



KINGDOM OF TONGA REVISED SHARK-PLAN (2018-2022)



Blue Shark (*Prionace glauca*)



Oceanic Whitetip shark
(*Carcharhinus longimanus*)



Silky Shark
(*Carcharhinus falciformis*)

January 2018

Prepared by

Ministry of Fisheries & Pacific Islands Forum Fisheries Agency

FOREWORD

The Kingdom of Tonga revised National Plan of Action for Sharks (Shark Plan) is intended to provide a comprehensive set of policies aimed at guiding the efforts of the Ministry of Fisheries in the conservation and management of oceanic sharks in Tonga's fisheries waters. These efforts are consistent with directions of Forum Leaders to promote stock sustainability and ensure maximum economic benefit from marine resources. As the Tonga begins to witness the steady increase in the influx of foreign fishing vessels, particularly in the tuna longline fishery, since the lifting of the moratorium, data collected since then, point to an overwhelming increase in the percentage of oceanic sharks that are caught as by-catch.

Without a National Plan of Action (NPOA) to guide and manage the activities of those engaged in the tuna longline fishery as to shark as a by-catch, catch of relevant oceanic shark species is, at current (accidental) catch levels, will continue to increase. Not only is such a scenario detrimental to Tonga's future plans to develop its domestic tuna fishery, but Tonga could be viewed as failing in its national and international obligations to conserve and manage the relevant species of oceanic sharks in its fisheries waters. Tonga's obligations in this respect are not only apparent under national law, but emanate from its participation in the Western and Central Pacific Fisheries Convention, and in particular, the relevant sharks conservation and management measures. Therefore failing to implement the necessary policy framework, such as this plan, to minimize and reduce the accidental harvesting of the oceanic shark species not only encourages adverse international media coverage of the Kingdom's actions, but it is in itself a failure to uphold an international obligation.

To this end, I, as Minister responsible, and on behalf of the Cabinet, welcome this new development whole-heartedly. May I also take this opportunity to pledge the support of Cabinet in this endeavour, as we look ahead to the implementation of the plan, over the course of the next four years.



Hon. Semisi Tauelangi Fakahau

Minister of Agriculture and Food, Forests and Fisheries



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ACRONYMS

NPOA	National Plan of Action
IPOA	International Plan of Action
WCPO	Western and Central Pacific Ocean
MF	Ministry of Fisheries
MCS	Monitoring, Control and Surveillance
EAFM	Ecosystem approach to fisheries management
TMDP	Tuna Management and Development Plan
OP	Operational Plan
WCPFC	Western and Central Pacific Fisheries Commission
CMM	Conservation and Management Measure
FFA	Secretariat of the Pacific Islands Forum Fisheries Agency
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
FAO	Food and Agriculture Organisation
CCRF	FAO Code of Conduct for Responsible Fisheries
SB _{MSY}	Spawning biomass producing maximum sustainable yield
F _{MSY}	Level of fishing mortality that can be sustainably borne by the stock

1. PURPOSE

The Tonga NPOA (sharks) is a policy guideline that ensures conservation and management of oceanic sharks in the Kingdom's fisheries waters. It also promotes long-term sustainability and optimum use of sharks in Tonga's Tuna longline fishery in accordance to national development policy frameworks, and special needs and requirements to develop and commercialise its fisheries. In the medium-long term, the Plan serves to minimize any adverse environmental effects of fishing on oceanic shark species.

2. SCOPE

Tonga NPOA (sharks) applies to Tonga's fisheries waters of which sharks (including mantas and rays) are caught as accidental and by-catches. The Plan is focused predominantly on longline gear, however it also extends to other gears that catch sharks as accidental and by-catches.

This Plan applies to current and future fishing vessels categorised as domestic, licensed and flag to Tonga. All fishing vessels under access and partnership arrangements, which may be active in national fisheries waters and in the high seas, are also included. Moreover, this Plan will apply to Tonga vessels or scientific research vessels which may conduct directed or experimental fishing for sharks or if vessels regularly catch sharks in non-directed/ experimental fisheries such as the longline fishery anywhere in the WCPO. Artisanal, Sport fishing and Community fisheries are also covered under this shark plan.

3. REVIEW

The period of this Plan is four years and will be reviewed annually plus a mid-term review at the end of the second year of implementation. FAO recommends review of the Plan at least every four years. The reviews should take into consideration latest stock assessments on key shark species including available shark data in TUFMAN, latest decisions of the WCPFC and other relevant international and regional shark instruments which Tonga is a Party or cooperating non-member. The review will identify gaps and highlight specific areas of improvement and cost-effective strategic interventions thereby increasing the Plan effectiveness.

