

Maldives Reef Fishery Management Plan

DECEMBER 2020

UNOFFICIAL TRANSLATION

Government Gazette Reference: Volume 49, Issue 274, 24 December 2020



Ministry of Fisheries, Marine Resources & Agriculture

Malé, Maldives





Maldives Reef Fishery Management Plan

December 2020

Copyright © 2020 Ministry of Fisheries, Marine Resources and Agriculture

The Ministry encourages the use, reproduction and dissemination of material in this management plan. Except where otherwise indicated, material may be copied, downloaded and printed for private study, research and teaching purposes, or for use in non-commercial products or services, provided that appropriate acknowledgement of the Ministry as the source and copyright holder is given.

Contributing Authors:

Hawwa Raufath Nizar, Munshidha Ibrahim, Aminath Lubna

Other contributors:

Mohamed Ahusan, Hussain Sinan, Ahmed Shifaz, Adam Ziyad, Mohamed Shimal, Aishath Sarah Hashim, Hussein Zameel, Adam Manik.

Reviewed by:

Dr. Charles Anderson and The Environmental Markets Solution Lab (emLab), UCSB

Acknowledgement:

The Ministry acknowledges the various government agencies and stakeholders that

contributed towards making this management plan holistic and inclusive. The Ministry also thanks the island councils for playing a crucial role in ensuring that the concerns of fishers and sector stakeholders are directly heard at the highest level of fisheries governance and policy making.

The Ministry highly appreciates the time, meticulous contributions and the wealth of knowledge shared by fishers, without whom this plan would not have been possible. Their meaningful insights and constructive suggestions have been invaluable.

The Ministry recognises Maldives Marine Research Institute's efforts to produce research on our reef fishery resources and support evidencebased policy making.

Sincere thanks to the World Bank funded Sustainable Fisheries Resources Development Project (SFRDP) for providing the Ministry with the essential resources and financial support for the formulation of this plan.

For bibliographic purposes, this management plan shall be cited as:

Ministry of Fisheries, Marine Resources and Agriculture (2020), Maldives Reef Fishery Management Plan. MoFMRA, Malé, Maldives

Ministry of Fisheries, Marine Resources and Agriculture 7th Floor, Velaanaage Ameer Ahmed Magu Malé, 20096 Republic of Maldives,

Table of Contents



5	List of Contents	20	Chapter 5: Objectives and
6	Foreword		Strategies
7	Abbreviations	26	Part 6: Management
8	Chapter 1: Preamble		Measures Under This Plan
8	1.1 Introduction and Title	26	6.1 Establishment of an advisory
8	1.2 Overall Purpose		committee
9	1.3 Scope and Application	28	6.2 Licensing
9	1.4 Guiding Principles	29	6.3 Data collection and Management
10	1.5 Interpretation	29	6.4 Gear Regulation
10	1.6 Entry into Force	30	6.5 Catch Certification
		30	6.6 Precautionary Measures
11	Chapter 2: Commonly Caught		
	Reef Fish Species, Their Habitat	31	Chapter 7: Implementation of
	and Ecology		this Plan
11	2.1 Introduction	31	Chapter 8: Reviewing the
11	2.2 Snappers (Lutjanidae)		Management Plan
12	2.3 Sweetlips (Haemulidae)		
12	2.4 Jack (Carangidae)	32	References
12	2.5 Barracuda (Sphyraenidae)		
		34	Annex
13	Chapter 3: Overview of the	34	Annex 1: Glossary
	General Reef Fishery	36	Annex 2:List of reef fish within the scope
13	3.1 General Reef Fishery		of this Plan
14	3.2 Fishing Gears		
14	3.3 Trade & Export		
17	Chapter 4: Previously Undertaken Eff	orts	
-	to Manage Reef Fishery Resources		
17	4.1 Important research conducted on the fi	shery and res	sources
17	4.2 Fishery Data Collection		
18	4.3 Licensing of reef fishery fleet		
18	4.4 Harvesting and export restrictions		



Foreword



Praise be to Allah, the Creator of the oceans, marine life and other blessings upon the earth. Prayers and peace be upon our Prophet, Muhammad, who taught us the righteous way to make use of these blessings.

The oceans, lagoons and reefs are national heritages that are inextricably linked to our culture, tradition, and the Maldivian identity. The Maldives fisheries are heavily dependent on this heritage. Hence it is our utmost responsibility to ensure that they are faithfully passed down to our future generations. The Ministry is committed to working towards achieving this goal, and to implement the government's policies on the expansion of the blue economy agenda. To this end, we have compiled this plan to steer our efforts towards maximising long-term benefits of marine resources to Maldivians.

Since the time of our forefathers, the fishery sector has been a major pillar of our economy, upon which our incomes, our livelihoods and our sustenance are dependent. Therefore, the measures included in these fisheries management plans are geared towards the sustainable development and management of these fisheries resources. These legally recognised fisheries management plans mark a watershed moment in the history of marine resource management in the Maldives.

Fisheries resources are common goods, of which all Maldivians hold a share. These plans have been developed based on principles of the Precautionary Approach, Ecosystem-Based Management, Sustainable Development and Equity, with due regard to the various and variety of interactions within an ecosystem and to ensuring timely and cost-effective measures are taken to safeguard ecosystems and prevent irreparable damage to them. This process has been informed by meaningful suggestions and constructive feedback from various stakeholders including fishers, others engaged directly and indirectly within the fisheries sector as well as civil society organisations working towards natural resource management, conservation, and protection.

The fisheries management plans will be the primary basis for guiding the authorities as well as stakeholders in the sustainable management of the fisheries sector in the Maldives. These plans comprise of developmental goals and objectives for each fishery, measures and actions to achieve them, the roles and responsibilities of stakeholder agencies in the implementation of these measures and an implementation timeline for the measures. It is my sincere hope that these plans contribute towards realising the vision set forth by the Fisheries Act of the Maldives.

