reporting the data to the IOTC,

(3) Managing purse seine effort through a limit of the number of floating objects tracked by a purse seiner at any time, and

(4) Implementing technical measures for the design and components of the materials to limit the incidental catch of marine species through entanglement and reduce the amount of synthetic marine debris. In addition, the plan recommended to limit bycatch and discards, with particular attention to sensitive species such as sharks and marine turtles. attention to sensitive species such as sharks and marine turtles.

The IOTC Resolutions 15/08, 17/08, 18/08 and 19 /02 strengthened the Resolution 13/08 by increasing the data collection and reporting requirements and sequentially reducing the number of instrumented buoys available to each purse seiner at any time. Furthermore, the rebuilding plan for the Indian Ocean stock of yellowfin tuna (Resolution 16/01 superseded by 17 /01, 18/01 and 19/01) called for a progressive reduction in the number of auxiliary (support) vessels supporting the purse seiners' activities through the maintenance of the DFAD network. In 2019, the IOTC Compliance Committee reviewed the DFAD-MPs available from eight CPCs and showed that the Seychelles plan was not fully compliant with the IOTC guideline, and it covered only 75% of the requirements (IOTC2019a).

Since 2015, the use of DFADs in the Indian Ocean purse seine fishery has been greatly modified in relation with technological innovations, market demand and management measures such as the catch limit on the yellowfin tuna stock. During 2015-2019, the Seychelles purse seine fishery has substantially increased the part of the catch taken on tuna schools associated with DFADs, i.e., from 75% in 2015 to about 95% in 2019. During 2017-2019, the fleet, comprising of 13 purse seiners caught on average more than 110,000 metric tonnes of tropical tuna each year, of which more than 90% was taken on DFADs.

In this context, the report presents a one-year bridge plan for the DFAD-MP that follows the guidelines of the IOTC (Annex I of Resolution 19/02) and builds on the different certifications already obtained by some fishing companies (i.e. MSC, APR, and Friends of the Sea), the ongoing Fisheries Improvement Projects involving Seychelles purse seiners (SIOTI, OPAGAC), and some company led initiatives dealing with FAD data collection (e.g. Code of Good Practices, French industry funded observer program OCUP, Seychelles National Observer Program, Electronic

1

Monitoring, and ECHEBASTAR FAD Management Plan) and adverse impact mitigation (e.g., FAD WATCH).

It is anticipated that the 2022-2023 DFAD-MP will incorporate a third-party model where vessel owners will be responsible for engaging authorized service providers to administer DFAD activities. As a condition of the issuance of a fishing license, this model would require third-party service providers to establish government approved DFADs, receive and review DFAD data, submit required reports and infractions of fishing activity to SFA, and store data to be accessed by governmental auditors or enforcement personnel. The responsibility for auditing and enforcement, whether civil or criminal, would remain the domain of SFA. In this model, the SFA would also qualify third-party service providers and set the performance standards that must be met by industry.

This third-party model will increase program efficiency and accountability, while reducing overall costs. It will also shift much of the burden of DFAD program execution and capacity constraints from SFA to industry, allowing SFA to access propriety information in real-time and further cultivating industry collaboration. As of March 2020, the third-party model is currently being piloted with electronic monitoring systems within three (3) longline and (2) purse seine vessels operating in Seychelles EEZ. Lessons learned from the pilot model will be used to inform implementation of a third-party model for DFADs within Seychelles.

A third-party model for the DFAD-MP is expected to be developed throughout the 2021 calendar year. In the interim, SFA may continue to administer functions and activities within the DFAD program. The following 2022-2023 FAD-MP therefore notes functions and activities which may be overseen by SFA or a qualified third-party service provider, depending on timing of the FAD-MP and other considerations. Please see Appendix I for more information on this potential model.

