TONGA DEEPWATER FISHERY

MANAGEMENT PLAN

2017 - 2019

Prepared by the Ministry of Fisheries, Tonga, March 2017

FOREWORD

Deepwater fishery is one of Tonga's most important natural resources. Recently, the deepwater fishing industry have experienced a tough time in increasing fishing effort which pushes the biological reproductive nature of the fish under stress. Lack of access to international markets and low catch rates creates a very challenging environment for vessel owners to remain viable. With that said, a need to manage and develop deepwater fisheries resources is very vital for the people of Tonga.

The Tonga Deepwater Fisheries Management Plan (DWFMP) is a high level policy documents that provides guidance to the management and development of the deepwater fisheries in the periods of 2017-2019. This is an effort to establish responsible and adaptable fisheries management for sustainable utilization of the deepwater fisheries resources in the Kingdom of Tonga. It is a product of many stakeholder consultations and meetings and reflect the views and wishes of our people. The Plan presents key management and compliance strategies and future guidance frameworks. Followed in the plan is the Implementation Schedule that provides direction upon which the management actions will be implemented.

I thank all who contributed and make this plan a success. The plan will need updating to meet new situations and requirements of the fishery to ensure responsible and adaptable management in the future. It also requires full support and cooperation of the private sectors (deepwater fishing and processing sectors), other stakeholders, government authorities which include the Ministry of Fisheries (MOF). This plan shall ensure that our resources are managed in the most effective and sustainable way.

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Honourable Semisi Tauelangi Fakaltan
Minister of Agriculture and Food, Forest and Fisheries

(March 2017)

TABLE OF CONTENTS

DEFINITIONS AND ACRONYMS

CPUE	CATCH PER UNIT EFFORT
DWFMP	DEEPWATER FISHERIES MANAGEMENT PLAN (DWFMP)
DFMC	DEEPWATER FISHERIES MANAGEMENT COMMITTEE
FMA 2002	FISHERIES MANAGEMENT ACT 2002
MOF	MINISTRY OF FISHERIES
MCS	MONITORING, CONTROL AND SURVEILLANCE
NIWA	NATONAL INSTITUTE OF WATER AND ATMOSPHERIC RESEARCH
SPC	SECRETARIAT OF THE PACIFIC COMMUNITY
SFMP 2007	SNAPPER FISHERY MANAGEMENT PLAN 2007
TAC	TOTAL ALLOWABLE CATCH
TDFMP	TONGA DEEPWATER FISHERIES MANAGEMENT PLAN
VMS	VESSEL MONITORING SYSTEM

1: INTRODUCTION

The Tonga Deepwater Fishery Management Plan guides the management and development of the deep slope resources of snapper, grouper and emperors in Tonga fisheries waters.

The Government of Tonga began promoting exploitation of deepwater resources of snapper, grouper and emperors in Tonga in 1980. The fishery was originally intended to relieve fishing pressure on inshore resources but developed into an export fishery that generated greater economic benefits from foreign revenue. In the recent years, the nature of the fisheries has changed, the majority of the target species are exported while the by-catch and shallow water species are sold at the local market. The exploitation level of deepwater fisheries resources was 360mt and TOP$2,192,621 export value from 2011-2015.

The Fisheries Management Act 2002 empowered the Ministry of Fisheries (MOF) to promote conservation, management, sustainable utilization and development of Deepwater fisheries resources. The Tonga Deepwater Fishery Management Plan (TDFMP) 2017-2019 is the third plan for this fishery and is based on the Tonga Deepwater Fisheries Management Plan 2014 -2016 and the previous Snapper Fisheries Management Plan (SFMP) 2007. This management plan has been established through consultations and cooperation with stakeholders.

2. LEGAL CONTEXT

The legal foundation for this plan is stipulated in provisions of the Fisheries Management Act 2002. The Acts provides for the "conservation, management, sustainable utilization and development of fisheries resources in the fisheries waters and ensures implementation of the plan".

Section 7 of the Fisheries Management Act 2002 requires the CEOfor Fisheries 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.

The policy direction for the Tonga Deepwater Fisheries Management Plan 2017 -2019 is to ensure a responsible fishing, participation by stakeholders, sustainable utilisation and an economically viable fishing sector for Tonga.

3. GOAL

" A sustainable multispecies fishery maximizing export returns while ensuring viability of the fleet to enhance livelihood as well as food security for all Tongans."

4. PURPOSE

To promote the conservation, management, sustainable utilization of Tonga fisheries resources. The plan encourages co-management of the resources to foster and active partnership with fishers and stakeholders and government.

