TONGA DEEPWATER SNAPPER FISHERY MANAGEMENT AND DEVELOPMENT PLAN

2020- 2023

Prepared by the Ministry of Fisheries, Tonga

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Foreword

Tonga is a small island developing state with limited land and natural resources. It is blessed with a vast ocean abundant with an array of fisheries resources. The sustainable development, management and utilisation of our marine resources is considered crucial so that the benefits from the utilization of the Deepwater resources flows directly to the people of Tonga. Tonga Deepwater Fishery is one of the most important marine resources which continues to contribute to the social and economic development of Tonga through providing employment and economic returns to the people. The fishery is domestically based with a total of 30 licences.

The Tonga Deepwater Management plan manages the sustainable use and conservation of Tonga's deep-water fisheries resources. It reflects the government priority areas in this sub-sector and serves to ensure sustainable growth in the fishery consistent with Tonga Strategic Development Framework (TSDF), Strategic Development Goal (SDG) and national law of Tonga. This plan has a lifespan of three years and also serves as a vehicle of information dissemination on the fishery to its stakeholders and government line ministries. Ministry of Fisheries continues to play the roles of managing fisheries under the Fisheries Management Act. The Fisheries Management Act 2002 stipulates that the Secretary establishes and keeps under review plans for the conservation, management and sustainable utilization and development of fisheries in fisheries waters of the Kingdom.

I would like to acknowledge and thank the Ministry of Primary Industries, New Zealand and Pacific Community (SPC) for their technical guidance towards the review of this plan. Ministry of Fisheries staff, stakeholders and the National Institute of Water and Atmospheric Research (NIWA) who have put a lot of effort and contribution towards the preparation of this plan.
It is therefore my pleasure to present this plan to the Government, the people of Tonga and to invite all to practice this plan in our strive for the common good of the fishery and the Kingdom of Tonga.

Lord Tu'ilakepa

Minister for Fisheries

CONTENTS

ACRONYMS

CEO	CHIEF EXECUTIVE OFFICER
CPUE	CATCH PER UNIT EFFORT
DFMP	DEEPWATER FISHERIES MANAGEMENT PLAN
DFMC	DEEPWATER FISHERIES MANAGEMENT COMMITTEE
EEZ	EXCLUSIVE ECONOMIC ZONE
FAD	FISH AGGREGATION DEVICES
FMA 2002	FISHERIES MANAGEMENT ACT 2002
HoD	HEADS OF DIVISIONS (MINISTRY OF FISHERIES)
MCS	MONITORING, CONTROL AND SURVEILLANCE
MEL	MONITORING, EVALUATION AND LEARNING
MoF	MINISTRY OF FISHERIES
MPI	MINISTRY FOR PRIMARY INDUSTRIES (NEW ZEALAND)
NFC	NATIONAL FISHERIES COUNCIL
NIWA	NATIONAL INSTITUTE OF WATER AND ATMOSPHERIC RESEARCH (NEW ZEALAND)
SDG	SUSTAINABLE DEVELOPMENT GOALS
SOP	STANDARD Of PROCEDURE
SPC	THE PACIFIC COMMUNITY
TAC	TOTAL ALLOWABLE CATCH
VMS	VESSEL MONITORING SYSTEM

1. INTRODUCTION

The Deepwater Fishery Management Plan manages the sustainable use and conservation of Tonga's deepwater marine resources of snapper, grouper and emperors in Tongan fisheries waters. The plan addresses priority areas in the government which serves to ensure sustainable growth in the fishery consistent with government development plans, Sustainable Development Goals (SDG)and national laws of Tonga.

Tonga's deepwater fishery is a domestic fleet; activities within the fishery includes onshore repacking of fish landed for fresh exports abroad, as well as selling fresh catch in the local fish markets. Flametail snapper is the main deepwater species exported due to its high value and demand by most overseas markets.

Over the past 30 years, the fishery has contributed to the social and economic development of Tonga. Based on this, the Ministry of Fisheries (MoF) intends to continue to ensure its sustainability.

The Ministry of Fisheries continues to provide support to the fishery through such initiates as the fuel concession scheme, and tax exemption on all fishing equipment to support the development of the fishery.

This plan builds on the Deepwater Fisheries Management Plan 2017-2019, using lessons learnt on the successes and challenges faced during the implementation of the plan. A review of the plan was conducted in November 2019; it identified key successes which included achieving strategies and measures set under the plan. Large parts of that plan were successfully implemented but key ongoing challenges identified will be addressed under this revised plan. The policy direction for the Deepwater Fisheries Management Plan 2020 - 2023 is to ensure responsible fishing, participation by stakeholders, sustainable utilization and an economically viable fishing sector for Tonga.

The Ministry of Fisheries is currently working with the Government of New Zealand under the National Institute of Water and Atmospheric Research (NIWA) funded project aiming at improving governance, management, and economic and biological sustainability of the demersal line fishery in Tonga.

2. LEGAL CONTEXT

The Ministry of Fisheries is mandated under the Fisheries Management Act 2002 (the Act) to manage and develop the deepwater fishery in Tonga. The main legal tool for developing and managing this fishery is the Act. The Act ensures that "conservation, management, sustainable utilization and development of fisheries resources in the fisheries waters and ensures implementation of the plan".

It is also according to Section 7 of the Act, the Chief Executive Officer (CEO) for Fisheries is required to *"progressively prepare and keep under review plans for the conservation,*

management, sustainable utilization and development of fisheries in the fisheries waters and ensure implementation of such fishery plans." This provides the platform to progress fisheries management and development in Tonga.

This legal tool provides the regulatory framework for effective implementation of the plan and to ensure responsible fishing, participation by stakeholders, sustainable utilization and an economically viable fisheries sector for the benefit of Tonga.

Other relevant legislative instruments that contribute to the sustainable management and development of the fishery includes the Fisheries Management (Processing and Export) Regulation 2008, Fisheries Management (Conservation) Regulations 2008, Fisheries (Local Fishing) Regulations 2009.

3. GOAL

An ecologically and economically sustainable deepwater fishery, enhancing food security and livelihoods of all Tongans.

4. PURPOSE

The purpose of the plan is to manage the sustainable utilisation and development of Tonga's deepwater snapper resources.

5. SCOPE AND APPLICATION

The Deepwater Fisheries Management and Development Plan 2020-2023 applies to Tonga Deepwater snapper fishery and the Squid fishery also the following:

a) Fishing for deep bottom fish (demersal) species (***Appendix 2: List of* species**), by fishing gear that includes, but not limited to drop lining (a weighted line with hooks attached)

b) The target and non-target, associated or dependent species taken in the course of fishing for the following species. ***(Appendix 2)***

c) Vessels licensed to fish these species in the deepwater regions of the banks and seamounts in the Tongan EEZ.

d) All "related activities", as per the FMA 2002:

(i) Transhipping not permitted in the deepwater snapper fisheries except with the written authorization of the Chief Executive Officer (CEO).