4. PLANNING & REPORTING

Tonga's Ministry of Fisheries will report on the implementation of this Plan as part of its Annual Report, and if relevant, other fisheries related forums and committees. Progress of implementation will also be reported in part through Tonga's WCPFC Part I & 2 reports and direct report to FAO relative to the implementation status of the IPOA and NPOA (sharks), consistent with reporting requirements against CMM2010-07 paras, 2 & 4, CMM2011-04 para.3, CMM2012-04 paras.3 & 6.

The FAO recommends production of sharks assessment reports that should contain threats, management and stock status of any elasmobranchs that occur in fisheries waters, whether target or non-target species.

5. LEGAL CONTEXT

The overarching legal basis of this Plan is enshrined in the Fisheries Management Act, 2002. The Act provides for the conservation, management and sustainable utilization and development of the fisheries resources in the fisheries waters in the Kingdom. Section 7 allows the development, review and implementation of management and development plans. Other relevant sections of the Act for this Plan include sections 3 and 5 addressing the Minister's responsibility and principles to be accommodated in decision-making respectively.

The Plan also draws on relevant international and regional instruments such as the FAO-International Plan of Action for Sharks (FAO IPOA sharks), FAO Code of Practice for Responsible Fisheries, Regional Plan of Action (Sharks) and WCPFC conservation and management measures on sharks (CMM2010-07; CMM2011-04; CMM2012-04). More importantly the Plan needs to align and consistent with Tonga National Development Strategy, strategic policy directions under its Tuna Management and Development Plan 2018 - 2022 and other relevant legislations and policies of the government.

6. GUIDING PRINCIPLES

Drawing from the FAO IPOA sharks (FAO, 1999) and relevant shark related instruments, the key guiding principles under this Shark Plan shall be:-

<i>Participation</i>	Effective participation in shark management and contribute towards minimizing fishing mortality on shark species or stocks.
<i>Sustaining stocks</i>	Management and conservation strategies should aim to keep total fishing mortality for each stock within sustainable levels by applying the precautionary approach.
<i>Nutritional & socio-economic considerations</i>	Management and conservation objectives and strategies should recognize that in some low-income food-deficit communities in the Kingdom, shark catches are a traditional and important source of food, employment and/or income. Such catches should be managed on a sustainable basis to provide a continued source of food, employment and income to local communities.
<i>Cooperation & integration</i>	Require for the fullest possible cooperation among government and non-government agencies and institutions, stakeholders of the fishing industry and local communities, and engagement pursuant to this Shark Plan, TMDP and broader regional and international technical guidelines and measures on sharks.
<i>Scientific & political actions</i>	Scientific and political actions, as appropriate, which are responsible for the management of migratory shark fisheries, and the need to strengthen and improve their role in taking measures to improve or restore a favourable conservation status of sharks listed in the WCPFC CMMs related to sharks.

<i>Best available science on sharks</i>	Sharks should manage to allow for sustainable harvest where appropriate, through conservation and management measures based on the best available science information.
<i>Ecosystem & precautionary principles</i>	Measures given in the Plan should apply widely both an ecosystem and precautionary principle. Lack of scientific certainty should not be used as a reason for postponing measures to enhance the conservation status of sharks in the Kingdom's fisheries waters.
<i>Monitoring & compliance</i>	Promotes effective monitoring of fishing activities and ensures compliance to shark measures in this Plan. All licensed fishing may establish by mutual consent verifiable reporting systems incl. logsheet and observer reports that include full reporting of shark related data and information pursuant to this Shark Plan, TMDP and broader regional and international guidelines and measures on sharks

7. PREPARATION & STRUCTURE

This revised Plan was prepared through effective participation and engagement of all stakeholders consistent with requirements of the FAO IPOA (sharks). The basis is clearly to raise level of awareness and promote ownership of the Plan by all relevant stakeholders.

Under this Plan the key components include a brief preamble section, key challenges, description of the current state of shark populations and a management framework covering key measures and actions. An implementation schedule provides a clear roadmap towards implementing specific measures/ actions over the 4-years timeframe. The effectiveness of management measures would be closely managed through the MCS framework, and, the mid-term review should provide for possible modifications, if necessary, of management measures.