Zaha Waheed

Minister of Fisheries, Marine Resources and Agriculture



Abbreviations



FIS	Fisheries Information System
IGO	Intergovernmental Organisation
LGA	Local Government Authority
ME	Ministry of Environment
MFDA	Maldives Food and Drug Authority
MIRA	Maldives Inland Revenue Authority
MMRI	Maldives Marine Research Institute
MNDF	Maldives National Defence Force
MoE	Ministry of Education
MoED	Ministry of Economic Development
MoT	Ministry of Tourism
MPS	Maldives Police Services
NBS	National Bureau of Statistics
RFB	Regional Fishery Body
SDFC	SME Development Finance Corporation
SWIOFC	Southwest Indian Ocean Fisheries Commission
UCSB	University of California, Santa Barbara



Preamble

1.1 Introduction and Title

This Plan is made pursuant to Article 18 of the Act No. 14/2019 (Fisheries Act of the Maldives) and provides for the management of the fishery stated in Section 17 (a) (6) of the Act. The plan will be the primary basis for guiding the authorities as well as stakeholders in the sustainable development of the general reef fishery and trade in the Maldives. This Management Plan shall be cited as "Maldives Reef Fishery Management Plan".

1.2 Overall Purpose

The overall purpose of the management plan is to:

- (a) Ensure long-term benefits to the people of Maldives through the responsible management of the fishery; and
- (b) Guide the authorities and stakeholders in the sustainable development of the reef fishery and trade in the Maldives.



1.3 Scope and Application

This Plan applies to all reef fish species included in Appendix 2, as well as all other non-target species which are caught in the reef fishery.

This Plan also applies to all activities carried out in the Maldives that may impact reef fishery resources, including but not limited to fishing, fishing related activities, processing, trading and exporting of reef fish and reef fish products from the Maldives. The Plan also applies to all parties, vessels, processing and export facilities or places engaged in or otherwise connected with any activity within the scope of this Plan.

This Plan shall not apply to any invertebrate species that are part of the reef ecosystems or the recreational reef fishery, as they will be managed by separate plans specific to them.

1.4 GuidingPrinciples

- **1.4.1 Precautionary Approach:** Timely and cost-effective measures shall be taken to safeguard ecosystems and prevent irreparable damage to them despite the lack of full scientific certainty.
- **1.4.2 Ecosystem-based management:** The various and variety of interactions within an ecosystem, including anthropogenic elements, shall be recognised as opposed to accounting for matters, species, or ecosystem services in isolation.
- **1.4.3 Universal Responsibility:** Local policies governing marine resource management shall be in harmony with global efforts to protect, conserve and manage biodiversity.
- **1.4.4 Sustainable Development:** In developing the fishery, the needs of the present shall be met without compromising the ability of the future generations to benefit from the resource.
- **1.4.5 Equity:** Resources shall be acknowledged as shared and common goods and benefits obtained from the utilisation of resources shall be shared in a fair and just manner among all through the application of transparency, legitimacy, accountability and decentralisation.



1.4.6 Participatory Approach: All stakeholders, particularly those who are directly affected by a policy or a measure, shall be engaged in the decision-making process to ensure inclusivity and consensus-oriented outcomes.

1.5 Interpretation

Unless stated otherwise, words or expressions used in this Plan have been given the meaning specified in Annex 1: Glossary.

1.6 Entry into Force

This Plan shall come into force upon the publication in the Government Gazette.



Commonly Caught Reef Fish Species, Their Habitat and Ecology

2.1 Introduction

Since reef-building corals evolved over 240 million years ago (Veron 1995), their associated fish fauna assemblages have continued to evolve and grow in functional morphospace. Today, coral reef systems are amongst the most biodiverse ecosystems and host a varied range of species groups that form a variety of relationships, association and food web linkages. The coral reef systems of Maldives remain the most important natural asset to the country. The two main pillars of the Maldivian economy, the tourism and fisheries sectors, are directly dependant on the health, biodiversity and abundance of these reef systems. Listed below are some of the ecologically and economically significant reef and reef associated species groups in the Maldives.

2.2 Snappers (Lutjanidae)

Containing some important food fishes, the habitat range of this species group can vary from moderate depths to shallow reefs. Juveniles of several species are typically found further inshore (Kuiter 2014). As a group, they are generally slow growing and mature relatively late. Much like *epinephelid* groupers, some lutjanids are also known to form spawning aggregations (Colin et al. 2003). Their diets may vary from bottom dwelling invertebrates and fish, to zooplankton (Kuiter 2014).



2.3 Sweetlips (Haemulidae)

Haemulidae species are generally found in the shallow nearshore areas, as well as deeper waters of the Indian, Pacific and Atlantic oceans (Cardoso de Melo et al. 2020). These nocturnally active species shelter during daytime and feed at night (Burkepile and Hay 2008). Their diets are mostly based on planktons and invertebrate such as crabs and prawns, especially tanaidacea and copepods belonging to the subphylum Crustacea. Additionally, larger fishes belonging to this family also feed on other smaller fishes (Cocheret de la Morinière et al 2003; Nagelkerken et al 2000; Rocher et al. 2008).

2.4 Jack (Carangidae)

The carangids are wide ranging, spread out across the tropical, subtropical and temperate regions of across Indian, Pacific and Atlantic oceans (Bannikov 1987) and can be found in multiple habitats, from coral reefs, to sea grass beds, to the open ocean. Similarly, they occupy a diverse variety of ecological niches where they occur, from plantivores, to reef associated piscivores, to benthic carnivores (Reed et al. 2002; Floeter et al. 2018). Their predators include tunas, barracudas and *Coryphaena hippurus*, the dolphinfish (Department of Land and Natural Resources 2000). They are gonochoristic and reproductive strategies include oviparity (young hatch after eggs have been laid) and iteroparity (multiple reproductive cycles). Fertilisation is always external (Department of Land and Natural Resources 2000). Some carangid species have been noted to exhibit cooperative hunting to target prey that exhibit schooling behaviour (Department of Land and Natural Resources 2000).