(ii) Bait fishing

(iii) Provisioning and all other services relating to the snapper & grouper fisheries,

e) Deepwater snapper fishery and all commercial activities relating to the fishing for processing and exporting of deepwater snapper within Tonga fishery waters.

f) Chief Executive Officer (CEO) for MoF shall consider this plan when scientific research and test fishing authorizations are granted to any applicant for any kind of deepwater fishing activity, which will affect this fishery.

6. AUTHORITIES AND ROLES

The Ministry of Fisheries plays a primary role in promoting conservation, management, sustainable utilization and development of deepwater fisheries resources.

The Minister of Fisheries will manage the fishery in cooperation with stakeholders through a co-management approach. Co-management facilitates the sharing of information, promotion of voluntary compliance, and engagement to assist with monitoring the fishery.

The Act (s7(4)) states that there may be a Management committee established for each major fishery in Tonga. The functions and roles of the Deepwater Fisheries Management Committee (DFMC) are appended in ***Appendix 3.*** Members of the DFMC that are not employed by the Public Service Commission are eligible for the Government prescribed meeting fees and be remunerated from the Ministry of Fisheries annual budget.

7. COMMENCEMENT AND REVIEW

The plan will be effective once endorsed by the Minister of Fisheries.

The progress of implementing the DFMP shall be reported in the Annual Report of the Ministry of Fisheries. The mid review of the plan will take place in 2021 and the full review will take place prior to the end of the plan in 2023.

8. OBJECTIVES, STRATEGIES AND INDICATORS

This plan contains five Objectives supported by 21 strategies. It is intended that the effective implementation of the 21 strategies will contribute to achieving the five objectives and the overall goal of the plan. This table forms the key element of the plan.

STRATEGIES	INDICATORS
1. To maintain a sustainable fishery through effective management	
1. Limit the amount of deepwater fish taken by setting an annual total allowable catch (TAC) 2. Continue enforcing the minimum size limit for Flametail (FLA) 3. Limit the number of vessels permitted within this fishery, only allowing domestic vessels 4. Effectively monitor fishing activities and utilise that information to manage the fishery 5. Explore potential diversification opportunities, using the squid fishery as an initial trial (Refer Appendix 9) 6. Examine the squid fishery catch data from fishing years 2020-2023.	i. TAC is maintained at 200mt for the deepwater assemblage (including 86mt FLA) and monitored. ii. "Process for Monitoring Total Allowable Catch Limits" procedure is implemented when fishery meets thresholds iii. FLA minimum size limit is maintained at 48cm and catch is monitored iv. Undersize FLA is limited to no more than 20% of total FLA catch per trip v. Number of licences set maintained at 30 per year vi. 100% of vessels are registered and licensed vii. Catch and fishing activity is monitored, analysed and reported on quarterly to HoDs viii. All vessels have VMS and/or tracking device ix. Number of fuel concessions provided to fishers who return completed reporting requirements (e.g. log sheets) x. Number of Compliance activities conducted and reported to HoDs xi. Information, including catch/effort/market success of the squid fishery, is reported annually xii. All squid fishing data are examined and analyzed.
2. To ensure an economically sustainable fishery, maximizing benefits for Tonga	
1. Investigate the economic performance of the fishery 2. Build MoF capacity to undertake economic analysis and marketing research 3. Continue to explore potential markets, both domestic and international, particularly for squid 4. Investigate access procedures for new markets for deepwater species, including squid	i. Publish and present economic reports to stakeholders ii. MoF staff attend training opportunities iii. Analysis and reporting on locally sold and/or exported product is provided through quarterly reporting iv. Analysis of the fishery's revenue is provided to HoDs quarterly and annually v. New markets are identified, reported on, and accessed by fishers

STRATEGIES	INDICATORS
	vi. Process for accessing new markets is developed and reported to the CEO
3. To promote an ecologically sustainable approach to ensure a healthy and abundant fishery	
1. Protect seamounts from fishing 2. Collaborate with line agencies to understand environmental impacts on the fishery, including the effects of climate change 3. Investigate if minimum size limits for species, other than FLA, may be appropriate within the fishery 4. Continue to explore diversification opportunities for other deepwater species	i. Reduction of fishing on seamounts ii. Awareness material is produced to increase public knowledge on fishing's environmental impacts iii. Reports published and presented to MoF on climate change impacts on the fishery iv. Results on the investigation into size limits are reported to stakeholders v. Results on diversification investigations are reported to the CEO
4. To ensure the fishery contributes to food security and livelihoods for all Tongans	
1. Encourage Tongan employment within the fishery 2. Promote local fish markets, and encourage increased availability of deepwater fish, including squid, particularly for Tongatapu 3. Provide public awareness of the availability of deepwater species, particularly squid, for consuming as part of a healthy diet	i. Number of Tongans employed within the fishery ii. Number of training for best practice in the handling of fish and icing iii. Quantity of fresh fish (deepwater species or squid) sold at local markets versus quantity exported to foreign markets iv. Number of awareness-raising activities (cooking shows, recipe development, school home economics) developed, published and broadcast
5. To enhance engagement and cooperative management of the fishery	
1. Encourage transparency across the fishery to improve informed management decisions 2. Encourage engagement and communication within MoF 3. Continue collaboration and engagement with external stakeholder (line agencies, women's groups, fishing associations, environmental groups) 4. Reestablish the Deepwater Fisheries Management Committee to commence in 2021 5. Develop public awareness programmes and materials for further understanding of the fishery	i. Monthly updates from FMDD provided to other internal MoF teams ii. Quarterly updates provided to HoDs iii. Number of engagements with external stakeholders iv. Number of meetings and/or emails with other line agencies v. DFMC to meet twice a year, beginning 2021 vi. Number of awareness materials developed, published and broadcast

9. MANAGEMENT MEASURES

The following management measures will be implemented to sustainably manage the utilisation and development of the fishery, through limiting access and effort to the fishery.

1. Catch

1.1. The annual total allowable catch (TAC) for the deepwater snapper assemblage is 200 metric tonnes (mt) including 86 mt for Flametail snapper.

(i) The deepwater snapper TAC only includes species specified in Appendix 2 excluding kingfish, bluenose, and ocean blue eye;

1.2. The minimum size limit for Flametail Snapper is 48 cm.

(i) No more than 20% of the total Flametail catch, per trip, can be under 48cm.

1.3. Vessels must avoid seamounts, particularly where large numbers of small fish are caught. Vessels are to fish from slopes and seamounts in water deeper than 50m.

2. Licensing

2.1. All fishing vessels must be licensed to fish for deepwater species in accordance with the Act and the Fisheries (Local Fishing) Regulations 2009.