8. OPERATIONAL OBJECTIVES

Further to the primary goal and purpose of the Plan outlined earlier, the following operational objectives are adapted from the FAO-IPOA sharks (FAO, 1999), Regional Shark Plan and also draws on the WCPFC CMM (sharks), and revised appropriately for implementation in Tonga fisheries waters. On this basis, the Tonga NPOA (sharks) should aim to:

- (i) Ensure that shark catches from oceanic and coastal fisheries are sustainable;
- (ii) Assess threats to shark populations, determine and protect critical habitats and implement harvesting strategies consistent with the principles of biological sustainability and rational long-term economic use;
- (iii) Identify and provide special attention, in particular to vulnerable, threatened shark stocks, and shark species of special interest;
- (iv) Improve and develop frameworks for establishing and coordinating effective consultation involving all stakeholders in research, management and educational initiatives;

- (v) Minimize unutilized incidental catches of sharks. Also minimize waste and discards from shark catches in accordance with Article 7.2.2.(g) of the Code of Conduct for Responsible Fisheries (for example, requiring the retention of sharks from which fins are removed). Encourage full use of dead sharks.
- (vi) Contribute to the protection of biodiversity and ecosystem structure and function;
- (vii) Facilitate improved species-specific catch and landings data and monitoring of shark catches;
- (viii) Facilitate the identification and reporting of species-specific biological and trade data;
- (ix) Implement all technical measures of the WCPFC CMM2010-07 (sharks);
- (x) Improve understanding of migratory shark populations through research, monitoring and information exchange;
- (xi) Build research, data collection, monitoring, compliance and enforcement capacity;
- (xii) Ensuring to the extent practicable the protection of critical habitats and migratory corridors and critical life stages of sharks; and
- (xiii) Increasing public awareness of threats to sharks and their habitats, and enhance public participation in conservation activities.

9. KEY CHALLENGES

Tonga does not have a dedicated domestic shark fishery and has no intention to close its waters to tuna fishing in order to ensure that no sharks at all are taken as by-catch. Historically, a relatively small proportion of shark by-catch was taken by Tonga's domestic longline vessels compared to shark by-catches in adjacent EEZs and the high seas, taken by vessels of other flags¹.

Until recent years, the implementation of shark measures set out under the current shark plan and legislations produced positive results, with reduction in the proportion of shark catches against total catches. These trends are very encouraging as it demonstrates Tonga's stern efforts to clear criticisms against high catches of sharks in 2015 following introduction of foreign fleets to fish in-zones.

The collection of shark data and the management of shark populations in Tonga's fisheries waters are essential for the broader conservation and management of key shark species in the WCPO. Tonga recognizes the importance of improving current knowledge of sharks and the practices resulting in shark by-catches in its domestic longline fishery. The Ministry of Fisheries identified the following challenges that this revised Plan aims to address:-

- (i) The issue of shark species identification remains a bottleneck for both observers and port samplers, which suggests need for training and up-skilling;
- (ii) There are no clear policies and regulations on the collection and reporting of shark catches in territorial waters. Collaborative work with coastal fisheries personnel

¹For the purposes of this Plan, Tonga's domestic longline vessels consist of "local fishing vessels", and "locally based foreign fishing vessels " as defined in the Fisheries Management Act, and including fishing vessels under bareboat charter arrangements under the Shipping Act'.

- and stakeholders may be necessary to better plan for the collection and reporting of shark data;
- (iii) The full utilization of shark meat is a challenge however improving and training on suite of recipe on shark meat could be further explored to meet dietary requirements, and thereby promote food security and campaign against NCDs;
 - (iv) Moderate progress of implementation of activities relative to capacity building, data collection, MCS and enforcement;
 - (v) Relatively low level of awareness by broader local populations and lack of interest by postgraduate and post-doctorate Tongan students in shark research;
 - (vi) Insufficient biological and environmental data on sharks;
 - (vii) Limited coordination on the collection of information on trans-boundary, straddling, highly migratory and high seas stocks of sharks;
 - (viii) Difficulty in achieving shark management goals in multispecies fisheries in which sharks are caught as incidental and by-catch;
 - (ix) Diminishing catches and catch rates with increase in fishing efforts (e.g. hook and vessel numbers); and
 - (x) Lack of skills and the difficulty amongst fishing masters to avoid incidental shark by-catch.