2.5 Barracuda (Sphyraenidae)

Barracudas are found in tropical and temperate coastal zones, with transitions between reef and non-reef ecosystems (Santini et al. 2015). Adults are typically pelagic piscivores, with crustacean and cephalopod species supplementing their diets. Juvenile and subadult barracuda exhibit schooling behaviour, while adults tend to be solitary (Kalogirou et al. 2012).



Overview of the General Reef Fishery

3.1 General Reef Fishery

Although a small-scale general reef fishery has existed in the Maldives for many years, an exploratory research carried out in the 1980s showed that unlike the tuna fishery, the general reef fishery is not widely practised in the Maldives (Anderson et al 1992; Van der Knaap et al 1991). Moreover, reef fish species were not a commonly found food source in Maldivian households. However, due to the rapid development of tourism in the late 20th century in the Maldives, a new market was opened up for reef fishers to sell their catch and this has resulted in the rapid development of the fishery. As a result, these species came an increasingly popular food fish for local as well. A survey conducted in 2014 to prepare a review of the fishery estimated that each household consumes approximately 1 to 5 fish per week. While there is a growing demand for reef fish in the export market, at present, the main markets for the general reef fishery are tourist establishments and local markets.

In comparison to other fisheries with longer fishing trips, reef fishing trips are typically day-long, with some trips lasting 2-3 days. Due to the lack of an established catch reporting mechanism for the fishery, it is difficult to estimate the scale of the fishery. Based on surveys conducted by the Ministry



in 2017 and 2018, it is estimated that around 1400 vessels and 5000 fishers are involved in the fishery. While some reef fishers are engaged in the general reef fishery opportunistically and on a part-time basis, for others it constitutes their primary source of income.

In terms of catch, a reef fishery review in 2014 (Sattar et al. 2014) estimated the annual reef fish catch at approximately between 18,000 tonnes to 23,400 tonnes. It is important to note that since this review was published, the reef fish fishery has significantly expanded.

3.2 Fishing Gears

The general reef fishery is carried out using a variety of gears and methods. Furthermore, fishers are known to carry out numerous gear modifications, based on locality and target species. Table 1 shows the typical gears used in general reef fishery.

Table 1: Typical gears used in general reef fishery with their descriptions

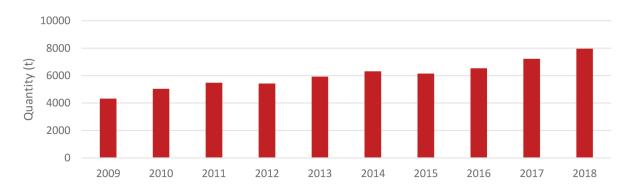
Gear / Method	Description
Hand-line	A single baited fishing line with a single hook and no attached weights, held by hand
Weighted Handline	A single baited fishing line with a single hook and a lead weight attached as a sinker
Drop-lines	A single weighted line attached to a baited hook, left afloat with a buoy, typically set-in multiples
Trolling	Long nylon wires with lures and a hook, set out from the side of the boat and trailed behind the boat. Sometimes the lines are deployed with floaters attached.

3.3 Trade & Export

As discussed, the tourism market remains significant for the reef fishery. The reef fishery review in 2014 (Sattar et al. 2014) estimated approximately 5300 t of reef fish as being purchased by tourist resorts. Assuming that the value of 0.84 kg of fish purchased per bed night derived in the paper remained constant throughout 2009-2018, it can be derived that the total reef fish purchased by



resorts in 2018, as per the number of bed-nights for that year (9,478,094) is 7962 t (Figure 2). The data indicates that as the number of tourist resorts, and consequentially, bed-nights, continue to increase annually, the amount of reef fish purchased by resorts follows the same trend.



• Figure 1: Estimated reef fish purchase by resorts from 2009-2018

In addition to the tourism market, local consumption of reef fishes also creates an important market. Aside from the resort and local markets, export remains the third most important market for reef fish. Export quantities fluctuated between 559 tonnes and 267 tonnes from 2012 to 2019. Returns from exports remained fairly consistent throughout, except for in 2019, where the marked reduction in quantity also correlated with the reduced returns (Figure 3). This may have been affected by a number of factors, including market influences.



• Figure 2: Reef fish exports from Maldives, 2012-2019



Majority of the product are exported to Sri Lanka. Most of the reef fish exported are salted dried, the majority of which are rainbow runners (averagely 36% over the course of 2012-2019) (Figure 24). The figure 4 shows the reef fish export composition from 2012 to 2019.



• Figure 3: Composition of major reef fish products exported from 2012 – 2019.

Export data is officially maintained solely by the Maldives Customs Service, documenting quantities and values declared at the time of export. This data is shared with the Ministry periodically.



Previously Undertaken Efforts to Manage Reef Fishery Resources

4.1 Important research conducted on the fishery and resources

Several research studies have been conducted in the past to manage the reef fish fishery. This includes the 'Reef Fish Resources Survey in the Maldives', which is the first report published on the subject in the Maldives (Van der Knaap et al 1991). Since then, based on research conducted on reef resources in the 1980s and 1990s, the 'Reef Fish Resources Survey in the Maldives - Phase 2' has been published (Anderson et al 1992). This report, which was published in 1992, estimated the Maximum Potential Yield for reef fishery resources. In addition, several reports on the status of the fishery and its resources were published in 2008, 2010 and 2014 (Sattar 2008; Sattar 2010; Sattar et al 2014).