1- Objectives

The overarching objective of the 2022-2023 Seychelles DFAD-MP is to provide a fair and transparent framework that determines the roles and responsibilities of each stakeholder involved in the Seychelles purse seine fishery operating within the IOTC area of competence in a first step as well as the foreign purse seine fleet licensed to operate within the Seychelles' waters in a second step. The 2022-2023 DFAD-MP aims to propose a set of operationalizable actions, recommendations and regulatory measures that address the data collection and reporting requirements related to DFADs and their use by purse seiners and support vessels, with the aim of reducing their impact on marine and coastal ecosystems without affecting the economic viability of industrial fishing in and around Seychelles' Exclusive Economic Zone.

The Seychelles DFAD-MP aims to comply with national fisheries policies and regulations (Seychelles Fisheries Act (2014), Seychelles Fisheries Comprehensive Plan (2019)) and international Conventions and Agreements signed by the Seychelles, including but not limited to the IOTC Conservation and Management Measures (IOTC2019b), the FAO Code of Conduct for Responsible Fisheries (FAO 1995), and the Annex V of the International Convention for the Prevention of Pollution from Ships (MARPOL 1983).

The Seychelles Fishing Authority (SFA) is the agency responsible for the implementation and follow-up of the DFAD-MP on behalf of the Ministry of Fisheries and Agriculture (MoFA) (Section Institutional arrangements).

2- Scope

The core of the Seychelles 2022-2023 DFAD-MP covers the large-scale purse seiners and support vessels flying the Seychelles flag. Vessels flagged from other states are expected to adopt and employ equivalent conservation measures. The 2022-2023 DFAD-MP component related to DFAD construction, design, and components includes some measures defined within the Seychelles Fisheries Comprehensive Plan. This current 2022-2023 DFAD-MP does not include a spatial component related to the specific conditions applying within the Medium Biodiversity Protection and Sustainable Uses areas delineated through the Seychelles Marine Spatial Plan, which will enter into force in 2021. However, we aim to incorporate buy-in to address Seychelles Marine Spatial Plan processes, including concerns about all foreign purse seiners and support vessels authorized to operate within the Seychelles' waters in future plans.

2.1- DFADs & buoys numbers

In 2022, the number of DFADs that can be deployed by each Seychelles purse seiner and associated support vessel must comply with the maximum limits of 500 instrumented buoys acquired annually for each purse seiner and a maximum of 300 operational buoys by any purse seiner at any one time in conformity with the IOTC Resolution 19/02.

The monitoring of the number of DFADs tracked by each Seychelles purse seiner at any time is based on the information (e.g., GPS position) transmitted through satellite communication by the instrumented buoys attached to the DFADs. SFA or a qualified third-party service provider will track each Seychelles purse seiner and provide data reports (including but not limited to infractions) on all legally deployed

DFADs and vessel positions via VMS. Whereby a third-party service provider, designated by the SFA is used, SFA shall maintain audit rights over the data. SFA's specified requirements include:

- Vessels are strictly prohibited from deploying a DFAD at sea without any instrumented buoys with satellite tracking ability or to use alternative positioning systems (e.g., radio), in accordance with IOTC resolution 19/02.

- Each buoy deployed at sea must be in active transmission mode and included in the individual quota of each Seychelles purse seiner. Operational buoys cannot be remotely activated or re-activated at sea after deactivation (See Definitions), i.e., they must be brought back to port where they can be recovered for reuse.

- The marking of the electronic buoy consists of two components: (1) a unique and permanent identifier linked to the satellite transmission communication and (2) the full name or approved acronym of the purse seiner to which the buoy is permanently assigned in compliance with IOTC Resolution 19/02. The unique identifier includes the buoy model followed by a number of digits that varies with the third-party service provider [i.e., Thalos model + 4 digits (Iridium satellite transceiver); Satlink model + 4-6 digits (Insmarsat satellite transceiver); Marine Instruments Model + 5-6 digits (Iridium satellite transceiver)].