5. SCOPE AND APPLICATION

Tonga Deepwater Fisheries Management and Development Plan 2017-2019 applies to Tonga Drop Line Bottom Fishery, Deepwater Drop Line Fishery and Deepwater Snapper Fishery and also the following:

a) Fishing for deep bottom fish (demersal) species ***(Appendix 1: List of species)***, by fishing gear that includes, but not limited to;

Drop lining (a weighted line with baited hooks attached)

b) The target and non-target, associated or dependent species taken in the course of fishing for the following species. ***(Appendix 1)***

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, including, but not necessarily limited to:
   a) Transhipping;
   b) Bait fishing;
   c) Provisioning and all other services relating to the snapper & grouper fisheries,

f. Chief Executive Officer (CEO) for MOF shall consider this plan when exploratory or test fishing authorisations are granted to any applicant for

any kind of deepwater fishing activity, which will affect this fisheries, including marine scientific research fishing

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

6. AUTHORITIES AND ROLES

Ministry of Fisheries plays a primary roles in promoting conservation, management, sustainable utilization and development of deepwater fisheries resources. The plan also acknowledges the different stakeholders within the fisheries and the Deepwater Fisheries Management Committee (DFMC) **(*Appendix 3*)** and their respective roles in co-managing the fishery.

7. COMMENCEMENT AND REVIEW

This plan is effective after it is approved by the Minister responsible for fisheries.
Pursuant to Section 7(1) of the FMAct 2002, the CEO is responsible for the review of the plan. This includes organizing consultations with key stakeholders in the review of the plan.

The progress of implementing of the DFMP shall be reported in the Annual Report of the Ministry of Fisheries.

There will be a mid-term review of the plan in 2018 and the completion of the plan in 2019 or earlier as deemed necessary. The Ministry of Fisheries is currently working with the Governement of New Zealand under the National Institute of Water and Atmospheric Research (NIWA) funded project which aim at improving governance, management and economic and biological sustainable of the demersal line fishery in Tonga. The outcomes and informations from this project will inform the review of new management plan at the end of 2019.

8. OBJECTIVES, STRATEGIES AND INDICATORS

OBJECTIVES	STRATEGIES	INDICATORS
Objective 1: To manage the fishery at a more sustainable level	1. Limit the catch through a Total Allowable Catch (TAC) of 200tons per year.	i. Total annual catch of deepwater and snapper species must be 200mt or less during the fishing year ii. Total annual effort (both in number of trips and number of hooks/hours) iii. Catch rate (catch per trip) and catch per unit effort (CPUE as catch per hook/hour)
	2. Limit the number of snapper and deepwater fishing license to a total number of 30 fishing vessels during the duration of the plan	i. Total annual number of licensed fishing vessel license to fish is 30 or less in the next 3 years.
	3. Impose a maximum length of 23 meters on all fishing vessels	i. All licensed vessels comply with the maximum length approved.
	4. All vessels registered & licensed	i. 100% of deepwater fishing vessels are registered and licensed ii. Licence suspended for breaking the law
	5. Vessels fitted with operational VMS	i. All licensed vessel installed operational VMS in the vessel ii. Number of infringements and temporary suspension of licence relating to non operating VMS

	6. Fuel concession continue to encourage data collection & monitoring	i. Logsheet and landing data provided to MOF before issues fuel for next trip
Objective 2: Protect a number of seamounts (and banks) as a safety valve for stock sustainability and for protecting juvenile fish	1. Seek assistance from SPC to conduct survey of seamount OR follow-up reports on past studies/survey on seamounts in Tonga.	i. Existing seamount surveyed with approx. level of catch in each seamounts and banks ii. New seamounts and banks identified and record
Objective 3: To improve/increase the return of the fishery to fishers, processors and exporters	1. Conduct economic analysis of the fishery 2. Encourage economic efficiency of vessels. 3. Maximize the export revenue in the fishery 4. Upgrade ageing fleet and inefficient fishing technologies 5. Conduct market research on market available to promote market diversity for all deepwater and snapper species	i. Outcome of economic assessment inform decision on effort and catch ii. Assessment report of efficiency of each vessels and advice owner iii. Increase in percentage of deepawter snapper export by fisherman vi. Train fisherman in fish handling technique to suit the market requirements v. New markets available for other deepwater and snapper species in addition to existing markets
Objective 4: To contribute to the food security and livelihoods of Tongan people through employment opportunities	1. Ensure Tongans benefit through employment opportunities provided by the fishery.	i. Increased number of employment of Tongans in each company either as captain,crew, boatmen or process workers ii. Increased availability of fish at the local market
Objective 5: To manage the fishery in a cooperative and participatory way including all stakeholders	1. Revive Deepwater Fisheries Management Committee(DFMC) and conduct regular meeting of the committee	i. DFMC review and agreed with measures in the plan. ii. DFMC are constantly update with development and changes to the plan. iii. Number of adhoc meeting conducted