4.2 FisheryDataCollection

Systemic reef fishery data collection in the Maldives can be dated back to 1970 (Anderson 1986). While the initial data collection efforts prioritised the tuna fishery, non-tuna catch (billfishes; sharks; and reef fishes in three size groupings, small, medium and large fishes) was incorporated into the mechanism over time. This data collection system was based on complete enumeration, where the fishermen reported their daily catches in numbers to a designated person at their respective Island Offices who compiled the information into a "Monthly Fishing Report" and forwarded to the then,



Statistics and Data Management Section of the Ministry (Anderson et al. 2003). Additionally, a second, "Monthly Fisheries Report 2" was used to report other fishery related information such as export of fishery products from the island, numbers of fishers and registered vessels and numbers of fish landed by other means (Anderson, Adam and Rasheed, 2003). This system of reporting was adequate for the time as it was custom to count the days catch for distribution among the crew and owners (Anderson, 1986), the trips were mostly single day trips and the catch was mostly landed at the home island. With the introduction of logbooks in 2010, the data received via the previous system gradually declined and was officially halted in 2018. These logbooks were designed to collect information on catch and effort in the general reef fishery.

4.3 Licensing of reef fishery fleet

A general licensing mechanism was introduced in 2009, which, while mostly geared towards the tuna fishery, also provided for the licensing of commercial reef fishery fleet, although the requirement for reef fishing vessels was not mandatory. Additionally, a single licence accommodated multiple fisheries. Therefore, it is difficult to discern what proportion of the licensed fleet is primarily reef fishing vessels.

4.4 Harvesting and export restrictions

Corals and reef organisms provide a host of vital ecosystem services. They play a critical role in maintaining the flow of nutrients and minerals in the food chain through, amongst other processes, the re-mineralisation of organic nutrients. Some reef fish species are keystone species that contribute significantly to the health and productivity of the ecosystems where they are present. The removal of these species from the community, could completely alter the ecosystem balance and reduce the biodiversity of the reef ecosystem. In the past, the Ministry has protected and enforced harvest and export bans on a number of keystone species. These measures have mostly been ad-hoc in nature and driven by the need to protect the resource from uncontrolled exploitation. The hump-head wrasse (*Cheilinus undulatus*) was protected in



Maldives in 1995 and this measure was also included in the General Fisheries Regulations which was compiled in 2006. Furthermore, the protected species status for this species was reiterated in the new General Fisheries Regulation (2020/R-75) enacted under the 2019 Fisheries Act (14/2019). In addition, all species of parrotfish (*Scaridae*) were also protected under the same regulation.



Objectives and Strategies

This management plan comprises of objectives, strategies, and actions that would contribute towards achieving the overall purpose.

The five specific objectives are;

- (1) Ensure that all activities associated with the harvest and trade of groupers are carried out through the application of principles of sustainability, ecosystem-based management and the Precautionary Approach;
- (2) Prioritise evidence-based policymaking through the collection of biological, ecological, and socio-economic data on the reef fishery and associated resources;
- (3) Implement Monitoring, Control and Surveillance (MCS) measures and strengthen data collection and data reporting mechanisms for the reef fishery and trade;
- (4) Ensure equitable benefits to all Maldivians and improve their livelihoods through decentralised development of the reef fishery and trade; and
- (5) Increase education and awareness on reef fishery and resources amongst stakeholders and the general public.

Strategies and actions developed to achieve these objectives are summarised in Table 1

Table 2: Breakdown of each objective by strategies, actions, timeframe and responsible parties

Objective 1 Ensure that all activities associated with the reef fishery and trade are carried out through the application of principles of sustainability, ecosystem-based management and the Precautionary Approach

Strategy	Action	Time frame	Responsible parties
	1.1.1 Enact harvest and/or export bans for key reef fish species	Within one year of implementation of this Plan	o Ministry o MMRI o MCS
1.1 Adopt precautionary	1.1.2 Apply harvest and/or export bans on specific reef fish species, deemed to be overexploited or subjected to overfishing	Medium-term (3 – 5 years)	o Ministry o MMRI o MCS
approach for the management of the fishery in the absence of reliable data or full scientific certainty	1.1.3 Establish a set of input and output control measures for specific species, where deemed necessary	Long-term (5 – 10 years)	o Ministry o MMRI o MoED o MCS
	1.1.4 Coordinate with stakeholder agencies in designating and managing MPAs and ecologically significant areas for reef fish species	Immediate	o Ministry o MoE o MoED o MCS
1.2 Promote the use of environmentally friendly gears and techniques in the reef fishery	1.2.1 Implement and enforce the restriction on the use of fishing method or gear prohibited in the Fisheries Act (14/2019) and its pursuant regulations	Immediate	o Ministry o MPS o MNDF-CG
	1.2.2 Regulate gear usage in the reef fishery	Medium-term (3 – 5 years)	o MMRI o Ministry
1.3 Maintain a leading role in regional and international fisheries management organisations such as RFMOs and Regional Fishery Bodies (RFBs) in management and conservation of reef fishery resources	1.3.1 Actively participate in the scientific and management processes of SWIOFC and other relevant regional and international bodies	Immediate	o MMRI o Ministry

Objective 2 | Prioritise evidence-based policymaking through the collection of biological, ecological, and socio-economic data on the reef fishery and associated resources

Strategy	Action	Time frame	Responsible parties
	2.1.1 Implement a nationwide size sampling and survey programme to assess population dynamics of reef fishery resources in the Maldives	Immediate	o MMRI
2.1Improve data collection and management on	2.1.2 Gather geographical information on fishing grounds in order to study the spatio-temporal exploitation patterns in reef fishery	Immediate	o MMRI o Ministry
biological, ecological, and socio-economic aspects of reef fishery to support evidence-based policymaking	2.1.3 Understand the relative distribution and size of marine protected areas established to conserve reef ecosystems and their resources and any other no-take zones	Short-term (1 – 3 years)	o MMRI

Objective 3 | Implement Monitoring, Control and Surveillance (MCS) measures and strengthen data collection and data reporting mechanisms for the reef fishery and trade