2.2. Deepwater fishery licences are:

(i) Limited to 30 vessel licences per year;
(ii) issued for a one year term from when that licence was granted;
(iii) non-transferable; and
(iv) granted after all relevant licence fees have been paid.

2.3. All fishing vessels must comply with its licence terms and conditions (Appendix 4);

2.4. Licences will be suspended for breaking laws and rules. Penalties, as set out in the Act, will be applied.

3. Vessels

3.1. All fishing vessels must be registered to fish for deepwater species in accordance with the Act and the Fisheries (Local Fishing) Regulations 2009;

3.2. Fishing vessels can be no more than 23 metres;

3.3. All vessels fishing in the fishery are to be fitted with functioning VMS.

4. Reporting Requirements

4.1. A Deepwater Fisheries approved Catch Log Sheet must:

(i) be completed by the Master;
(ii) be submitted to the CEO in their original and unaltered form not later than three (3) days after the completion of the fishing trip to which the log sheet relates; and
(iii) include all catch and bycatch by species and quantities.

4.2. The Master must submit the vessel unloading catch record:

(i) in the form approved by the CEO; and
(ii) within three (3) days of unloading.

4.3. If the vessel unloading catch record is not provided, export permits will not be issued by MoF.

4.4. The Deepwater Fishery Export Log Sheet must list:

(i) all species and quantities;
(ii) destination; and
(iii) other information as requested by MoF and / or the importing country.

4.5. Once the Deepwater Fishery Export Log Sheet is submitted, an Export Permit will be issued by MoF which is required for each shipment.

4.6. The fuel concession will be provided to fishers after they provide the necessary data and information required to MoF.

5. Processing Premises

5.1. Any fish processing establishment used for Deepwater fisheries product must comply with Part 4 of the Fisheries Management (Processing and Export) Regulations 2008 (the Processing and Export Regulations).

5.2. All fish processing establishments must comply with its licence terms and conditions

10. MONITORING AND COMPLIANCE

MOF is currently utilizing the Catch Monitoring Tool (Appendix 7) to ensure the TACs does not exceed for both flametail and all deepwater species combined.

In case of non-compliance activity with minimum size limit etc. MoF will follow the Standard of Procedure (SOP Appendix 11) to improve behaviour and ensure compliance

with this plan.

MoF currently exercises the Standard of Procedures to inspect vessels and to ensure compliance of the license holder. The Ministry will continue to monitor target, bycatch or landings of species in ***Appendix 2*** in other fisheries.

The fines and prosecution procedures are detailed in the FM 2002, and relevant fisheries act in general.

11. MONITORING, EVALUATION AND LEARNING

Monitoring, evaluation and learning (MEL) are critical to ensure that the plan is achieving what it sets out to achieve (monitoring), achieving the right results (evaluation) and what needs to be done to improve (learning).

The Ministry will develop a MEL plan after endorsement, to assist in the monitoring, evaluation and learning of the plan.

12. APPENDICES

Appendix 1: State of Tonga's Deepwater Fisheries and Characterisation

This fishery continues to exploit multispecies assemblage of members of the family *Lutjanidae* (snappers), *Lethrinidae* (emperors) and *Serranidae* (groupers). Dropline bottom fishing occurs to depths ranging from 50 to 450 m (Bell et al, 1995) in which catches are derived from both banks and seamounts.

The life history characteristics of these species are; long longevity; slow-growth rate; low rates of natural mortality; large size at sexual maturity; and spawning aggregations. Their characteristics make them vulnerable to over-fishing and exploitation: As such the Ministry in collaboration with the NIWA has resolved to diversify the fishery by trailing other fishery such as Bluenose, Ocean Blue eye, Kingfish and squid. This is an ongoing trial in which squid was successful during the trial period.

Vessels and Total Allowable Catch:

The Ministry still aims to limit the licensed vessel in this fishery to a total number of 30 as a sustainable management strategy. This also includes ensuring that all 23 meters in length vessels are registered. The current valid license is a total of 25.

The TAC for Snapper is a total of 200 mt which include 86 mt for the flame tail. Monitoring of catch rate is on-going to ensure that it does not exceed the TAC stated in the plan. Collection of catch, effort and size- frequency data began is going very well due to the establishment of the Fuel Concession, which provided a mechanism for encouraging the supply of quality logsheet and offloading data from licensed fishers.

The graph (Figure 1) below displays the catch exploited in this fishery and the number of license vessels for the past four years. The trend of activity show vessel numbers peaked in 2017 with 31 vessels and then decrease in 2018-2019. On 2018 most vessels were badly affected by the Cyclone Gita, which contribute to the declining of vessels during this period. The same trend shows in the catch history which highlight the highest catch in 2017 and then a slow drop in 2018-2019. This was possibly the result of high exploitation in this fishery which also led to the Ministry effectively monitoring the TAC not to exceed 200mt.

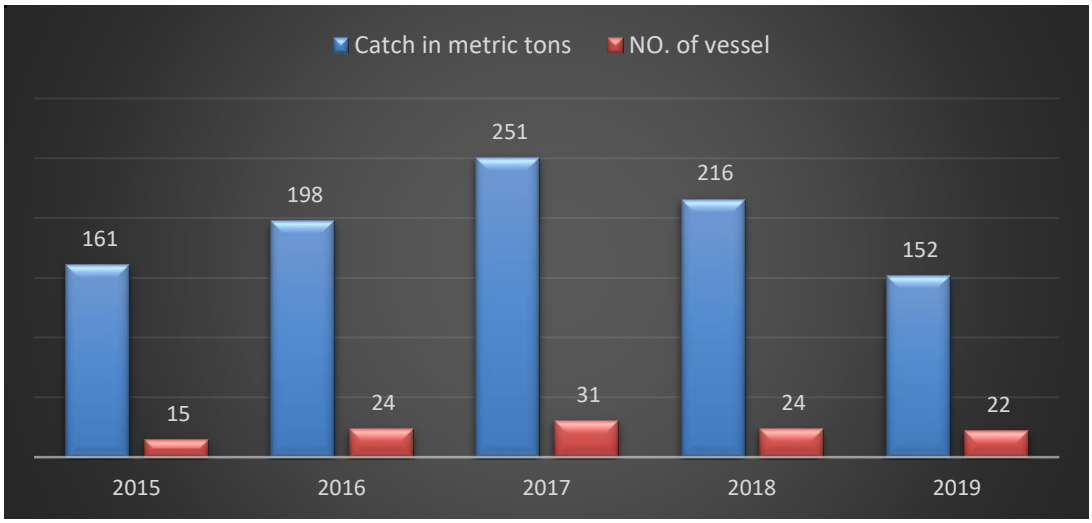


Figure 1

Non-compliance with VMS installed in vessels is a challenge in this fishery. This is due to the high cost of purchasing, installing and operating a VMS within the vessel. However, the Ministry has sought SPC's assistance by providing monitoring tracking devices to track the vessels in the near future.