Objective 6: Provide stakeholders with the formalised regulations	1. Formalize the draft Deepwater fisheries regulation	i. Regulation approved for MOF and stakeholders to use.
Objectives 7: Develop effective MCS plan to assist the implementation of the plan	1. Implement and monitor measures in the plan 2. Report on performance of each vessel	i. MCS report on compliance with regulation and rules presented in the quarterly data working group meeting ii. Performance of each vessel readily available to be use
Objectives 8: Develop effective M&E to track the performance of management	1. Develop and monitor indicators set for the performance of the plan. 2. Evaluate trends against benchmark made regularly.	i. Indicators and benchmark for each objectives drafted and monitor during the life of the plan

9. MANAGEMENT MEASURES

The following management measures shall be implemented to meet the goal and objectives of the plan. It emphasise the need to limit the access and effort to the fishery and co-managing of the resources with the stakeholders. There is also a need for a proper data collection method and a good MCS plan in place for monitoring purposes.

1: Catch

1.1. The Total allowable catch (TAC) of 200 tonnes for all deepwater snapper species combined annually.

1.2. A minimum size limit of 48 cm for flametail snapper (fish under this size can form no more than 20% of the total catch landed)

1.3. The catch may only include those species specified in ***(Appendix 1).***

1.4. Skippers will be required to avoid seamounts where large numbers of small fish are caught.

2: Gear and boat restrictions

2.1. To address the objectives of this plan, the number of licensed boats should be reduced. The fishery has been limit through boat limitation and catch limitation. The maximum number of Deepwater Fishery licence is limited to thirty (30) licences provided that this nuber will be reviewed during the mid-term review at the end of 2018;

2.2. The maximum length of all fishing vessels to be licenced in this fishery is 23 meters and vessels are to fish from slopes and seamounts in depth deeper than 50m. This is to prevent very large vessels entering the fishery;

2.3. All fishing vessels fishing in this fishery (local fishing vessel) shall be registered and licensed to fish for deepwater and snapper species in accordance with the Act and the Fisheries (Local Fishing) Regulations 2009. Licence terms and conditions ***(Appendix 4)*** will be used to control the catch and export of deepwater and snapper product;

2.4. A licence to fish for deepwater and snapper resources shall be issued for a one year term, which shall be subject to annual reviews and payment of annual licence fee. This licence is not transferable. Licences will not be issued unless the required fees are paid ***(Appendix 5)***.

2.5. All vessels shall have all the "Vessel Identification Markings" as prescribed in Schedule 3 of the Fisheries (Local Fishing) Regulations 1995; Sect 9(c), 17 (c).

2.6. Licence holders will allow and assist any observer/authorised officer to carry out their duties;
2.7. All vessels fishing in the fishery are to be fitted with VMS.
2.8. The fuel concession that provides incentives for fishers to provide the necessary data and informations required to manage the fishery should stay in place.
2.9. License suspended for breaking laws and rules and penalties set out in FMA2002 applied.

3. Monitoring and Reporting requirements

3.1. A Deepwater Fisheries approved Log Sheet shall be completed by the Master and shall be submit 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 catches and by-catches by species and quantities.

3.2. The master or fishing agent shall submit the vessel unloading catch record, in the form approved by the CEO, Ministry of Fisheries, three (3) days after the unloading. If this form is not provided, export permits will not be issued;

3.3. Upon submitting of the Deepwater Fishery Export Log Sheet an Export Permit issued by the Ministry of Fisheries is required for each shipment of deepwater and snapper products. The Deepwater Fishery Export Log Sheet must list all species and quantities, destination, and other information as requested by the Ministry of Fisheries and the importing country:

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

4. Export and markets

The Ministry of Fisheries will conduct market research and explore new international market opportunity for the fishery. Training of best practice in handling of fish and icing is also an ongoing need of the fisherman.

5. Consultative co-management Framework

The Minister responsible for fisheries will manage the fishery in cooperation with stakeholders through participatory (co-management approach) management. Participatory management facilitates the sharing of information, input into the development of MCS measures and promotion of voluntary compliance, fostering of co-management with the industry so they can assist in monitoring their fishery and report on non-

compliant activity. The Fisheries Management Act 2002 states that there may be established a Management committee for each major fishery in Tonga. Functions and roles of the Deepwater Fisheries Management Committee (DFMC) is appended in ***Appendix 3.***

6. MCS Issues

The monitoring, control and surveillance (MCS) issues for this fishery will depend on the management objectives and measures finally agreed. Vessels licensed for deepwater snapper fishing are fitted with VMS and adhere to the VMS regulations and other legal VMS requirements as set by CEO for Fisheries.