10. STATUS & DESCRIPTIONS of WCPO Sharks

Oceanic whitetip shark – The most recent stock assessment was conducted in 2012. Spawning biomass, total biomass and recruitment have all exhibited a declining trend since 1995 (the first year of the assessment) across the Pacific region as a whole, and the current spawning biomass is estimated to be at 15% of SB_{MSY} and current fishing mortality is estimated to be more than six times greater than F_{MSY} . The key conclusions are that overfishing is occurring and the stock is in a heavily overfished state relative to MSY-based reference points. The greatest impact on the stock is due to longline bycatch, with somewhat lower impacts from direct targeting by longliners and as bycatch in purse seine fisheries.

Silky shark – Silky shark is a low productivity species. The greatest impact on the stock is attributed to by-catch from the longline fishery in the tropical and subtropical areas. But there are also significant impacts from the purse seine fishery at lower latitudes which catches predominantly juvenile sharks. The most recent stock assessment 2012 concluded that estimated fishing mortality has increased to levels far in excess of F_{MSY} . The continuation of current levels of fishing effort Pacific-wide would continue to deplete the stock below SB_{MSY} . The 9th meeting of the WCPFC Scientific Committee (SC9) concluded that overfishing is occurring and, it is highly likely that the stock is in an overfished state.

South Pacific Blue shark – A stock assessment was conducted on blue shark in 2016 however due to large data gaps and lack of critical life history information, the assessment recommended that derived stock status estimates be used as the basis for management. However, indicators show a declining trend. However, the assessment noted that the majority of assessment runs estimated current spawning biomass depletion to be around 10% of unfished spawning biomass, inferring very strong impacts from fishing. Historically, blue sharks have been the most commonly captured shark in the Tonga EEZ.

Mako shark -are among the least productive of all pelagic sharks, but are occasionally targeted for their food value; WCPFC scientists have suggested further research and/or data improvement to identify and clarify population status trends for these species.

Thresher shark - are also among the least productive of all pelagic sharks; again, WCPFC scientists have suggested further research and/or data improvement to identify and clarify population status trends for these species.

Whale shark—it is estimated that 75 whale sharks (*Rhincodon typus*) were killed in the Western and Central Pacific Ocean as a result of interactions with the region's purse seine fishery in just two years (2009 and 2010). A ban on whale shark setting by licensed purse-seine fishing vessels anywhere in the Pacific was adopted by the Pacific Island States that are parties to the Nauru Agreement in 2010, and this ban was later extended to the entire western and central Pacific Ocean purse-seine fleet by WCPFC.

Hammerhead shark— widely distributed in latitudinal range and appears to prefer tropical warm waters, and is largely concentrated along continental shelves and coastlines, but can be found in the deep ocean. Hammerhead sharks are at a high risk of extinction and are a delicacy in many countries. Little data exists on the by-catch of hammerheads in the WCPO and thus no formal assessment been done on the stock for consideration at the WCPFC Scientific Committee.

Mobulidae (mantas & rays) - Most mobulid species have been reported as bycatch by several fishing methods, including purse seine, longline, trawl and gillnets, and are also taken as target species. Mobulids have life history characteristics (e.g. slow growth, extremely low fecundity, and delayed age of first reproduction) that make them exceptionally susceptible to overexploitation.

11. DOMESTIC TUNA FISHERIES (shark-associated)

Between 2010 and 2013 total catch and effort by Tonga domestic tuna longliners was relatively stable – total catch was around 200 mt and effort was around 0.5 million hooks. In 2014 and 2015 both catch and effort increased considerably – catches were greater than 500 mt in 2015 and effort was greater than 1 million hooks.

In 2011 the Tonga EEZ was re-opened to foreign fishing vessels. In 2011, one license was issued; a total of 19 were issued in 20012 and 2013. Foreign licenses dropped to 13 in 2014 and 5 in 2015. As a result of this reintroduced access, total catch and effort in the Tonga EEZ increased dramatically. Total catch was over 1800 mt in 2012 and over 3250 mt in 2013. Similarly, effort was very high – 4.5 million hooks in 2012 and 10.7 million hooks in 2013. For 2014 and 2015, catch and effort by foreign-flagged vessels had dropped substantially.

Between 2011 and 2015, Tonga longliners catch was dominated by yellowfin (>50%), blue marlin (~8%), swordfish (~5%) and albacore (~5%). Non-shark catch by foreign

flagged vessels was dominated by the three target tuna species (albacore, bigeye and yellowfin).