- To ensure full control and compliance of the status (active, de-activated, lost, stolen, etc.) and total number of DFADs tracked by the Seychelles purse seine fishery and address the IOTC reporting requirements (Appendix III), each company operating Seychelles purse seiners must provide the SFA or the designated third-party service provider with specified data requirement. If a third-party service provider is used, the provider will relay data to SFA in consolidated and coordinated reports. This data includes:

    1. Invoices and receipts of the buoy orders made during the current year from the different buoy manufacturing companies, including the number of buoys assigned to each purse seiner;

    2. Monthly reports of numbers of buoys with activations/deactivations for each purse seiner, including first day of the month, last day of the month, minimum, mean, and maximum daily numbers of operational buoys in the month;

    3. The data set of GPS buoy positions within a maximum delay of three (3) months, including the unique buoy identifier, timestamp (yyyy-mm-dd H:M:S UTC), longitude, latitude, and IOTC vessel registration number as per the requirement under clause 21 of Resolution 19/02.

2.2- DFAD deployments and monitoring

Information on the extent and location of the DFADs deployed by the Seychelles purse seiners and associated support vessels must be collected and reported to the IOTC Secretariat as per the requirement of IOTC Resolutions 19/01 and 19/02. Whereby a designated third-party service provider is used; it shall

provide the specified data to the SFA and the latter shall transmit the mandatory data or reports to the IOTC. To address the IOTC reporting requirements (Appendix II), industry will work with SFA and/or a third-party service provider to collect the following data from DFADs within the Seychelles purse seine fishery:

1. Logbooks for all purse seiners and support vessels that include the buoy identifier, the DFAD type (See Definitions), the date, UTC time and geographical coordinates of their deployment in addition to other activity types in compliance with the Annex III of Resolution 19/02 (Section DFAD logbooks & Appendix I);

2. The data set of GPS buoy positions to derive the position of deployment from the starting point of each DFAD trajectory at sea (Section DFADs buoys numbers);

3. Observations at sea collected from onboard observers and review of videos and images collected with Electronic Monitoring (EM) programs conducted within the Seychelles purse seine fishery.

2.3- DFAD design and construction

All DFADs deployed by Seychelles purse seiners and support vessels in the IOTC area must be designed and built following the guidelines and best practices on non-entangling DFADs defined by the International Seafood Sustainable Foundation (ISSF)[1] to reduce the entanglement of marine species as much as possible in agreement with IOTC Resolution 19/02:

- The surface structure of the raft must not be covered with netting or non-meshed materials (e.g., canvas, tarpaulin, or shade clothes) to reduce entanglement of marine turtles;
- The subsurface structure must be made with non-meshed materials, i.e., ropes, canvas, nylon sheets, or other non-entangling material, to reduce the entanglement of sharks and marine turtles

As per the IOTC Resolution 19/02, information on DFAD design characteristics, i.e. dimension and material of the floating part and of the subsurface structure of the raft, must be recorded by the vessel operator at deployment and entered in the DFAD logbook for all Seychelles purse seiners and support vessels following the logbook template designed by the SFA (Section DFAD logbook & Appendix I). Furthermore, information on DFAD design and materials must be collected by the observers onboard Seychelles purse seiners and support vessels as well as by the dry observers analysing data collected with Electronic Monitoring (EM) onboard Seychelles vessels following the protocols used in the Seychelles national scientific observer program that relies on the ANABAC/OPAGAC Code of Good Practices and the ORTHONGELOCUP program.

Following IOTC Resolution 19/02 and the Seychelles Fisheries Comprehensive plan (2019), the use of natural or biodegradable materials in DFAD construction should be promoted to reduce as much as possible the amount of synthetic marine debris. Petroleum-derived products such as plastic, PVC, and nylon nets, as well as metallic components employed in both the submerged and sub-surface structure of DFADs should be progressively replaced by biodegradable materials, i.e. naturally occurring materials (e.g.,

[1] https://iss-foundation.org/knowledge-tools/guides-best-practices/non-entangling-fads/

bamboo, cotton, or vegetal fibres), or in their absence, bio-based and biodegradable compounds complying with international standards such as CEN/TS 16137[1] or ASTM D6868[3], with the exception of materials used for the instrumented buoys, as per Clause 18 of IOTC Resolution 19/02. Recommendations from the experiments conducted throughout the BIOFAD project should be followed and trials pursued with the aim of progressively increasing the proportion of natural and biodegradable materials used in the DFADs deployed by the Seychelles fleet. A full review of the progress accomplished in this domain will be made at the end of the bridge plan to define future directions and take measures related to the use of natural or biodegradable materials in DFAD construction in consultation with all stakeholders.