Regardless of the measures, monitoing of licenses need to be strictly enforced. Boats <6m that presently do not need to be licensed will need to be brought into the scheme. If boats want to fish both tuna and snapper, a dual license will be required.

The fines and prosecution procedures are detailed in Section 19 of the FM 2002, and need to be strictly enforced to meet the objectives of this plan.

7. Monitoring and Evaluation (M&E) of Management performance

The main indicators that require ongoing monitoring of the plan were under each of the DWFM objectives in Section 8 of this plan.

The Ministry of Fisheries has a number of sources of data for monitoring of the deepwater snapper fishery:

1. *Log sheets:* All requirements of the log sheets are detailed in the Terms and Conditions of licenses.
2. *Port Sampling:* All requirements of the port sampling are detailed in the Terms and Conditions of licenses.
3. *Packing Sheets:* Export data are submitted (pre-export) to the MOF in a prescribed Packing List. A fully detailed packing list is submitted to Customs and stamped when approved. This copy is submitted (post export) to the MOF. These data include destination, weight, species, local price and in some cases a value for export price.
4. *Local Market Records:* Ministry staff at the Tuimatamoana Market currently record catch landed from both licensed and unlicensed vessels by species, weight, boat owner, trip departure and arrival dates and times.
5. *Vessel Monitoring System:* All licensed deepwater bottom fishing vessels are required to operate with VMS.

For economic analyses, additional data will be required. This could be obtained from a sample of companies and boats and include major costs of fishing (i) fuel, (ii) fishing gear, (iii) bait, (iv) food and supplies, (v) ice, (vi) crew wages, (vii) depreciation, and (viii) miscellaneous.

The collation, analysis and presentation of these data are required for evaluating the fishery performance and the responsibility of the MOF. This should take the form of reporting the indicator against its agreed benchmark. This M&E of fisheries performance should be incorporated into the consultative process and reported to the quarterly meetings of the DFMC.

The plan is to keep simple, and use indicators such as catch rates and size of fish which can be easily monitored, yet still provide an indication of the biological and economic sustainability.

10. ANNEXES

Annex 1: Implementation Schedules

Tonga Deepwater Fisheries Management Plan (DFMP) 2017-2019

IMPLEMENTATION SCHEDULES

GOAL: ***"A sustainable multispecies fishery maximizing export returns while ensuring viability of the fleet to enhance livelihood as well as food security for all Tongans."***

OBJECTIVES:

1. To manage the fishery at a more sustainable level
2. Protect a number of seamounts (and banks) as a safety valve for stock sustainability and for protecting juvenile fish
3. To improve/increase the return of the fishery to fishers, processors and exporters
4. To contribute to the food security and livelihoods of Tongan people through employment opportunities
5. To manage the fishery in a cooperative and participatory way including all stakeholders
6. Provide stakeholders with the formalised regulations
7. Develop effective MCS Plans to assist the implementation of the plan
8. Develop effective M&E to track the performance of management

POLICY AREA/SUB-SECTOR: FISHERIES SECTOR IN TONGA

SUB-SECTOR: Deepwater Fisheries in Tonga

Implementation Schedules Table

OBJECTIVES	STRATEGIES	INDICATORS	Monitoring Plan for each strategy	Responsibility for Implementation	Time Frame	Quarterly performance evaluation
Objective 1: To manage the fishery at a more sustainable level	1. Limit the catch through a Total Allowable Catch (TAC) of 200tons per year.	i. Total annual catch of deepwater and snapper species must be 200mt or less during the fishing year ii. Total annual effort (both in number of trips and number of hooks/hours) iii. Catch rate (catch per trip) and catch per unit effort (CPUE as catch per hook/hour)	i. Monitor through logsheet and port sampling reports from Offshore Section ii. Update license vessel owners on status of the catch especially when TAC almost reached	FMDD and FSD	Quarterly	
	2. Limit the number of snapper and deepwater fishing license to a total number of 30 fishing vessels during the duration of the plan	i. Total annual number of licensed fishing vessel license to fish is 30 or less in the next 3 years.	Monitor through reports from Licensing Section	FMDD and FCD	Quarterly	