In order to encourage economic efficiency of vessels and maximising the export revenue in the fishery, small loans have been provided through the Tonga Development Bank to assist in improving fleets. The government still continues with its initiative to exempt customs duty and consumption tax (CT) on fuel, baits, fishing gears and equipment related to fishing activities. This is to assist licensed businesses by reducing the cost of production.

The Ministry has also identified Australian markets through market research. The purpose of this market research was to seek available markets to further promote market diversity for all deepwater and snapper species.

The Ministry in collaboration with NIWA has encouraged the improvement of the quality of the fish for export, by funding a fish handling training in March 2019. Women in Fishing Group participated in this training and was commented successful. There is a stable number of Tongans employed within the fishery which typically are women undertake to sell in the local markets.

Fishery diversification such as the newly introduced trials of Squid in the Kingdom has contributed to employment opportunities offered within the fishery. On April 2019 a squid promotion was conducted with the NFC where a group of Tongan women from the Fafine Tonga 'a Ngatai group showcased different ways of how to cook squid.

Appendix 2: Biological characteristics of deepwater species

TL – total length; SL – standard length; K – growth rate; tm – the age at first maturity; tmax – life span; target species ****** (major export species (Langi et al, 1992)).

1. Rusty jobfish / palu polosi	
Family	Lutjanidae (Snappers)
Scientific name	*Aphareus rutilans*
Max. size	110 cm TL (male/unsexed); max. published weight: 11.3 kg Spawning months are from September through to February
Environment	Reef-associated; marine; depth range 100 – 330 m
Resilience	Medium, minimum population doubling time 1.4 - 4.4 years (K=0.16)
Biology	Inhabits reefs and rocky bottom areas to depths of at least 100 m. Feeds on fishes, squids and crustaceans.
2. Green jobfish / 'utu	
Family	Lutianidae (Snappers)
Scientific name	*Aprion virescens*
Max. size	112 cm TL (male/unsexed); max. published weight: 15.4 kg
Sexual maturity	Both males and females generally reach spawning condition between 24 to 30 inches (over 2.6 years but under 5years)
Environment	reef-associated; marine; depth range 0 - 180 m
Resilience	Medium, minimum population doubling time1.4 - 4.4 years (K=0.29; tm=4-5)
Biology	Inhabits open waters of deep lagoons, channels, or seaward reefs. Usually seen singly, but also in groups. Feeds mainly on fishes, but also on shrimps, crabs, cephalopods and planktonic organisms. Large individuals may be ciguatoxic. Reports of ciguatera poisoning
3. Bluefin trevally / lupo	
Family	Carangidae (Jacks and pompanos)
Scientific name	*Caranx melampygus*
Max. size	117 cm FL (male/unsexed); max. published weight: 43.5 kg
Environment	reef-associated; brackish; marine; depth range 0 – 190 m
Resilience	Medium, minimum population doubling time 1.4 - 4.4 years (K=0.23; tm=2; Fec=49,700)
Biology	A coastal and oceanic species, associated with reefs. Juveniles occur seasonally in shallow sandy inshore waters. Found in rivers. Occasionally in schools. Feed mainly on other fishes, also crustaceans. Often toxic when it reaches a length of more than 50 cm.
4. Red grouper / ngatala kula	
Family	Serranidae (Sea basses: groupers and fairy basslets), subfamily: Epinephelinae

Scientific name	*Epinephelus morio*
Max. size	125 cm TL (male/unsexed); max. published weight: 23.0 kg; max. reported age: 25 years
Environment	reef-associated; non-migratory; marine; depth range 5 – 300 m
Resilience	Low, minimum population doubling time 4.5 - 14 years (K=0.1-0.18; tm=4-6; tmax=25; Fec=1.4 million)
Biology	Occurs mainly over rocky and muddy bottoms. Uncommon around coral reefs. Usually rests on the bottom. Juveniles may be found in shallow water, but adults are usually taken from depths of 70-330 m. Feeds on a wide variety of fishes and invertebrates. A protogynous hermaphrodite. Most females transform to males between ages 7 to 14. Susceptible to red tide toxin (*Ptychodiscus brevi*).
5. Comet grouper / ngatala pusi	
Family	Serranidae (Sea basses: groupers and fairy basslets), subfamily: Epinephelinae
Scientific name	*Epinephelus morrhua*
Max. size	90.0 cm TL (male/unsexed); max published weight: 6,700 g
Environment	reef-associated; non-migratory; marine ; depth range 80 - 370 m
Resilience	Low, minimum population doubling time 4.5 - 14 years (Preliminary K or Fecundity.)
Biology	Deepwater habitat. Considered rare in Tahiti but quite common in atolls. The species is easily confused with *E. poecilonotus*, *E. radiatus*, or *E. tuamotuensis*, three closely related deepwater groupers. Known to be ciguatoxic at Mauritius. Reports of ciguatera poisoning.
6. Eightbar grouper / mohuafi	
Family	Serranidae (Sea basses: groupers and fairy basslets) , subfamily: Epinephelinae
Scientific name	*Epinephelus octofasciatus*
Max. size	130 cm TL (male/unsexed); max. published weight: 80.0 kg
Environment	bathydemersal; marine; depth range 150 – 300 m
Resilience	Very low, minimum population doubling time more than 14 years (Preliminary K or Fecundity.)
Biology	Probably occurs in rocky reefs. Its apparent rarity may be due to its preference for relatively deep water. Reports of ciguatera poisoning
7. Flame snapper / longtail snapper / palu tavake**	
Family	Lutjanidae (Snappers), subfamily: Etelinae
Scientific name	*Etelis coruscans*
Max. size	120 cm TL (male/unsexed)
Sexual maturity	One fish reported to reach sexual maturity at about 20.6