In order to monitor and control the DFAD design and components as per the Seychelles fisheries comprehensive plan (2019), as of 1st January 2022, all DFADs deployed within the Seychelles waters by Seychelles-flagged purse seiners and associated support vessels must be assembled on land in the Seychelles in dedicated DFAD manufacturing workshops where inspections will take place.

2.4- Incidental bycatch reduction & utilization policy

All Seychelles vessels operating within the IOTC area must strictly comply with the IOTC Resolutions on the conservation of marine turtles (12/04), cetaceans (13/04), whale sharks (13/05), sharks (12/09, 13/06 and 17/05), and on the full retention for both targeted tuna species and finfish bycatch species (19/05). Information relative to the capture, retention and discarding practices (i.e., species composition, magnitude, and status) must be collected through logbooks, landing reports and the Seychelles national scientific observer program and reported to the SFA at the scale of the fishing operation following the SFA logbook (Section DFAD logbook) and observer data collection forms. Data will be reported to the IOTC Secretariat in conformity with the IOTC reporting requirements, i.e. forms and formats of the Regional Observer Scheme and IOTC forms 1DI and 1DR.

Furthermore, the fishing companies operating Seychelles purse seiners must follow the best practices for materials and construction for non-entangling DFADs (section 2.3) and best practices for the handling and release of sensitive marine species (i.e., sharks, rays, and marine turtles) taken as bycatch following the ISSF guidelines[4] in order to maximise their chances of survival through release. This includes sorting practices and equipment that allow for quick, safe, and effective live release during sorting, and providing regular training for skippers and crew in bycatch handling.

It is strongly recommended that the fishing companies technically and/or financially contribute and support programs devoted to the study of handling practices and post-release mortality, e.g., based on tagging operations.

2.5- Statement or policy on 'DFAD ownership'

In line with the voluntary guidelines for the marking of fishing gear developed by the FAO to improve the state of the marine environment by combating, minimising and eliminating abandoned, lost or otherwise

[2] https://www.european-bioplastics.org/bioplastics/standards/
3 https://www.astm.org/Standards/D6868.htm
4 https://iss-foundation.org/downloads/16456/

discarded fishing gears (ALDFG) and taking into account the fact that all DFADs deployed must be equipped with instrumented buoys and the frequent exchange of buoys attached to the DFADs, the marking ownership of each DFAD deployed by Seychelles-flagged vessels must be made through the attached buoy based on (i) the unique buoy identifier of the satellite transmission communication and (ii) the full name or approved acronym of the purse seiner to which the instrumented buoy is permanently assigned in compliance with IOTC Resolution 19/02 (Section 2.1 DFADs & buoys numbers). It is strictly prohibited to modify the buoy marking.

2.6- Consideration of interaction with other gear types, including small scale fisheries

DFADs and associated buoys are not equipped with radar reflectors but are generally visible within a distance of 1-2 nautical miles, although some rafts are designed to be positioned below the water surface to be stealthy and to be more difficult to detect. Buoys are equipped with flashing lights which are remotely activated to detect the DFADs at sea but not used to indicate their presence and avoid an interaction with a vessel.