	3. Impose a maximum length of 23 meters on all fishing vessels	i. All licensed vessels comply with the maximum length approved.	Monitor through Port and Inspection reports from Licensing Section	FMDD and FCD	Quarterly	
	4. All vessels registered & licensed	i. 100% of deepwater fishing vessels are registered and licensed ii. Licence suspended for breaking the law	Monitor through Port and Inspection reports from Licensing Section	FMDD and FCD	Quarterly	
	5. Vessels fitted with operational VMS	i. All licensed vessel installed operational VMS in the vessel ii. Number of infringements and temporary suspension of licence relating to non -compliance with VMS requirements	Monitor through Port and Inspection reports from Licensing Section	FMDD and FCD	Quarterly	
	6. Fuel concession continue to encourage data collection & monitoring	i. Logsheet and landing data provided to MOF before issues fuel for next trip	Monitor through Offshore report and verify data	FMDD and FSD	Quarterly	

Objective 2: Protect a number of seamounts (and banks) as a safety valve for stock sustainability and for protecting juvenile fish	1. Seek assistance from SPC to conduct survey of seamount OR follow-up reports on past studies/survey on seamounts in Tonga.	i. Existing seamount surveyed with approx. level of catch in each seamounts and banks ii. New seamounts and banks identified and record	Follow-up with SPC reports on past studies and survey on seamount in Tonga. Commence monitoring work once seamounts are identified	FMDD	Commence once the plan approved	
Objective 3: To improve/increase the return of the fishery to fishers, processors and exporters	1. Conduct economic analysis of the fishery 2. Encourage economic efficiency of vessels. 3. Maximize the export revenue in the fishery 4. Upgrade ageing fleet and inefficient fishing technologies 5. Conduct market research on market available to promote market diversity for all deepwater and snapper species	i. Economic assessment report informs decision on effort and catch limitation. ii. Assessment report of efficiency of each vessels and advice owner iii. Increase in percentage of deepwater snapper export by fisherman vi. Improve fisherman skills in fish handling technique to suit the market requirements v. New markets available for other deepwater and snapper species in addition to existing markets	Number of vessel will be based on Economic assessment report, also advice vessel owner on the efficiency of the vessel Ensure ongoing market research to secure new market for snapper species	FMDD – Seek assistance from SPC on economic assessment of the each vessels	Commence once the plan approved	

Objective 4: To contribute to the food security and livelihoods of Tongan people through employment opportunities	1. Ensure Tongans benefit through employment opportunities provided by the fishery.	i. Increased number of employment of Tongans in each company either as captain, crew, boatmen or process workers ii. Increased availability of fish at the local market	MCS report on the performance of each vessel to include crew members	FMDD	Ongoing	
Objective 5: To manage the fishery in a cooperative and participatory way including all stakeholders	1. Revive Deepwater Fisheries Management Committee(DFMC) and conduct regular meeting of the committee	i. DFMC review and agreed with measures in the plan. ii. DFMC are constantly update with development and changes to the plan. iii. Number of adhoc meeting conducted	Monitor interaction with stakeholder in all meeting. Update DFMC in all new development for the fishery	FMDD	Commence once the plan approved	
Objective 6: Provide stakeholders with the formalised regulations	1. Formalize the draft Deepwater fisheries regulation	i. Regulation approved for MOF and stakeholders to use.	Discuss with legal officer	FMDD and Legal Section		

Objectives 7: Develop effective MCS plan to assist the implementation of the plan	1. Implement and monitor measures in the plan 2. Report on performance of each vessel	i. MCS report on compliance with regulation and rules presented in the quarterly data working group meeting ii. Performance of each vessel readily available to be use	MCS quarterly report compliance of vessels	FMDD and FCD		
Objectives 8: Develop effective M&E to track the performance of management	1. Develop and monitor indicators set for the performance of the plan. 2. Evaluate trends against benchmark made regularly.	i. Indicators and benchmark for each objectives drafted and monitor during the life of the plan	Quarterly monitor and evaluate of indicators	FMDD		

Annex 2: State of Tonga's Deepwater Fisheries and Characterisation

Annex 2a: Background information on the deepwater fishery

The drop line fishery exploits a multi-species assemblage of members of the family *Lutjanidae* (snappers), *Lethrinidae* (emperors) and *Serranidae* (groupers). Drop line 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.

Species of these families are bottom dwelling carnivores that feed on benthic fishes and crustaceans. The life history characteristics of these species make them vulnerable to over-fishing and exploitation - long longevity, slow-growing, low rates of natural mortality, large size at sexual maturity and spawning aggregations. Although there is uncertainty about the degree of migration between seamounts, limited data does suggest that seamounts support relatively isolated meta-populations (MRAG, 1994).