	inches; 55-80 cm FL (5 years) and spawning season from May to October similar to Etelis carbunculus
Environment	reef-associated; marine ; depth range 90 - 400 m
Resilience	Low, minimum population doubling time 4.5 - 14 years (k=0.12)
Biology	Inhabits rocky bottoms. Feeds on small fishes, squids and crustaceans.
8. Longnose emperor / ngutukao	
Family	Lethrinidae (Emperors or scavengers), subfamily: Lethrininae
Scientific name	*Lethrinus miniatus*
Max. size	90.0 cm TL (male/unsexed); max. published weight: 9,600 g; max. reported age: 22 years
Environment	reef-associated; non-migratory; brackish; marine; depth range 5 – 30 m
Resilience	Medium, minimum population doubling time 1.4 - 4.4 years (K=0.06-0.17; tm=2-3; tmax=22)
Biology	Inhabit coral reefs during daytime where they feed occasionally in sand and rubble areas between coral heads. At night, they move out over the sandy sea floor and forage actively. Usually occur in small schools. Feed mainly on crustaceans, echinoderms, molluscs and fish, with crabs and sea urchins predominating
9. Saddle-back snapper / sea bream / palu mutumutu	
Family	Lutjanidae (Snappers) , subfamily: Apsilinae
Scientific name	Paracaesio kusakarii
Max. size	60.0 cm SL (male/unsexed)
Environment	reef-associated; marine ; depth range 100 - 310 m
Resilience	Medium, minimum population doubling time 1.4 - 4.4 years (Preliminary K or Fecundity.)
Biology	Occurs over rocky bottoms.
10. Ornate jobfish / 'utu	
Family	Lutjanidae (Snappers), subfamily: Etelinae
Scientific name	Pristipomoides argyrogrammicus
Max. size	40.0 cm SL (male/unsexed)
Environment	reef-associated; marine; depth range 70 – 350 m
Resilience	Medium, minimum population doubling time 1.4 - 4.4 years (Preliminary K or Fecundity.)
Biology	Occurs over rocky bottoms. Feeds on small fishes, crustaceans and squids.
11. Crimson jobfish / palu hina*	
Family	Lutjanidae (Snappers) , subfamily: Etelinae
Common name	Pristipomoides filamentosus
Max. size	100.0 cm TL (male/unsexed); max. published weight: 8,154 g; max

	reported age: 18 years
Sexual maturity	Females generally reach spawning condition at a fork length of 19.2 inches. Reach sexual maturity at about 1.8 years and generally at about 2.2 years.
Environment	benthopelagic; marine ; depth range 40 - 400 m
Resilience	Medium, minimum population doubling time 1.4 - 4.4 years (K=0.16-0.31; tmax=18)
Biology	Occurs over rocky bottoms; off Guam, caught most abundantly between 180 and 270 m. At night, it migrates vertically to the upper part of its habitat to feed. Feeds on small fishes, shrimps, crabs, amphipods, ascidians and salps.
12. Golden eye jobfish / palu sio'ata	
Family	Lutjanidae (Snappers) , subfamily: Etelinae
Scientific name	*Pristipomoides flavipinnis*
Max. size	50.0 cm SL (male/unsexed)
Environment	reef-associated; marine ; depth range 90 - 360 m
Resilience	Medium, minimum population doubling time 1.4 - 4.4 years (K=0.27-0.36)
Biology	Occurs over rocky bottoms; off Guam, caught most abundantly between 180-270 m. Feeds primarily on benthic fishes and to a lesser extent on crustaceans, squids, and pelagic tunicates.
13. Ruby snapper / red snapper / short-tailed red snapper / palu malau	
Family	Lutjanidae (Snappers) , subfamily: Etelinae
Scientific name	*Etelis carbunculus*
Max. size	127 cm FL (male/unsexed)
Sexual maturity	Reach this at about 11.7 inches fork length (2.8years). A fish 20 inches in fork length can release over 1.3 million eggs per spawn and may release 2 or more batches during a spawning season. Spawn in May to October
Environment	reef-associated; marine ; depth range 90 - 400 m
Resilience	Medium, minimum population doubling time 1.4 - 4.4 years (K=0.13-0.31)
Biology	Inhabits rocky bottoms. Feeds on fishes and larger invertebrates such as squids, shrimps and crabs; also takes planktonic organisms, including pelagic urochordates.
14. Convict grouper / mohuafi	
Family	Serranidae (Sea basses: groupers and fairy basslets) , sub-family: Epinephelinae
Scientific name	*Epinephelus septemfasciatus*
Max. size	155 cm TL (male/unsexed); max. published weight: 62.8 kg
Environment	reef-associated; non-migratory; marine; depth range 5 – 30 m

Resilience	Very low, minimum population doubling time more than 14 years (Preliminary K or Fecundity.)
Biology	Occurs near shore, including semi-enclosed sea areas in rocky reefs in shallow waters.

(Sources: FishBase, Current Line Fish Facts for Bottom Fishes of Hawaii)

Appendix 3: Function of the Deepwater Fishery Management Committee

The functions of the DFMC will be to:

a) Review the performance of the DFMP annually and, in consultation with all stakeholders, provide feedback on changes to the Plan;

b) Provide a forum to discuss issues, objectives, and strategies with input from stakeholders in regard to the fishery;

c) Advice on the effective management and administration of the fishery;

d) Provide information relating to the fishery operations;

e) Ensure transparent decision making in regards to the fishery;

Memberships

The DFMC will have representation from all major stakeholders and should include the following representatives:

- Three representatives from Tongatapu deepwater licence holders; one representative from the Vava'u and one from Ha'apai deepwater fisheries licence holders;
- A representative of the small-scale fisheries sub-sector;
- ad hoc advisors and members as determined by the Chair;
- Fisheries Management representative from MoF;
- Compliance representative from MoF;
- Representatives from such other government ministries/departments as selected by the Chair;

Chair

Meetings of the DFMC will be chaired by the CEO for the Ministry of Fisheries.

Frequency of Meetings

The DFMC shall meet every six months, and further as required by the Chair to address specific matters.

Appendix 4: Licence Terms and Conditions

Appendix 4a: Fishing Licence Terms and Conditions (Local Fishing vessels)

The owner and the master of the vessel shall comply with the following terms and conditions at all times:

1. The Master shall keep this licence or certified copy on board at all times and shall produce the licence for inspection upon the request of an authorized officer, high seas inspector or foreign high seas inspector.

2. All the crews must be Tongan with the exception of the senior officers (Captain, Chief Engineer and Fishing master).

3. The vessel must not fish;

(i) within 3 nautical miles of a Fish Aggregating Device (FAD) except without the specific written permission of the CEO;

(ii) in other Designated closed areas or Special Management Areas(SMA) of the Kingdom of Tonga.

4. The fishing gear of local fishing vessel must be stowed in such a manner that it is not immediately available for fishing whenever the vessel is present in a part of the fisheries waters in which it is not authorized to fish.

5. The Master shall report to the CEO (telephone (676) 21 399, 27 799 or Facsimile (676) 23 891) and to the Fisheries Office at Tu'imatamoana market (676) 873-2353, 873-4545, 8403699 and 8822945) at the following times -

(i) at least 24 hours prior to departure from port; (for boarding and inspection purposes).

(ii) at least 24 hours prior to entry into any port in Tonga for boarding and inspection & port sampling purposes).

6. Each such report shall contain the following information -

(i) name of vessel;

(ii) estimated total catch on board

7. The Master shall complete an accurate written log (approved logsheets) of everyday that it spends at sea on board the vessel in the form approved by the CEO, Ministry responsible for Fisheries as follows;

a. for days with fishing operations, the log must be completed by recording the effort and catch at the end of each fishing operation (i.e. end of a purse-seine set,

end of a longline -haul, or at the end of the day in the case of all other fishing methods); or

b. for days with no fishing operations but where any other „fishing effort1" occurred, then the relevant activities (e.g. searching, transit) must be entered in the log at the end of the day; or

c. for days with no fishing operations and no other "fishing effort", the main activity of the day must be entered in the log at the end of the day.

d. the master of each vessel shall keep an accurate and unaltered original or copy of the required information pertaining to the current trip on board the vessel at all times during the course of a trip.