The bycatch, and incidental catch of sharks has been substantial in Tongan waters. Extrapolation from observer data indicates that shark catch actually exceeded tuna catch in 2010 and 2012 and was similarly large in the other years prior to 2014. In 2014 and 2015, the ratio of incidental catch of shark to tuna catch is estimated to have dropped to under 15%. The common sharks caught incidentally by longliners in the Tonga EEZ are blue shark, oceanic whitetip shark, short finned and long finned makos and silky sharks. Estimated total catch of sharks (for Tonga-flagged and foreign-flagged vessel combined) are illustrated in Table 1.

Table 1: Estimated total shark catch by Tongan- and foreign-flagged longliners in the Tonga EEZ. Estimates are derived from onboard observer data stored at the Ministry of Fisheries.

Species	2011	2012	2013	2014	2015
Blue shark	3.9	84.6	311.3	49.0	152.4
Oceanic whitetip	62.3	502.6	264.5	22.5	13.8
Short finned mako	0.0	257.7	197.6	40.1	49.4
Silky shark	43.9	466.2	125.4	5.0	7.8
Long finned mako	0.0	33.7	0.0	2.6	2.7
All other shark spp.	63.0	215.5	18.0	4.6	3.6
Total shark catch	174.0	1560.2	916.8	123.8	229.7

From Observers' reports, Tonga tuna fishery has no impacts on species of special conservation interest (e.g. turtle, marine mammals and birds). Wahoo, dolphinfish, moonfish and billfishes also had high retention rates as these are also valuable components for the fishery. In contrast, lancetfish, escolar, oilfish and certain shark species are rarely retained, although almost all sharks (greater than 90%) are finned before being discarded. In 2011 one turtle (unidentified) was captured by the domestic longline fishery in the Tonga EEZ, and was released alive. No other interactions with species of special conservation interest (e.g. turtles, marine mammals, birds) were reported by observers since the program started in 1995 (WCPFC SC11, Tonga Part 1 report, 2015).

In 2012, an est. 130 mt sharks were landed in Tonga port, which fetched an export value of 2,101,976 Tonga Pa'anga (equiv. USD 1,187,616²)³. Table 2 provides trends on landings of non-target species by Tongan longliners from 2011 to 2015. Key shark species historically caught by Tonga flagged longline vessels are blue sharks, silky sharks, mako sharks and oceanic whitetip sharks.

² 1 TOP = 0.565000 USD (Mid-market rates: 2013-05-26 23:09 UTC)

³ Shark data submitted by Tonga Fisheries Dept., May 2013.

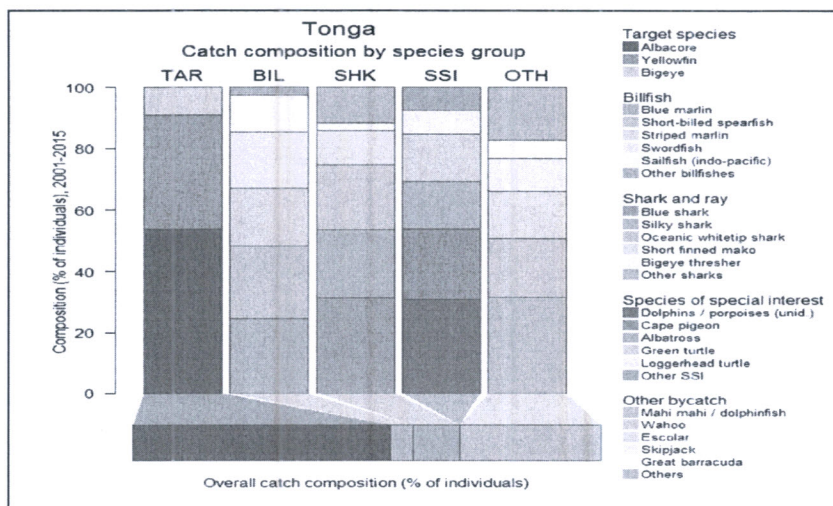
Table 2. Annual estimated catches (mt) of non-target and bycatch species, including sharks, by the Tongan Longline Fleets, in the WCPFC Convention Area, for years 2012 to 2016 (source: Tonga SC13 Part 1 report 2016).