Collection of catch, effort and size frequency data began in the 1986. Unfortunately it has not been collected consistently, often due to limited staff and funds. This has resulted in data deficiencies at certain times, especially in the 2000s. The establishment of the Fuel Concession in 2000 provided a mechanism for encouraging supply of quality log-sheet and offloading data from licensed fishers. Data collection systems were reviewed in 2004 and since then checking and validation mechanisms have been in place to ensure data quality and completeness. Data collected from 2006 to 2016 are of a high quality.

Research has been conducted in Tonga and in other areas of the Pacific to obtain life history parameters to aid in management. ***Annex 2b*** provides a summary of the known biology of the main species.

Annex 2b: Biological characteristics of target and non-target species

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

1. ***Aphareus rutilans***	
Family	Lutjanidae (Snappers)
Common name	Rusty jobfish (palu polosi)
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. ***Aprion virescens***	
Family	Lutianidae (Snappers)
Common name	Green jobfish ('utu)
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 time 1.4 - 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. **Caranx melampygus***	
Family	Carangidae (Jacks and pompanos)
Common name	Bluefin trevally (lupo)
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 crusta-

	ceans. Often toxic when it reaches a length of more than 50 cm.
4. ***Epinephelus morio***	
Family	Serranidae (Sea basses: groupers and fairy basslets), sub-family: Epinephelinae
Common name	Red grouper (ngatala kula)
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. ***Epinephelus morrhua***	
Family	Serranidae (Sea basses: groupers and fairy basslets) , sub-family: Epinephelinae
Common name	Comet grouper (ngatala pusi)
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	Deep-water 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 deep-water groupers. Known to be ciguatoxic at Mauritius. Reports of ciguatera poisoning.
6. *Epinephelus octofasciatus*	

Family	Serranidae (Sea basses: groupers and fairy basslets) , sub-family: Epinephelinae
Common name	Eightbar grouper (mohuafi)
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 poi-soning
7. *Etelis coruscans***	
Family	Lutjanidae (Snappers) , subfamily: Etelinae
Common name	Flame snapper / longtail snapper (palu tavake)
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 crusta-ceans.
8. *Lethrinus miniatus*	
Family	Lethrinidae (Emperors or scavengers), subfamily: Lethrini-nae
Common name	Longnose emperor (ngutukao)
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, mollusks and fish, with crabs and sea urchins predominating.
9. *Lethrinus chrysostomus*	
Family	Lethrinidae (Emperors or scavengers) , subfamily: Lethrininae
Common name	Sweetlip emperor (manga)
Max. size	
Sexual maturity	
Environment	
Resilience	
Biology	Feeds on crustaceans, echinoderms and molluscs, crabs and sea urchins. Carnivorous bottom feeders quite selective and individualistic in their diet.
10. *Paracaesio kusakarii*	
Family	Lutjanidae (Snappers) , subfamily: Apsilinae
Common name	Saddle-back snapper / sea bream (palu mutumutu)
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.

11. *Pristipomoides argyrogrammicus*	
Family	Lutjanidae (Snappers), subfamily: Etelinae
Common name	Ornate jobfish (‘utu)
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.

12. *Pristipomoides filamentosus* **	
Family	Lutjanidae (Snappers) , subfamily: Etelinae
Common name	Crimson jobfish (palu hina)
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.
13. *Pristipomoides flavipinnis*	
Family	Lutjanidae (Snappers) , subfamily: Etelinae
Common name	Golden eye jobfish (palu sio'ata)
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.
14. *Hyperoglyphe antarctica*	
Family	Centrolophidae (Medusafishes)
Common name	Antarctic butterfish (sifisifi)
Max. size	140 cm TL (male/unsexed; Ref. 9563); max. published weight: 60.0 kg; max. reported age: 15 years
Environment	benthopelagic; marine; depth range 40 – 1500 m
Resilience	Low, minimum population doubling time 4.5 - 14 years (K=0.03-0.3; tm=5-7; tmax=15)
Biology	Most common over or near rocky areas at 100-300 m. Generally, blue eye remain close to the sea bed during the day and move up in the water column at night, following concentrations of food. The fish are found over rough ground and at the edges of canyons and steep drop-offs. Blue eye appear to prefer cold water as part of their general behavior. Juveniles inhabit surface waters,

	sometimes in association with floating debris. Feed primarily on the pelagic tunicate *Pyrosoma atlantica* which is found near the sea bed during the day but dispersed throughout the water column at night. They also feed on squid, mollusks and crustaceans and fish ranging from small lanternfish (Myctophidae) to large fish such as gemfish (*Rexea solandri*). Juveniles consume small planktonic and sedentary organisms.
15. *Etelis carbunculus*	
Family	Lutjanidae (Snappers) , subfamily: Etelinae
Common name	Ruby snapper / red snapper / short-tailed red snapper (palu malau)
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.
16. *Epinephelus septemfasciatus*	
Family	Serranidae (Sea basses: groupers and fairy basslets) , subfamily: Epinephelinae
Common name	Convict grouper (mohuafi)
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)

Annex 2c: Fleet size

Fleet size – The fleet is currently comprised of two basic classes of boats, the older, smaller vessels constructed under the UN Project in 1988 and the modern larger vessels of greater capacity.