Interactions between the purse seine fishery and longline fisheries are considered to be limited as DFADs are small floating devices of surface area around 2.5-4 m^2 as compared to the length of a longline (10-150 km). Interactions with the small-scale longline fishery is spatially restricted as the main fishing grounds of the Seychelles small-scale longline fleet are situated on and around the Mahe Plateau where purse seiners do not operate, but where DFADs do drift. Some interactions with small-scale longliners and small-scale artisanal vessels have however been reported and may result in some high risk for the crew when the propeller of the outboard motor is entangled with the net and other components of the DFAD subsurface structure.

Cases of interaction between a DFAD and any fishing gear or whereby a DFAD could constitute a hazard to navigation within the Seychelles waters must be reported to the SFA and/or a designated third-party service provider with information on the date, position, and ownership of the buoy attached to the DFAD (if any) to assess the extent and nature of the issue and propose solutions through a consultative meeting with the company concerned when the DFAD ownership can be determined. Noting special considerations to avoid sensitive areas relative to MSP zoning, including the Seychelles Plateau and small gears that exploit these areas.

2.7- Plans for monitoring and retrieval of lost DFADs

Each fishing company operating Seychelles purse seiners must provide the SFA and/or a third- party service provider with the data set of GPS buoy positions (Section DFADs & buoys numbers) so as to monitor the movements of the tracked DFADs and determine beaching events (i.e., stranding in coastal environments), potentially damaging sensitive habitats such as coral reefs, and contributing to coastal marine debris and ghost fishing. Based on a methodology developed in consultation with the companies to determine when beaching occurs, the SFA will estimate the extent and location of beached DFADs in the Seychelles to contribute to the preparation of the DFAD tracking and recovery policy of the IOTC. The GPS buoys equipping DFADs considered to be beached by the companies must be kept in transmission for one

month after stranding to ensure the location of the DFADs and facilitate their retrieval when possible, or until SFA deems them irretrievable.

All purse seine fishing companies with DFADs occurring within the Seychelles waters must contribute and participate to national projects of marine debris monitoring and cleanup activities, including initiatives to anticipate and predict stranding events, develop collaborations with national institutes and local NGOs to facilitate the removal of stranded DFADs and encourage recycling practices, particularly of non-functional instrumented buoys. FAD WATCH is an example of collaborative project with the industry which covers five islands of the Seychelles and involves the 42 purse seiners of the S IOTI Fisheries Improvement Project.

3 - Institutional arrangements for managing the DFAD-MP

The SFA is the agency responsible for the implementation and follow-up of the DFAD-MP on behalf of the MoFA and in close collaboration with the fishing companies operating purse seiners and support vessels flying the Seychelles flag or flying a foreign flag and operating within the Seychelles EEZ through access agreements. SFA is responsible for the monitoring and reviewing the DFAD-MP on an annual basis so as to make the appropriate changes to the MP when needed in consultation with the industry and in line with the evolution of the IOTC Conservation and Management Measures (CMMs).

An annual report including information on the protocols, training, main results, and challenges (including but not limited to monitoring, compliance, infractions) of the programs implemented by the companies to address the objectives of the DFAD-MP must be provided to the SFA a maximum of three months after the year of operation. Data confidentiality rules and arrangements relative to the data collected through the monitoring actions of DFAD-related activities must be defined as part of a general Memorandum of Understanding to develop between the SFA, the fishing companies or their associations, and/or a designated third-party service provider.

Penalties and fines following infractions and non-compliance with the DFAD-MP will be defined and included in national legislations and as licensing conditions or as conditions of the Certificate of Authorisation (COA).

3.1 - Application processes for DFAD and/ or DFAD deployment

Vessel owners and operators shall notify the Seychelles Fishing Authority of the number of DFAD including instrumented buoys they planned to deploy prior to leaving for any fishing operation. All actual deployment shall be recorded in the purse seiner and support vessel logbook as per appendix II.

3.2 Satellite Transceivers (requirement for serial number)

Any DFAD deployed at sea shall be equipped with an Instrumented buoy and shall be identified by the associated buoy serial number. The master of the vessel shall maintain a specific record on the buoys (serial number, brand, and type in the appropriate logbook (appendix II), at the time of deployment of the corresponding DFADs. Additionally, the same information, as well as type of operation undertaken on DFAD shall be recorded for any DFAD visited.