Strategy	Action	Time frame	Responsible parties
	3.1.1 Strengthen the existing licensing mechanism for commercial reef fishing vessels	Immediate	o Ministry o Local Councils
3.1 Establish an effectively controlled and monitored trade flow	3.1.2 Study the reef fishery fleet structure to develop a categorized licensing system with differentiated fees for fishing vessels based on vessel size	Short-term (1 – 3 years)	o Ministry
	3.1.3 Strengthen the existing licensing mechanism for reef fish processors	Immediate	o Ministry o MFDA
	3.1.4 Establish licensing arrangements to monitor operations of third-parties (resellers) trading reef fish species to exporters or resorts.	Short-term (1 – 3 years)	o Ministry o Local Councils o MoT

	3.1.5 Establish registration arrangements in Fisheries Information System (FIS), <i>Keyolhu</i> , for those engaged in reef fishery and trade	Within one year of implementation of this plan	o Ministry o MCS
	3.1.6 Require the introduction of a new type of fishing gear to the fishery to be pre-approved by the Ministry	Short-term (1 – 3 years)	o Ministry
	3.2.1 Strengthen the existing mechanism to collect catch and effort data from harvesters through fishery logbooks, and conduct awareness programmes to ensure that data submitted by fishers are complete and accurate	Immediate	o Ministry o Local Councils
	3.2.2 Require any third-parties (resellers) trading reef fishery resources to exporters and resorts to maintain and submit transaction log records to the Ministry	Short-term (1 – 3 years)	o Ministry o Local Councils o MoT o MoED
3.2 Establish an efficient documentation scheme for reef fishery	3.2.3 Require processors to submit purchase reports to the Ministry	Immediate	o Ministry
	3.2.4 Establish mechanisms to collect data on fish purchase by resorts.	Short-term (1 – 3 years)	o Ministry o MMRI o MoT
	3.2.5 Require exporters to submit purchase reports to the Ministry and expand the catch documentation scheme to cover reef fish exports and to ensure all reef fish export consignments are accompanied by a catch certificate.	Immediate	o Ministry

	3.3.1 Work with other government agencies to monitor reef fish exports	Immediate	o Ministry o MCS o MFDA o MIRA
	3.3.2 Conduct trainings in species identification for Maldives Customs Service officials and other inspectors	Immediate	o Ministry o MMRI o MCS
3.3 Establish an effective monitoring, control and enforcement system to ensure effective compliance	3.3.3 Ensure those engaged in the reef fishery and trade are compliant with relevant regulations, with the assistance of fisheries rangers	Short-term (1 – 3 years)	o Ministry o Local Councils
	3.3.4 Establish a mechanism to conduct inspections on-board vessels and in processing facilities, landing facilities, ports and airports to ensure compliance with relevant requirements and regulations.	Immediate	o Ministry o MMRI o MCS o Local Councils
	3.3.5 Expand existing Vessel Monitoring System (VMS) to incorporate commercial reef fishing vessels	Long-term (5 – 10 years)	o Ministry o MNDF-CG o MPS

Objective 4 | Ensure equitable benefits to all Maldivians and improve their livelihoods through decentralised development of the reef fishery and trade

Strategy	Action	Time frame	Responsible parties
4.1 Increase profitability for reef fishing communities	4.1.1 Facilitate and encourage fishers' participation in existing benefits schemes that are targeted for fishers	Immediate	o Ministry o MCS
4.2 Assist in the promotion of fish products and foster new market opportunities for reef fishery and trade	4.2.1 Support the diversification of value-added reef fishery products and foster new business opportunities to maximise economic returns to reef fishers and traders	Medium-term (3 – 5 years)	o Ministry o Local councils

4.3 Identify and engage stakeholders to ensure that policy decisions are made through a Participatory Approach	4.3.1 Establish, maintain, and update a fishers' registry, Masveringe Dhaftharu, to understand fishing community dependence on reef fishery resources 4.3.2 Engage with stakeholders and take their views and feedback into account in the implementation of management measures 4.3.3 Work in close liaison with key reef fishery communities, traders, civil society and the tourism sector	Immediate Immediate	o Ministry o Local councils o Ministry o Local councils o Ministry o Local councils o MoT
Objective 5 Increase education	on and awareness amongst stakeholders a	nd the general public	
Strategy	Action	Time frame	Responsible parties
5.1 5.2 Promote awareness and understanding of the reef fishery and its contribution to the Maldives economy	5.2.1 Based on data availability, compile and disseminate information on: • status of the fishery; • trade and exports; and • revenue to Maldives 5.2.2 Prepare and disseminate information on best practices in reef fishery 5.2.3 Educate fishers, traders, processors, exporters and enforcement officers about new and existing regulations via workshops,	Short-term (1 – 3 years) Immediate	o MMRI o Ministry o MoED o MIRA o MCS o NBS o Ministry o MMRI
	trainings and awareness campaigns 5.2.4 Develop awareness campaigns for school children and the general public on the important role reef fishes play in marine ecosystems	Short-term (1 – 3 years)	o Ministry o MoE
5.3 Promote appreciation for the marine environment and resources through public engagement in citizen science programmes	5.3.1 Implement a citizen science monitoring programme to collect and record photographic and observational data on reef fishery resources	Medium-term (3 – 5 years)	o MMRI



Management Measures Under This Plan

Unlike tunas, reef fish species have relatively low fecundity levels. These species generally display high site fidelity throughout their lives. These characteristics makes the reef fish species very vulnerable to consistent fishing pressures (Sattar 2008). In addition, the impacts of the ongoing changes in the global climate, such as coral bleaching due to warming oceans, poses a direct threat to the reproduction of reef fish species. In light of these collective threats, it is important to safeguard grouper populations and their habitats in order to ensure the sustainability of the fishery.

In the best interest of the communities that are dependent on the reef ecosystems, it is critical that timely management measures are introduced through legislative instruments so that this resource is sustainably managed to the benefit of stakeholders and future generations. To achieve this, the following are implemented. The measures identified are in accordance with FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (FAO 2014), the Code of Conduct for Responsible Fisheries (FAO 1995) and the Voluntary Guidelines on the Responsible Governance of Tenure of Land (FAO 2012).