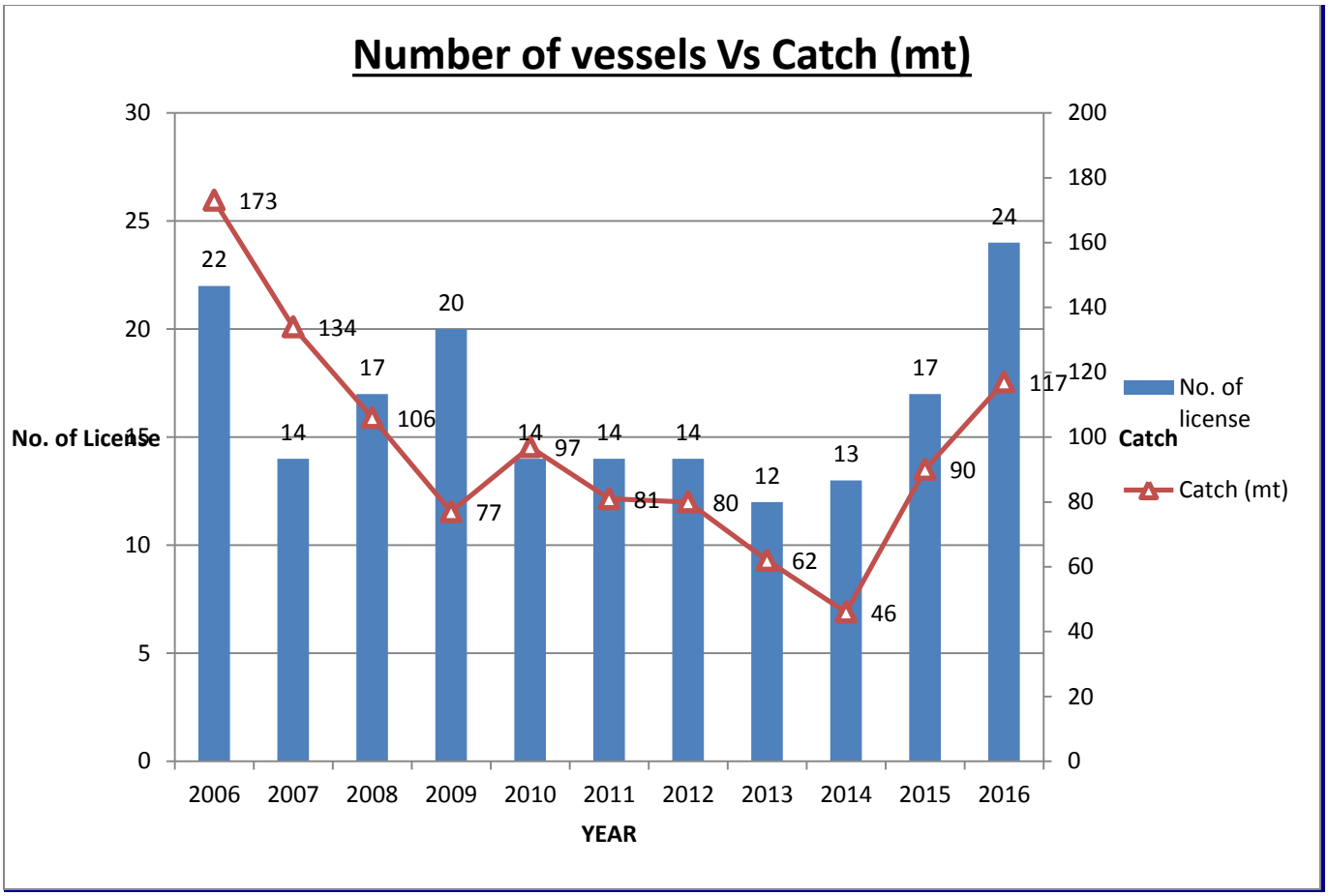
Prior to 2010 the deepwater fleet consisted of around 17-23 local fishing vessels. A decline in number of deepwater fishery licensed between 2010 – 2014 was due to the high cost of operation and ageing fleet not upraded. In 2014, the government establised the Government managed-fund with aiming at improving the cooperation between fisherman, vessel owner and exporters so that all parties can work more effectively together to generate increased exports, income and employment in the fisheries sector , and for these benefits to be shared more equitably amongst the fisheries sector. The availability of funding in 2014 enable the vessel owners to upgrade their vessels and cause an increase in the size of the fleet in 2015 and continuously in 2016.