4 - Applicable areas

In a first step, the Seychelles DFAD-MP concerns the IOTC area of competence for the Seychelles flag purse seine and support vessels. In a second step and following discussions to occur with the stakeholders, the DFAD-MP aims to include all the foreign-flagged purse seine and support vessels operating within the Seychelles Exclusive Economic Zone through the Access Agreement (EU/Seychelles Sustainable Fisheries Partnership Agreement, Mauritius/Seychelles Fisheries Agreement and private fishing agreements.

5 - Applicable period for the DFAD-MP

The current DFAD-MP is valid for a duration of one year and covers the period 2022-2023.

6 - Monitoring & reviewing implementation of the DFAD-MP

The implementation of the 2022-2023 DFAD-MP will be monitored and reviewed at regular intervals by the SFA based on the feedback of the different stakeholders and changes in the Seychelles fisheries regulations and IOTC Conservation and Management Measures. It may be updated and revised during the bridge year period, at any time, to better include stakeholder feedback and align with Seychelles' Marine Spatial Plan Initiative processes. DFAD-related data sets are managed by SFA and/or the designated third-party service provider. If a third-party service provider is selected, they will provide SFA with access to reports, data, and associated secured databases that ensure the storage and easy extraction of data. The monitoring will be conducted in close collaboration with the purse seine fishing companies and their associations to ensure the guidelines and actions of the DFAD-MP are clear and agreed by all stakeholders and modified in a transparent way (Section Institutional arrangements for managing the DFAD-MP). The DFAD-MP will be reviewed on a yearly basis to account for the evolution of the IOTC Conservation and Management Measures (CMMs) related to DFADs. A progress report on the implementation of the DFAD-MP will be submitted to the IOTC Secretariat on a yearly basis.

7 - DFAD logbook

The SFA designed a logbook for purse seiners and support vessels that includes the DFAD and buoy-related activities within the traditional skipper logbook that mainly focuses on fishing operations and associated catch (Appendix III).

Appendix I. Third-Party Service Provider Roles and Responsibilities Overview

Key Roles – Purse Seine Fishery (Licensed Flagged and non-Flagged, including vessels operating under chartering arrangements)				
Function/Task	**RESPONSIBILITY**			
	Fisheries Agency (where applicable)	**Industry/Fishers**	**Third-Party Service Provider**	***Costs***
Project inception: scoping, installation, and launch	Prequalify vendors	Contract vendors as needed for equipment procurement, shipping, installation, and servicing/maintenance. Contract with vendors for video review	Perform services as procured by industry/fishers	*Industry*
Data collection	Sets minimum FAD requirements for data collection	Ensures hardware, software, storage, maintenance, security, etc. meets FAD performance standard and data management plan	Work with industry to develop required FAD systems and procedures to meet minimum data requirements	*Industry*
Transmission of data	Sets protocols to ensure non-tampering, confidentiality, and privacy	Transmits data to FAD data review centres in accordance with data management plan and other protocols	Receives and stores data in accordance with protocols; submits analysed data to national authority; provides raw data to national authority under pre-specified protocols; provides data and reports to national authority and industry as specified in data management plan	*Industry*
FAD inspection and maintenance	Reserves right to inspect systems in accordance with applicable regulations	Ensures regular functionality of FAD systems	Performs maintenance as required (in collaboration with industry)	*Industry*
Data storage	Sets FAD data retention specifications	N/A	Stores raw FAD data in accordance with minimum retention requirements	*Industry*

SEYCHELLES FISHING AUTHORITY
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Annexe II: Logbook for Seychelles Flagged Tuna Purse Seiners