6.1 Establishment of an advisory committee An advisory committee will be established to advise the Ministry on management of reef fish stocks, fishery and trade. The committee will also give recommendations to the Ministry on research and sustainable development of this fishery. The meetings of the committee will be convened at least once per year.



The committee will comprise of the following members

- (a) Chairperson (a representative of the Ministry);
- (b) A representative from the MMRI;
- (c) 3 representatives of reef fishers;
- (d) 2 representatives of reef fish exporters and middlemen selling reef fish;
- (e) A representative from the Ministry of Environment;
- (f) A representative from the Ministry of Economic Development;
- (g) A representative from the Ministry of Tourism;
- (h) A representative from Local Government Authority;
- (i) A representative from Maldives Custom Service;
- (j) A representative of the Maldives Police Service;
- (k) A representative from a relevant locally registered NGO; and
- (l) A scientist conducting research on reef fishes and the reef fishery.

A public announcement will be made by the Ministry, calling for Expression of Interest for the following Committee positions;

- (a) Representatives of reef fishers;
- (b) Representatives of reef fish exporters and middlemen selling reef fish; and
- (c) Representative from a relevant locally registered NGO.

The responsibilities of the Committee will include:

- (a) Reviewing technical and other reports pertaining to the reef fishery;
- (b) Advising the Ministry on implementation of relevant regional and international management measures on a national scale;
- (c) Monitoring the implementation of this Plan and briefing the Minister on its progress on an annual basis;
- (d) Advising the Ministry on management measures in response to the outcomes and recommendations from the technical reports and



stakeholder workshops and consultations; and

(e) Advising the Ministry on the implementation, monitoring and review of this Plan.

6.2 Licensing

One of the overarching aims of establishing a licensing mechanism is to identify parties that are engaged in the fishery and those who are economically dependent on the fishery resources. Such a mechanism also supports the collection and management of fisheries data. Furthermore, the licensing mechanism plays a crucial role in providing the Ministry with information that contributes towards the development of the fisheries sector and the extension of essential services to fishers.

In addition, a licensing mechanism also allows for the formal recognition of stakeholders engaged in the fishery and trade, which in turn facilitates the Ministry to safeguard their rights and ensure their social and economic security. Maintaining records of the fishing fleet and crew members, as well as information on fish processing facilities, through a licensing system assures the international community that the Maldivian fisheries are effectively and responsibly managed. Such records also serve as an important basis for planning and implementing fishery development projects.

In light of these considerations, the following parties operating within the reef fishery and trade will be required to acquire a license:

- (a) All commercial fishing vessels;
- (b) All commercial parties that process reef fish; and
- (c) All third-parties (resellers) trading reef fish species to licensed processing facilities, exporters or resorts, unless stated otherwise in another management plan.

The general process of application for and issuance of licenses, their renewal and revocation as well as conditions of the licenses will be set forth in the relevant regulations. The Ministry will establish, maintain and update a database of licensed parties.



6.3 Datacollection andManagement

Collection and management of comprehensive catch and effort data and maintenance of fisheries statistics is an important measure that contributes towards assessing changes in the abundance of fish stocks in response to fishing. It also plays a critical role in ensuring that stocks are fished at sustainable levels and that future generations continue to benefit from these resources. The fundamental tool used for this purpose is the fishery logbooks, in which catch composition, fuel usage, fishing grounds and other trip details, for each fishing trip, are recorded and submitted by the licensed vessels. Other vital information collected on the fisheries sector include details on processing and trade of fish and fishery products.

In consideration of the aforementioned factors, an integrated data collection system will be established and used to collect the following information:

- Logbook / fishery data from licensed fishing vessels;
- Purchase reports from licensed reef fish processors / processing facilities;
- Purchase reports from licensed third-party traders (resellers);
 and
- Purchase reports from parties exporting reef fish and reef fish products.

6.4 Gear Regulation

As was stated above, in comparison with other marine fish species, reef fishes generally have a low maturity and a fecundity rate. Due to the unique biological and behavioural traits of these species, they are highly vulnerable to any fishing pressure on their population. Thus, it is important to ensure that the fishery is being conducted in a sustainable manner that minimises any adverse impacts on the environment. In order to ensure the use of environmentally-friendly fishing gears in the commercial reef fishery, the introduction of any new types of fishing gear will require prior authorisation from the Ministry.



6.5 Catch Certification

In order to address the issue of Illegal, Unregulated and Unreported (IUU) fishing and to ensure the all fish and fishery products caught and produced in the Maldives are well-regulated, the establishment of a catch certification mechanism is a crucial step.

Hence, the Ministry shall expand the existing catch documentation scheme to cover reef fish exports and require that an approved catch certificate is submitted along with all consignments of reef fish that is exported.

6.6 Precautionary Measures

The Precautionary Approach promotes the application of timely and costeffective measures to safeguard ecosystems and prevent irreparable damage to them, despite the lack of full scientific certainty. This approach falls within the purview of international best practices for sustainable management of natural resources (UNCED, 1982). In this regard, additional measures that are not stated in this Plan may be taken to protect and manage reef fish stocks. These measures may include but are not limited to the following:

- (a) Declaring the closure of a specific area within Maldives and prohibiting the extraction of reef fish from the no-take zone;
- (b) Prohibiting the capture, processing or export of a specific species of reef fish;
- (c) Establishing harvest and export size limits for reef fish species;
- (d) Implementing a species catch / export quota;
- (e) Impose other restrictions on activities that may affect reef fish stocks.