And, shall submit them to the CEO in their original and unaltered form not later than 3 days after the completion of the fishing trip to which the log sheet relates. Log sheets shall include all bycatch by species and quantities.

8. The master shall submit the vessel unloading catch record, in the form approved by the CEO, Ministry of Fisheries, and three (3) days after the unloading.

9. All data collect by Fisheries is confidential and will not give to anyone until it authorize to.

10. The Master shall not unload any fish unless inspected for port sampling purposes by the Authorized Officers and port samplers. The agent, master and crew members shall allow and assist any port samplers to carry out their duties. The master and crew members shall not assault, obstruct, resists, delays, refuse boarding or entry, intimidate, interfere with, or use threatening or abusive language or behave in a threatening manner towards any port samplers while in the execution of their duties

11. There shall be no directed fishing for sharks and all bycatch of sharks shall be recorded.

12. Fishing, storing or retaining on board, transshipping or landing in whole or in part, any of the following sharks listed below shall be prohibited:

Common Name	**Scientific name (Appendix ii, CITES list) & CMMs**
1. Oceanic whitetip shark (also CMM 2011-04)	*Carcharhinuslongimanus*
2. Smooth hammerhead	*S.zygaena*
3. Great hammerhead	*S. mokarran*
4. Scalloped hammerhead	*Sphyrnalewini*
5. Porbeagle shark	*Lamna nasus*

6. Silky Sharks (CMM 2013-08)	*Carcharhinus falciformis*

13. The fishing vessel, unless the CEO otherwise directs in writing or unless the master of the vessel is able to communicate effectively in English, shall carry a person who is able to communicate effectively in English, and in the language of the master of the vessel.

14. The Master shall allow authorized officers and observer(s) to participate fully in any research or survey project both on board the vessel and elsewhere. All costs for the placement of authorized observer(s) will be borne by the operator of the vessel concerned in accordance with instructions provided by the CEO.

15. The master and each of the crew members shall allow and assist any observer to carry out his duties. The master and crew members shall not assault, obstruct, resists, delays, refuse boarding or entry, intimidate, interfere with, or use threatening or abusive language or behave in a threatening manner towards any observer while in the execution of his duties.

16. The operator shall install, maintain and operate a registered VMS or such other approved ALC/MTU at all times and in accordance with the manufacturer's specifications and operating instructions and FFA standards as approved by the Secretary.

17. The operator shall ensure that no person tampers or interferes with the automatic location communicator or mobile transceiver unit and that the unit is not altered, damaged or disabled.

18. The operator shall ensure that the automatic location communicator or mobile transceiver unit is switched on and is operational at all times during the period of validity of this licence. In order to ensure the unit is working at all times, the Operator shall provide separate power to the unit to ensure that it can operate with its own battery when other electronic equipment is shut down.

19. The above terms and conditions shall be reviewed when necessary. Failure to comply with the above and all other terms and conditions of the licence, the Fisheries Management Act 2002 and Regulations made there under, may, in addition to any judicial penalties that may be incurred, result in the suspension or cancellation of this licence.

Appendix 4b: Licence Terms and Conditions for a Fish Processing Establishment

In accordance with s.33(1) of the Act, and as provided in regulation 5(5) of the Fisheries (Processing and Export) Regulations, the holder of a fish processing establishment licence shall-

(i) complete the Fish Processing Log sheet in Form 1 of Schedule 3;

(ii) submit all completed Fish Processing Log sheets to the Ministry in their original and unaltered form, weekly after the completion of the week to which the log sheet relates; and

(iii) ensure that the fish processed at such establishment shall not exceed the total quotas allowed to that establishment, including those relating to species and quantity.

Appendix 4c: Licence Terms and Conditions for Export of Fish

In accordance with s. 35(4) of the Act, and as provided in regulations 10-11 of the Fisheries (Processing and Export) Regulations 2008, the following applies:

(1) A licence to export fish for commercial purposes shall be subject to the following conditions in addition to any other conditions required under the Act –

(i) the objectives of the relevant management and development plan;

(i) fish products are processed in a licensed fish processing establishment pursuant to an effective HACCP system;

(ii) the HACCP Plan was prepared and is monitored by a person who received training in the application of HACCP Principles or by a seafood safety inspector;

(iii) the exporter demonstrating that they can consistently meet the appropriate standards regarding microbial and natural toxin contamination, chemical contamination and physical contamination;

(iv) every consignment of fish to be exported shall be accompanied by a health certificate which has been prescribed by the Secretary and published by Notice in the Gazette; and

(iv) comply with the export restrictions on selected species made in the Fisheries (Conservation and Management) Regulations 2008.

(2) Where a HACCP Plan has been prepared by a seafood safety inspector or where other work applicable is incurred, the fee specified in Schedule 2 shall be paid by the licence holder.

(3) A licence to export fish for domestic purposes shall be subject to –

(a) any restrictions on export of selected species made in the Fisheries (Conservation and

Management) Regulations 2008; and

(b) any other conditions required under the Act.

(4) A holder of a licence to export fish for commercial purposes shall-

(a) complete the Marine Products Export Log sheet, in Form 2 of Schedule 3, for every day of export of marine product for commercial purposes, including-

(i) Licence holder's name;

(ii) Date of export;

(iii) Destination;