Non Target Species	2012	2013	2014	2015	2016
Wahoo	6.3	3.0	9.7	17.4	16.6
Short-Billed Spearfish	1.0	2.6	4.1	7.9	8.7
Mako Sharks		1.0	8.4	8.5	19.6
Hammerhead Sharks			0.03	0	0.0
Oceanic Whitetip Sharks			0.0	0.0	0.0
Silky Sharks			0.0	0.0	0.0
Thresher Sharks			0.0	0.0	0.0
Blue Sharks			0.0	0.0	0.0
Sharks (Unidentified)	130.0	13.2	4.5	0.0	0.0
Sailfish (Indo Pacific)	0.8	2.1	4.0	14.4	10.8
Dolphin fish	39.0	53.3	190.1	162.6	128.2
Opah/Moonfish	0.5	0.0	0.3	0.1	0
Others	8.5	32.2	6.5	7.1	9.8
Total	186.0	107.4	227.5	218.0	193.9

Retained species

Tonga shark plan was first signed into implementation in 2014 and it sets out measures that seek to ban fining (though fins can be naturally folded), use of trace wires, full retention and 100% landing policy are now conditions of fishing licenses. The recent high observer & port sampling coverage means effective monitoring for compliance is in place and appears to be working effectively.

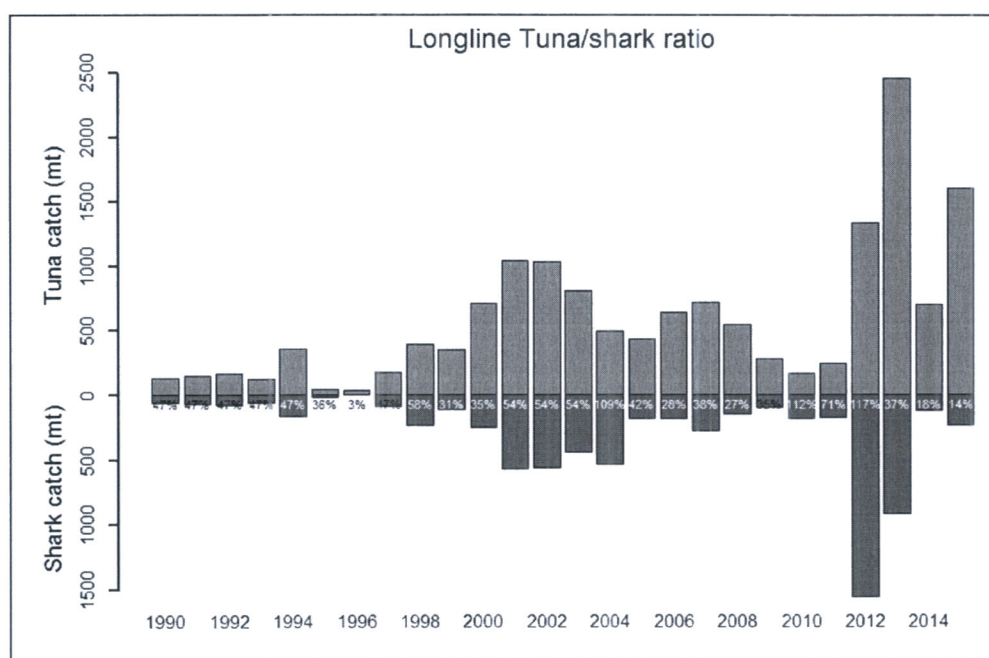
Below is the ranking and composition of catches in Tonga EEZ, 2001-2015. Shark catches is third ranking following target tunas and other bycatch (e.g. mahimahi). Blue and silky sharks dominate shark catches in Tonga EEZ.



Management measures

There are no so specific shark measures in the FMA and Regulations, but obligations stemming from shark measures incl. self-imposed shark limits are enforced by conditions of fishing licences and policy. For example: this policy suggests additional condition on the Tonga fishing license to include shark limit, such that “*The operator shall comply with shark by-catch limit currently set at no more than 10% of total catch per fishing trip.*” The impact of shark measures of the old plan have been successful in keeping shark catches low, exceeding the limits to date; and the “no retention” clause on oceanic white tip and silky sharks has generally been followed since 2015.

This revised plan encourages collection and reporting of sharks incidentally caught in territorial waters and associated with coastal fisheries. The preparation of trends and indicator analyses should inform periodic reviews and policy decisions in the absence of formal stock assessments on sharks.



Technical measures

Under the current tuna plan, the cap is set for tuna boat licences specifically for local boats, and for foreign fishing vessels. Targeted shark fishing is prohibited by law noting the same vessels targeting tunas are also incidental catching bycatch species of sharks. There is now increased coverage of port sampling activities, which is needed to handle 100% landing requirement. Shark identification is slowly improving with the use of printed shark cards donated the WCPFC Secretariat. There has been no formal training on the use of shark guides to date.