Implementation of this Plan

The Ministry is responsible for the implementation of each objective in this management plan, by strategies and actions, as outlined and in coordination with the relevant agencies. The Ministry shall also formulate a regulation, under the Fisheries Act of the Maldives, to implement and enforce all reef fishery management measures stated in this Plan. The Maldives Marine Research Institute shall formulate and implement a plan of action to undertake all research activities that the institute is responsible for under this Plan.

Chapter 8



Reviewing the Management Plan

This Plan will be reviewed and revised every 3 (three) years. The Ministry will ensure the engagement of reef fish fishing communities, licence holders, processors, exporters, civil society and other stakeholders in the review process. Where there is an immediate need to revise any part(s) or measures of this Plan, the Ministry shall carry out such revisions in consultation with the Committee.



References



Anderson, R. C. 1986. Republic of Maldives Tuna Catch and Effort Data, 1970-1983. Page IPTP/86/WP/14. Indo-Pacific Tuna Management and Development Programme (INT/81/034).

Anderson, R. C., Waheed, Z., Rasheed, M. and Arif, A. 1992. Reef Fish Resources Survey in the Maldives - Phase 2. Reef Fish Research Survey.

BOBP Programme. Madras, Bay of Bengal Programme/FAO 54pp.

Anderson, R. C., M. S. Adam, and H. Rasheed. 2003. Country Report on Fisheries and Statistics in the Maldives. Anderson, R. C. 1986. Republic of Maldives Tuna Catch and Effort Data, 1970-1983. Page IPTP/86/WP/14. Indo-Pacific Tuna Management and Development Programme (INT/81/034).

Anderson, R. C., M. S. Adam, and H. Rasheed. 2003. Country Report on Fisheries and Statistics in the Maldives.

Bannikov, A. F. 1987. On the taxonomy, composition and origin of the family Carangidae. Journal of Ichthyology 27(1):1–8.

Colin, P. L., Y. J. Sadovy, and M. L. Domeier. 2003. Manual for the Study and Conservation of Reef Fish Spawning Aggregations - Speci [. SCRFA.

Department of Land and Natural Resources. 2000. A review of the biology of the family Carangidae, with emphasis on species found in Hawaiian waters.

Floeter, S. R., M. G. Bender, A. C. Siqueira, and F. Cowman. 2018. Phylogenetic perspectives on reef fish functional traits 1 2. Biological Reviews 93(1):131–151.

Kalogirou, S., F. Mittermayer, L. Pihl, and H. Wennhage. 2012. Feeding ecology of indigenous and non-indigenous fish species within the family Sphyraenidae. Journal of Fish Biology 80(7):2528–2548. Blackwell Publishing Ltd.

Kuiter, R. H. 2014. Fishes of the Maldives Indian Ocean.

Reed, D. L., K. E. Carpenter, and M. J. DeGravelle. 2002. Molecular systematics of the Jacks (Perciformes: Carangidae) based on mitochondrial cytochrome b sequences using parsimony, likelihood, and Bayesian approaches. Molecular Phylogenetics and Evolution 23(3):513–524. Academic Press.

Santini, F., G. Carnevale, and L. Sorenson. 2015. First timetree of Sphyraenidae (Percomorpha) reveals a Middle Eocene crown age and an Oligo–Miocene radiation of barracudas. Italian Journal of Zoology 82(1):133–142. Taylor and Francis Ltd.

Sattar, S. A., E. Wood, F. Islam, and A. Najeeb. 2014. Current Status of the Reef Fisheries of Maldives and Recommendations for Management. Malé.

Veron, J. E. N. 1995. Corals in space and time: The biogeography and evolution of the Scleractinia. University of New South Wales Press, Sydney.



Annex 1: Glossary



(a) CommercialFishing

Fishing or Harvesting for the purpose of obtaining a financial benefit

(b) Enforcement officer

Any officer designated pursuant to Section 57 of the Act No. 14/2019 (Fisheries Act of the Maldives) to enforce regulations made under the Act.

(c) Fisheries Ranger

Persons who are appointed for and by the Ministry under Section 58 of the Act No. 14/2019 (Fisheries Act of the Maldives).

(d) Fishing /Harvesting

- (1) Searching for the purpose of catching, taking, killing and harvesting of fish;
- (2) Attempting to search for, catch, take, kill or harvest fish;
- (3) Engaging in any other activity that results in the searching, catching, taking, killing or harvesting of fish;
- (4) Placing or searching or retaking of any fish aggregating device or equipment including "radio beacons";
- (5) Undertaking any operation at sea or on an island in preparation for any activity mentioned in subsections (1), (2), (3) or (4).

(e) Fishing vessels

Any type of vessel, ship or any other thing which is used for fishing, which has been prepared for fishing, or which is usually used for fishing or related activities.

(f) Logbook

Any instruments used to record data on fishing trips, including catch and effort data, submitted electronically or via any other medium determined by the Ministry

(g) Management plans

Plans made with regard to fisheries planning, management and development pursuant to Chapter Three of the Act No. 14/2019 (Fisheries Act of the Maldives)

(h) Master /Captain

Person holding the most responsible position at any given time on-board a fishing vessel. (i) Minister

The minister responsible for fisheries, including aquaculture.

(j) Ministry

The ministry responsible for fisheries, including aquaculture.

(k) Precautionary measures

In the absence of complete information based on scientific research or where a matter has not been proved, measures adopted to manage the natural resources in a sustainable manner considering the possibility of an adverse outcome if such measures are not taken.

(I) Processing

Activities undertaken to package, pack or bring any change to fish in order to preserve fish for a long period.

(m) Processing facilities

Lands, buildings, or such other places on or in which:

- (1) fish or aquaculture products are cleaned, packaged, dried, salted, chilled, frozen or otherwise processed for sale in and outside the Maldives; or
- (2) fish or aquaculture products are stored for the purposes of packaging, canning, drying, cleaning, salting, chilling, freezing or otherwise for processing for sale in and outside the Maldives.