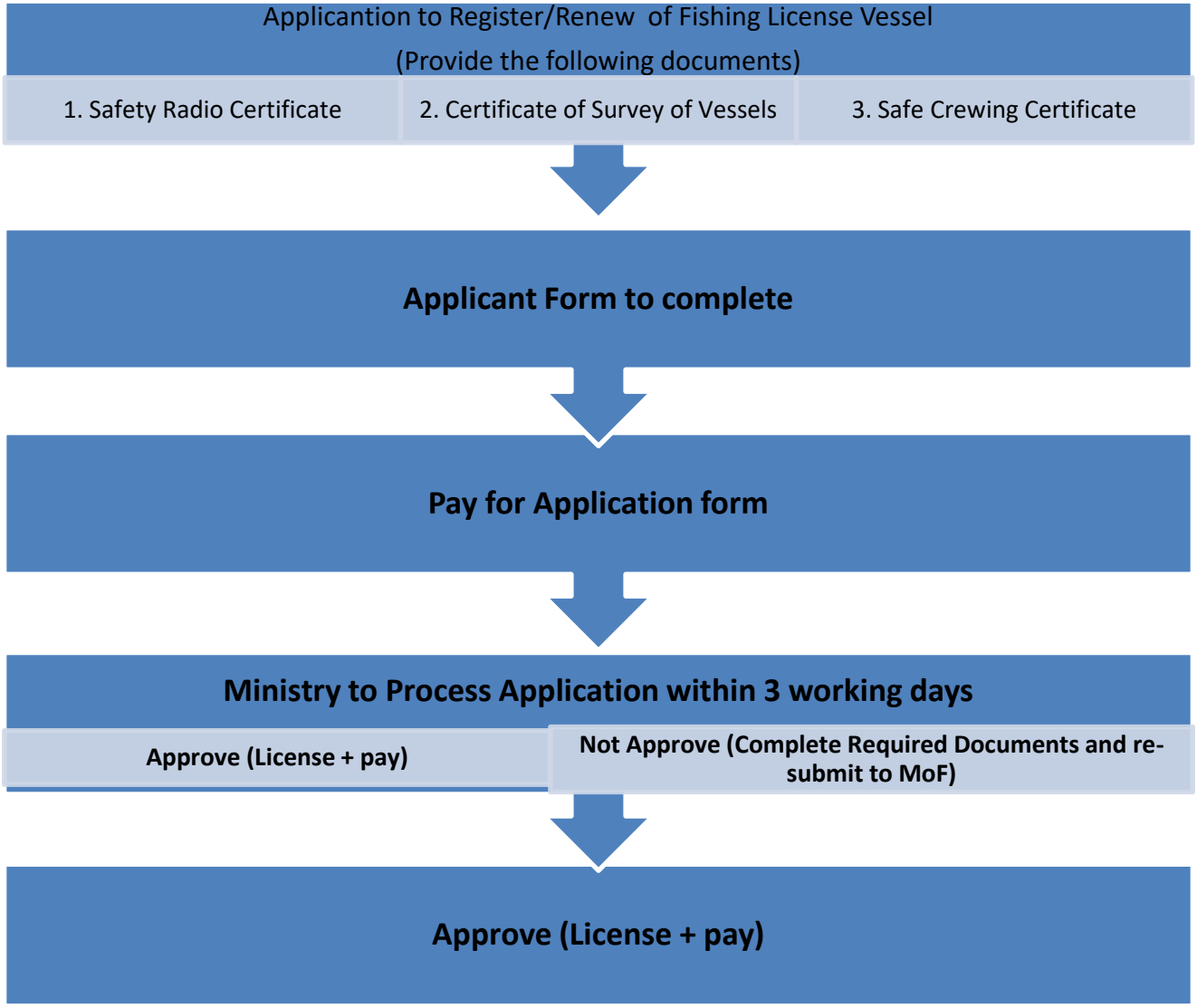
(iv) Scientific or common name of each species to export;

(v) Number of fish by species;

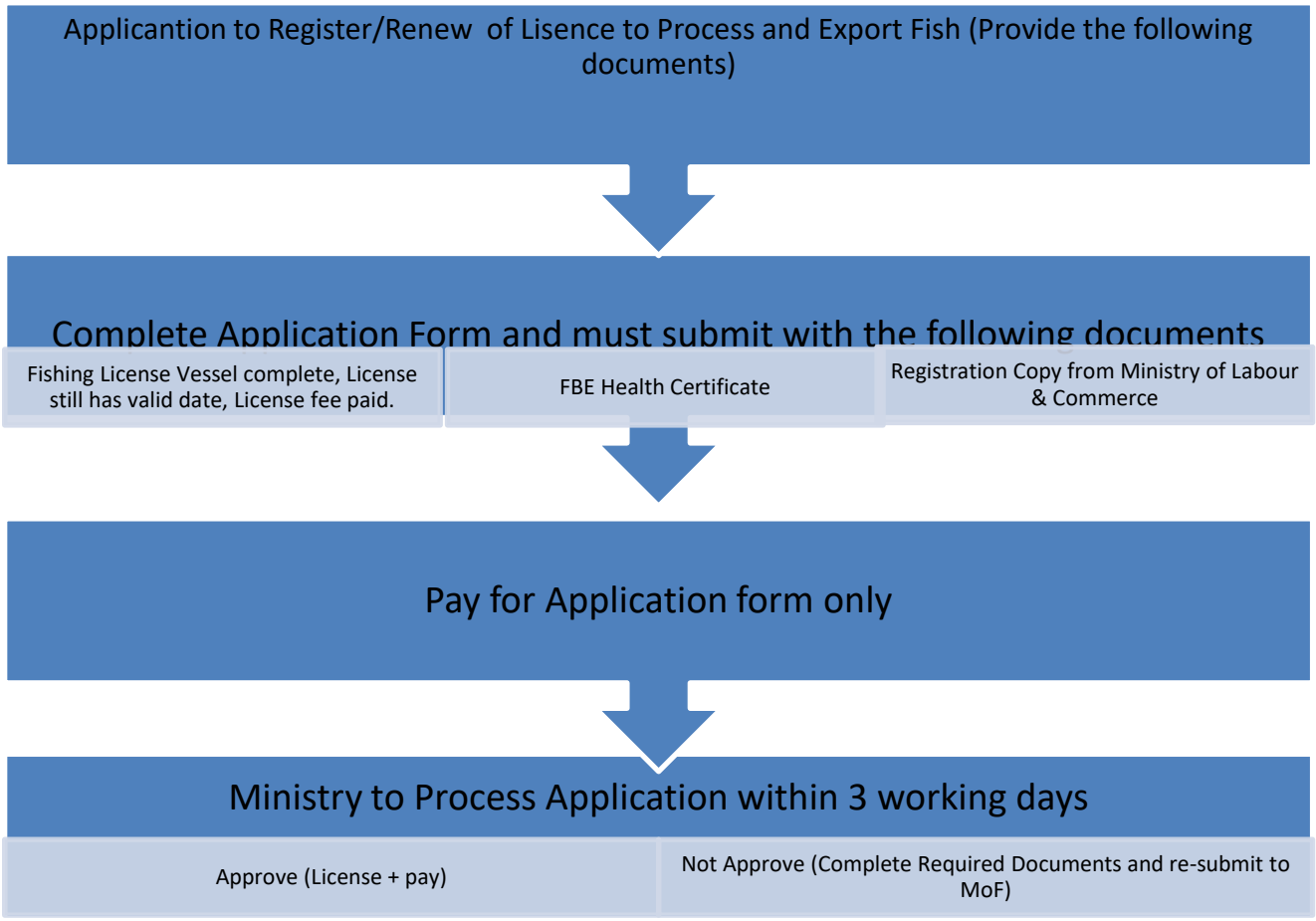
(vi) Total weight by species; and

(b) submit all completed Marine Products Log sheets to the Secretary in their original and unaltered form no later than 24 hours after the completion of the day to which the log sheet relates.