Tonga shark datasets are currently reported to the WCPFC through its Part 1 report, and the global Bycatch Management Information System (BMIS) would also benefit

from such data. This revised plan maintains enlisting shark species in fishing licence conditions; it also includes all binding measures on sharks such as oceanic whitetip and silky sharks, as well mobulids.

Operational measures

There is increasing use of bycatch landing in ports by local businesses and populations, which includes sharks. This also includes the utilization of shark carcasses that are fit for human consumption. Further work may be needed to promote and train locals on the utilization/ preparation of shark meat to meet local dietary requirements, and thereby ensuring food security locally.

This revised plan supports discouraging waste and discards; encouraging live release and control of finning as set out in fishing licence terms and conditions.

MCS & enforcement

The plan relies on regular and routine domestic MCS activities through sea/air patrols of Tonga EEZ, with and with assistance from NZ and regional operations coordinated through FFA Regional Fisheries Surveillance Center. Tonga observer coverage is relatively high but could be further improved for purposes of ensuring compliance with fishing licence terms and conditions, specific to sharks. Monitoring and enforcement of shark measures are also mandatory during landing in Tonga ports through Tonga ports sampling program.

Further improvement is required in regular/ routine enforcement activities and additional resources to support these operations. This includes enhanced working relationships between Ministry of Fisheries, His Majesty's Armed Forces, AG's Office, Department of Environment, Ministry of Infrastructure (Marine and Port Department) and National Fisheries Council.

Data collection & analysis

The logsheets and port sampling templates allow for reporting by-catch including shark species. The Ministry of Fisheries is intending to collect and store shark data in the TUFMAN-2 database. Observer reporting of shark data is stored in TUBS database.

The port samplers have managed to report on the percentage of shark catch by trip by all tuna vessels offloading in Tonga port. It is a requirement to submit these port samplers shark report before issue of fuel permit for the next trip.

The port samplers attended the Annual observer training course which includes Shark Identification Cards to update their knowledge on shark species and identifications. There have been no non-compliant cases reported so far from port samplers for breach shark requirements set out in the shark plan and licence fishing conditions.

One issue is that shark caught by snapper vessels are not included and reported in the logsheet. These logsheets will be amended to include the requirement to record shark

catches by species along with targeted species of deep water snapper and other demersal species.

12. STRATEGIC INTERVENTIONS

The strategic management framework on sharks draws on the FAO Technical Guidelines on the Conservation and Management of Sharks (FAO, 1999), RPOA (sharks), and all shark CMMs of the WCPFC. The strategies for achieving the above objectives outline in earlier sections are, *inter alia*:

Management Measures

- (i) Regulate or manage the harvest of sharks in the Kingdom's fisheries waters using the following combination of measures:
 - *Ban shark targeted fishing by longline vessels in all Tonga's fisheries waters*
 - *Maintain shark catches at a maximum of 10% of total catch per fishing trip; This is consistent with 10% target by 2017 (Art. 7, 10(3), 30, FAO, TMDP)*
 - *Commercial longline fishing and targeting sharks is prohibited in territorial waters. Territorial waters are now shark sanctuaries.*
 - *Mandatory and promote release of sharks if alive, an use of circle hooks (UN Res. 62/177*
 - *Ban finning and require natural folding of sharks catch and landed;*
 - *Monitoring trip and landing catches against shark catch limit in order to trigger precautionary steps as catch approaches the limit*
 - *Commercial longline fishing is prohibited in any area within 3 nautical miles from the centre of all under water seamounts located in Tonga's fisheries waters. Where two or more seamounts are in close proximity, the distance of 3 nautical miles shall be measured from the centre of the nearest seamount.*
 - *Ban on the use wire leaders and sets on whale sharks (CMM2011-04)*
 - *Prohibition of retention, transshipping, storing on a fishing vessel, or landing in whole or in part of any oceanic whitetip shark (CMM2011-04)*
 - *Encourage deeper hook deployment*
- (ii) Encourage setting targets based on the best available science for fish quotas, fishing effort and other restrictions to help achieve sustainable use
- (iii) Discourage development of national shark fishery

Technical Measures

- (iv) Monitoring all catches of shark by licensed vessels to ensure they are not targeting shark or incidental by-catch of shark does not exceed current management limits.
- (v) Monitor licensed fishing vessels for non-compliance against targeting sharks and shark catch exceeding management shark limits;
- (vi) Adjust fishing efforts and granting of fishing licenses where there are clear increasing trends of shark catches, and per fishing trip shark catch exceeds management limit
- (vii) Effective control and management of shark species identified in UNCLOS Annex 1 and WCPFC key shark species through close monitoring of catches and ensuring compliance with shark limits set out in this Plan :