(n) Recreational or sport fishing Fishing for recreation, game or sport, as well as the provision of any activity or service directly aimed at recreational or sport fishing to generate income, excluding fishing for personal consumption or fishing with the intention for sale or export for economic benefit

(o) Reseller

Any third-parties who trade fish to exporters or tourism markets as middlemen, but do not engage in the harvesting process

(p) FisheriesInformation System-Keyolhu

A web-enabled fishery information system designed to upload record catch data and issue permits and licenses to fishery and fishery related activities.



Annex 2: List of reef fish within the scope of this Plan



Scientific Name	Common Name	Local Name
Snapper (Lutjanidae)		
Lutjanus bohar	Two-spot red snapper	Raiymas
Aphareus rutilans	Rusty jobfish	Rankarumas
Lutjanus gibbus	Humpback red snapper	Ginimas
Macolor niger	Black and white snapper	Foniyamas
Macolor macularis	Midnight snapper	Kalhu foniyamas
Aprion virescens	Green jobfish	Giulhu
Lutjanus monostigma	One-spot snapper	Filolhu
Aphareus furca	Small-toothed jobfish	Keyolhurovvi
Lutjanus biguttatus	Two-spot banded snapper	Bodu reen'dhoomas
Lutjanus sebae	Emperor red snapper	Maa ginimas
Pinjalo lewisi	Slender pinjalo	Kan'du kirulhiyamas
Lutjanus madras	Indian snapper	Madharaasee mas
Lutjanus kasmira	Common bluestripe snapper	Dhon reen'dhoomas
Lutjanus bengalensis	Bengal snapper	Reen'dhu mas
Lutjanus fulvus	Blacktail snapper	Dhon' mas
Lutjanus argentimaculatus	Mangrove red snapper	Odidhoshu mas
Paracaesio sordida	Sordid snapper	Noo mas
Paracaesio xanthura	Yellowtail blue snapper.	Nigudhon' noo mas
Lutjanus decussatus	Checkered snapper	-
Lutjanus rufolineatus	Yellowlined snapper	Rai' reen'dhoo mas
Lutjanus ehrenbergii	Black-spot snapper	-
Emperor (Lethrinidae)		
Lethrinus conchyliatus	Redaxil emperor	Thun raiy filolhu
Lethrinus olivaceus	Longface emperor	Kashi thun filolhu
Gymocranius grandoculis	Blue-lined large-eye bream	-
Lethrinus lentjan	Pink ear emperor	-
Lethrinus erythracanthus	Orange-spotted emperor	Bolike
Lethrinus obsoletus	Orange striped emperor	-
Gnathodentex aureolineatus	Striped Large-eye bream	-
Lethrinus nebulosus	Spangled emperor	-

Lethrinus harak	Thumbprint emperor	Lah' filolhu/ Vilu filolhu	
Lethrinus microdon	Small-toothed emperor	Thun dhigu filolhu	
Gymnocranius griseus	Grey large-eye bream	Kan'du uniya	
Lethrinus rubrioperculatus	Spotcheek emperor	Kalhihi	
Lethrinus xanthochilus	Yellowlip emperor	Reen'dhoo thun filolhu	
Monotaxis grandoculis	Humpnose big-eye bream	Dhon'gu	
Gymnocranius elongatus	Forktail large-eye bream	-	
Lenthrinus ornatus	Ornate emperor	-	
Lethrinus mahsena	Sky emperor	-	
Jack (Carangidae)			
Elagatis bipinnulata	Rainbow runner	Maaniyamas	
Caranx lugubris	Black trevally / Black jack	Kalha han'dhi	
Carangoides orthogrammus	Island trevally	Thun'ba han'dhi	
Carangoides gymnostethus	Bludger trevally	Mushimas han'dhi	
Carangoides chrysophrys	Longnose trevally	Fathi han'dhi	
Carangoides fulvoguttatus	Yellow-spotted trevally	Dhonthiki han'dhi	
Alectis ciliaris	African pompano	Naruvaa han'dhi	
Carangoides caeruleopinnatus	Coastal trevally	Vahboa han'dhi	
Carangoides ferdau	Blue trevally	Dhabaru han'dhi	
Caranx melampygus	Bluefin trevally	Fani han'dhi	
Caranx ignobilis	Giant trevally	Muda han'dhi	
Caranx sexfasciatus	Big-eye trevally	Haluvimas	
Carangoides plagiotaenia	Barcheek trevally	Thimara han'dhi	
Gnathodon speciosus	Golden trevally	Libaas han'dhi	
Trachinotus baillonii	Smallspotted dart	Goru vaali	
Trachimotus blochii	Snubnose pompano	Rin'dha vaali	
Seriola rivoliana	Longfin yellowtail / Almaco jack	An'dhunmas	
Scomberoides lysan	Doublespotted queenfish	Kashi vaali	
Barracuda (Sphyraenidae)	and Needlefish (Belonidae)		
All species belonging to	Big eye barracuda, Great barracuda	Tholhi ge baavai' thah	
Families Sphyraenidae and	and all species of Needlefish		
Belonidae	-		
Tuna (Scombridae)			
Acanthocybium solandri	Wahoo	Kurumas	
Gymnusarda unicolor	Dogtooth tuna	Voshimas	
Parrotfish (Scaridae)			
All species belonging to the	All species of parrotfish	Lan'da ge baavai'thah	
family Scaridae	an opened of partonish	Sair au ge sauvar triair	
Jy 5 cm. mile			

Haemulidae					
Plectorhinchus chaetodonoides	Harlequin sweetlips Galu guruva				
Plectorhinchus albovittatus	Giant sweetlips	Maa guruva			
Plectorhinchus gibbosus	Harry sweetlips	-			
Plectorhinchus vittatus	Oriental sweetlips	Kan'du guruva			
Diagramma pictum	Painted sweetlips	Kilan'bu guruva			
Wrasse (Labridae)					
Cheilinus undulatus	Napoleon wrasse/ Humphead wrasse	Maa hulhun'bu landa			