Appendix 5: Process of License Registration



Appendix 6: Processing and Export of License Registration



Appendix 7: List of associated fees for the Deepwater fishery

As in accordance with the Fisheries Management (Processing & Export) Regulations 2008, Section and its subsequent sub paragraph in 4, 5, 6, 7, 8, 9 and 12 stipulates associated fees in regards to Export.

SCHEDULE 4A FEES

1.	Application for registration of a fish processing establishment	$5.00
2.	Certificate of registration of a fish processing establishment	$10.00
3.	Application for a fish processing establishment licence	$50.00
4.	Application to renew a fish processing establishment licence	$10.00
5.	Fish Processing Establishment Licence	$100.00
6.	Application for a fish export licence	$50.00
7.	Application to renew a fish export licence	$10.00

Licence for a local fishing vessel
Up to 10 metres - $200.00 for the first 6 metres and every additional metre shall be $5.00
Between 10 - 20 metres - $500.00 for the first 6 metres and every additional metre shall be $10.00
Over 20 metres - $800.00 for the first 6 metres and every additional metres shall be $20.00

Appendix 8: Process for monitoring the Total Allowable Catch limits

MOF will use the following process to monitor the TAC of both flametail snapper and the snapper assemblage, and communicate the results to the Minister and stakeholders.

a. Strict enforcement of a timely submission of data as a License condition. Fishing logs must be collected from all vessels no later than 3 days after each fishing trip.

b. Analyse data regularly to provide information every two weeks on catch and utilization of each TAC

d. When 75% of each TAC is reached, inform CEO and send memo to Deepwater license holders that 75% of the quota has been landed

e. MoF staff monitoring of the fishery to provide weekly updates of the total catch to CEO and HoD

f. When 90% of either TAC is reached, MoF advises all operators and prepares all documents for Minister to issue a notice to cease fishing

g. When 100% of either TAC is reached MoF will issue a fishing notice and send advice to all licence holders that landing flametail OR any DWS is prohibited.

Appendix 9: Deepwater Squid Fishery Management:

Introduction and Background

The Deepwater Squid Appendix is working towards developing the squid fishery. This fishery was introduced in 2018 as a means of diversifying fishing activity from the deepwater fishery. Approximately 1.1 tonnes of squid (68 diamondback squid; 200 neon flying squid) was caught during the trial period, between June 2018 and July 2019.

The Ministry still needs a lot of information to understand these species and the fishery. In collaboration with NIWA and SPC, MoF supports this emerging fishery through providing fishing gear and training to fishers. To understand the economic viability of this fishery MoF is undertaking market investigations, and raising public awareness about squid as an alternative food source (for example Ngatai ‘a Fafine showcasing different varieties of squid dishes during the Royal Agriculture Show 2019).

This management approach builds on the Deepwater Fisheries Management Plan 2017-2019, using lessons learnt on the successes and challenges faced during the implementation of that plan. This document aims to ensure responsible fishing, participation by stakeholders, sustainable utilization and an economically viable fishing sector for Tonga.

Scope

The Deepwater Squid Management approach is limited to Deepwater licence holders, and includes only diamond back and neon flying squid.

Biological information

Diamondback squid (*Thysanoteuthis rhombus,* DBS)

- Found in tropical and sub-tropical waters worldwide
- Extends to higher latitudes with warm currents
- Eat a variety of small fishes
- Prey for tunas, billfishes, marine mammals
- Can be aged via statoliths
- Max length = 100 cm, up to 30 kg
- Short life spans (approx. one year), almost semelparous

Neon flying squid (*Ommastrephes bartramii,* NFS)

- Found in sub-tropical and temperate waters worldwide
- Rarely encountered in equatorial waters
- Shoaling species - shoals are usually made up of uniform sized squid
- Eat a variety of small fishes
- Prey for tunas, billfishes, marine mammals
- Can be aged via statoliths

- Max length = 45 cm for males, 80-90 cm for females
- Short life spans (approx. one year), almost semelparous
- Spawning thought to occur throughout the year in the southern hemisphere, 2 spawning cohorts in North Pacific

MANAGEMENT MEASURES

Licensing and Vessels:

1. All fishing vessels fishing for squid must be registered and licensed to fish in the deepwater fishery, in accordance with the Act and the Fisheries (Local Fishing) Regulations 2009.

2. All fishing vessels fishing for squid must comply with its licence terms and conditions (Appendix 4);

3. Licences will be suspended for breaking laws and rules. Penalties as set out in the Act will be applied.

Fishing Gear:

1. Fishing methods allowed in the fishery are:

(i) Vertical or mini long-line;
(ii) Midwater jigging;
(iii) Trolling;
(iv) Hand-wind reels; or
(v) Surface and underwater lights.

Reporting Requirements:

1. An approved Squid Log Book (see appendix 9) must:

(i) be completed by the Master;
(ii) be submitted to the CEO in their original and unaltered form not later than three (3) days after the completion of the fishing trip to which the log sheet relates; and
(iii) include all catch and bycatch by species and quantities.

2. All squid fishers must complete all other necessary deepwater fishery reporting requirements, as per section 4 of the DWFMP 2020-2023.

Review

The plan will be reviewed in accordance to the DFMP timeline. A progress of fishery shall be reported in the Annual Report of the Ministry of Fisheries.

Appendix 10: Ministry of Fisheries Squid Logbook

ORIGINAL: APRIL 2019

MINISTRY OF FISHERIES SQUID LOGBOOK

GIANT SQUID FISHING RECORD - Diamond Back squid *(Thysanoteuthis rhombus) and* Neon flying squid *(Ommastrephes bartamii)*

VESSEL NAME		DATE & TIME OF DEPARTURE		PORT OF DEPARTURE	
REGISTRATION NUMBER		DATE & TIME OFARRIVAL		PORT OF ARRIVAL	
IRCS		DATE & TIME OF UNLOADING		PORT OF UNLOADING	
NUMBER OF CREW		NUMBER OF VLL		NUMBER OF HOOK/VLL	

ACTIVITY CODES: *1. A SET* *2. A DAY AT SET BUT NOT FISHED AND NOT TRANSIT* *3. TRANSIT* *4. IN PORT** **PLEASE SPECIFY*

Date	Activity code	Commence setting			Commence Hauling			Depth (m)	Weather condition (O'cast/Rain /Sunny etc)	Sea State		Wind		CATCH DETAILS					
																Diamond Back (DB)		Neon	
		Lat (S)	Long (W)	Setting Start Time	Lat (S)	Long (W)	Hauling Start Time			Height	Direction	Force	Direction	VLL No.	Hook No.	NO.	Wt	NO.	Wt.
																TOTAL			

NOTE:
1. LOCAL DATE AND TIME
2. WEIGHT IN KILOGRAM

CAPTAIN'S NAME	CAPTAIN SIGNATURE	DATE