Number of Deepwater fishery vessel, 2005-2016

Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
No. of licence DWFV	23	22	14	17	20	14	14	14	12	13	17	24

Annex 2d: Present state of exploitation

Recent trends of activity show vessel numbers have been decreasing from 2009 and slowly increasing in 2014-2016. The same trends shows in the catch history which shows that the highest catch was 2006 and then drop in number of catch and slowly increase in 2015- 2016 due to more vessels enter the fishery.


Number of vessels Vs Catch (mt)
No. of License
Catch
YEAR
No. of license
Catch (mt)
30
25
20
15
10
5
0
200
180
160
140
120
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
22
14
17
20
14
14
14
12
13
17
24
173
134
106
77
97
81
80
62
46
90
117

Annex 3: Deepwater Fishery Management Committee

Section 7(4) of the FMAct stated that the Deepwater Fishery Management Committee,(DFMC) "shall be primarily responsible for the implementation and review of the fishery plan or otherwise monitor the performance of the fishery subject of the fishery plan or perform such other duties and responsibilities as are given it under the fishery plan consistent with this Act".

Functions of the Committee
The functions of the Deepwater Fishery Management Committee (DFMC) will be to:

a) Review the performance of the Tonga Deepwater Fishery Management Plan over the previous twelve months; AND provide recommendations and advice to the CEO on changes to the Plan;
b) Provide a forum for discussion of issues and strategies that require the input of all stakeholders, industry, other government ministries and the MOF through the development of guidelines for decision-making, consultation and administration in regard to the deepwater line fishery;
c) Advise the Minister and CEO on the effective management and administration of the Deepwater Line Fishery through the establishment of objectives and strategic directions for the conservation and management of deepwater line fishery resources;
d) Provide recommendations and advice to the CEO relating to the deepwater line fishery operations on a regular basis for management and operational purposes through clear and transparent rules for licensing, monitoring and regulating deepwater fishing activities in Tonga's fishery waters;
e) Establish measures for deepwater conservation and management at the national level which are compatible with those established both regionally and internationally;
f) Ensure transparent decision making in regards to the deepwater line fishery;

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

- 3 representatives from National Fisheries Council (NFC)/Deepwater Snapper fisherman&license holders/sub-sector (Three representatives are all from Tongatapu deepwater fisheries license holders);
- A representative from the Vava'u and Ha'apai deepwater snapper fisheries license holders;
- A representative of the small-scale fisheries sub-sector;
- ad hoc advisors and members as determined by the Committee Chair;
- Fisheries Management representative from the MOF;

- Compliance representative from the MOF;
- Representatives from such other government ministries/departments as selected by the CEO for MOF;

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

Frequency of Meetings
The DFMC shall meet every quarter, and further as required by the Chair to address specific matters.

Annex 4: Term and Conditions

Annex 4a: Fishing License 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 license or certified copy on board at all times and shall produce the license 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 effort[1]" 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 by-catches 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 by-catches 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: License 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 license 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.

License 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, the following applies:

(1) A license 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;
(ii) fish products are processed in a licensed fish processing establishment pursuant to an effective HACCP system;
(iii) 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;
(iv) the exporter demonstrating that they can consistently meet the appropriate standards regarding microbial and natural toxin contamination, chemical contamination and physical contamination;
(v) 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
(vi) 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 license holder.

(3) A license 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 license 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) License 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.

Annex 5: 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 *Tohi kole ke lesisita ha fale ngaohi'anga ika*	$5.00
2.	Certificate of registration of a fish processing establishment *Tohi Fakamo'oni kuo lesisita ha fale ngaohi'anga ika*	$10.00
3.	Application for a fish processing establishment license *Tohi kole ki ha laiseni fale ngaohi'anga ika*	$50.00
4.	Application to renew a fish processing establishment license *Tohi kole ke fakafo'ou ha laiseni fale ngaohi'anga ika*	$10.00
5.	Fish Processing Establishment License *Laiseni 'o e Fale Ngaohi'anga Ika*	$100.00
6.	Application for a fish export license *Tohi kole ki ha laiseni ke hu atu ki tu'apule'anga 'a e ika*	$50.00
7.	Application to renew a fish export license *Tohi kole ke fakafo'ou 'a e laiseni ke hu atu ki tu'apule'anga 'ae ika*	$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