Version 04.2016

SALIDA / DEPARTURE			LLEGADA / ARRIVAL		PATRON / PATRON / MASTER		BARCO / VESSEL	HOJA SHEET
PUERTO / PORT			PUERTO / PORT				NOMBRE/NAME:	
DATE / FECHA			FECHA / DATE				INDICATIVO/CALL SIGN	
HORA / HOUR			HORA / HOUR		VIAJE / TRIP		BANDERAF/FLAG	
CORREDERA / LOCH			CORREDERA / LOCH					

		POSICION		LANCE			CAPTURAS ESTIMADAS (toneladas)/ Estimated catch (Tonnes)														ASOCIACION						ACTIVIDAD SOBRE LOS DCP						CORRIENTE		VIENTO		OBSERVACIONES
							YELLOWFIN		SKIPJACK		BIGEYE		ALBACORE		OTHERS			DISCARDS																			
FECHA/ DATE	HORA /TIME	LATITUDE.	LONGITUDE.	POSITIVO / SUCCESSFUL	NULO / NIL	Cuba/NO Cuve/Well	CAT.	TONS	CAT.	TONS	CAT.	TONS	CAT.	TONS	ESPECE/ SPECIES.	CAT.	TONS	ESPECE/ SPECIES.	CAT.	TONS	OBJETO / RAFT	LIBRE / FREE	AVES / BIRDS	BALLENA / WHALE	TIBURON BELENA/WHALE SHARK	BARCO de APOYO/ Supply	TIPO DE VISITA/ VISIT TYPE	TIPO DCP/ FAD TYPE	MARCAS DEL DCP	TIPO BALIZA/ BUOY TYPE	ID BALIZA/ BUOY ID	TEMPERATURA (°C)	DIRECCION (grados)	VELOCIDAD (m/s)	DIRECCION (grados)	VELOCIDAD (nudos)	

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Annexe II: Logbook for Seychelles Flagged Support Vessels

Version 04.2016

SALIDA / DEPARTURE			LLEGADA / ARRIVAL		PATRON / PATRON / MASTER		BARCO / VESSEL	HOJA SHEET
PUERTO / PORT			PUERTO / PORT					
DATE / FECHA			FECHA / DATE					
HORA / HOUR			HORA / HOUR		VIAJE / TRIP			
CORREDERA / LOCH			CORREDERA / LOCH					

		POSICION				ACTIVIDAD SOBRE LOS DCP (See worksheet Referentials)												TONELAJE TOTAL ESTIMADO						CORRIENTE			VIENTO		COMENTARIOS
							BALIZA AL LLEGAR						BALIZA AL PARTIR																
FECHA DATE	HORA TIME	LAT.		LONG.		TIPO DE VISITA/ VISIT TYPE (S	TIPO DCP / FAD TYPE	MARCAS DEL DCP	ID BALIZA/ BUOY ID	TIPO BALIZA/ BUOY TYPE	PROPIA/ AJENA		TIPO DCP / FAD TYPE	MARCAS DEL DCP	ID BALIZA/ BUOY ID	TIPO BALIZA/ BUOY TYPE	PROPIA/ AJENA	YELLOWFIN (MT)	SKIPJACK (MT)	BIGEYE (MT)	ALBACORE (MT)	OTHERS ((GIVE NAMES)	MT	TEMPERATURA (ºC)	DIRECCION (grados)	VELOCIDAD (m/s)	DIRECCION (grados)	VELOCIDAD (nudos)	

Appendix III. Mandatory reporting requirements of the Indian Ocean Tuna Commission pertaining to the use of DFADs and buoys

- Form 3FA: Yearly interactions with Fish Aggregating Devices (FAD) set by purse seiners and supply vessels by moth, grid, and fleet
  https://www.iotc.org/sites/default/files/documents/data/Form_3FA.zip

- Form 3FD: Number of FADs deployed in 2018 and 2019 by purse seine vessels and associated supply vessels per 1°x1° grid
  https://www.iotc.org/sites/default/files/documents/data/Form_3FD.zip

- Form3BU: Detailed monthly report of active buoys by vessel
  https://www.iotc.org/sites/default/files/documents/data/Form_3BU.zip