UNCLOS Annex 1 - bluntnose sixgill (*Hexanchus griseus*), basking shark (*Cetorhinus maximus*), threshers (Family Alopiidae, 3-species), whale shark (*Rhincodon typus*), requiem sharks (Family Carcharhinidae, 52 species),

hammerheads (Family Sphynidae, 9 species) and lamnids (Family Isuridae, 5 species) – in total, 72 species);

WCPFC key shark species - porbeagle (*Lamna nasus*), winghead hammerhead (*Eusphyra blochii*), great hammerhead (*Sphyrna mokarran*), scalloped hammerhead (*S. lewini*) and smooth hammerhead (*S. zygaena*); blue, silky, oceanic whitetip, shortfin mako, longfin mako, bigeye thresher, common thresher and pelagic thresher, whale sharks, porbeagle mantas and rays

- (viii) Sharks and mobulids enlisted under CITES as threatened are also included in this plan, and it is a requirement for licensed fishing vessels not to catch or land these shark species with fins attached

Operational Measures

- (ix) Improve the utilization of sharks caught as incidental catch;
- (x) Implement all obligations of shark CMMS of the WCPFC: encourage live release, discourage waste and discards, controls on finning (i.e. cutting of a shark's fins and discarding its carcass at sea);
- (xi) Prepare and submit report on the progress of the assessment, development and implementation of Tonga revised *Shark-plan* as part of its MOF Annual Report, WCPFC Part 1 Annual Report, biennial reporting to FAO on the Code of Conduct for Responsible Fisheries;
- (xii) Through conditions of fishing licences:-
 - a. Encourage live release of sharks;
 - b. The vessel operator shall ensure the vessel does not use wire trace or leaders;
 - c. Land sharks with fins attached to the carcass;
 - d. Prohibit retention, transshipment or trading in fins caught in contravention of CMM2010-07;
 - e. Release of oceanic white tip sharks as soon as possible after being caught;
 - f. Prohibit retention onboard, transshipping, storing or landing silky sharks in whole or in part;
 - g. Observers must be allowed to collect biological samples from silky sharks that are dead on haul back provided that the samples are part of a research project approved by the WCPFC Scientific Committee;

Monitoring & Evaluation Framework

- (xiii) Compliance staffs will implement activities related to MCS and Enforcement
- (xiv) Policy staffs will monitor progress of implementation across the entire shark plan
 - Support and encourage the role of the newly recruited Policy Officer to ensure monitoring progress of implementing tuna plan and shark plan and responsible for all other by-catch species;
 - Support for the newly recruited Marketing person to explore marketing opportunities and utilization of shark meat, collaborate with Media Section of the ministry to promote awareness;

Data Collection & Analysis

- (xv) Improve and strengthen data collection and monitoring of shark data including logsheets, port sampling, observer reports, etc.;

- (xvi) Facilitate collection and provision of shark landing data from all Tonga fishing vessels and licensed vessels active in its EEZ ;
- (xvii) Create and maintain species-specific national records of shark catches, landings and discards;
- (xviii) If applicable, obtain utilization and trade data on shark species;
- (xix) Facilitate the timely access to and exchange of information necessary to coordinate conservation and management measures, and facilitate training in data quality;

Research

- (xx) Collaborate and assist in the implementation of the WCPFC Shark Research Plan;
- (xxi) Facilitate and encourage research on little known shark species;
- (xxii) Promote and coordinate stock assessments and research in collaboration with appropriate management and scientific bodies – to estimate potential for a shark fishery and options in setting future hard limits;

Capacity Building

- (xxiii) Use shark identification guides and to train and raise awareness amongst stakeholders, particularly observers, crews, skippers and boat operators. Training fishing masters on ways that avoid targeting shark also important;
- (xxiv) Regular awareness programmes incl. radio, newspaper, posters, seminars, school talks and seminars –targeting schools and communities, associations and general fisheries awareness outreach programs;
- (xxv) Seek assistance through OFP-SPC, WCPFC Secretariat, FAO and others in the production of shark information and educational material in local language;
- (xxvi) Cooperate with relevant agencies and institutions to facilitate the work conducted in relation to this Plan – raise profile of implementation in fisheries forums and committee meetings;
- (xxvii) Build/ strengthen overall capacity in research, data collection, monitoring, compliance and enforcement;

11. IMPLEMENTATION PLAN & SCHEDULE

This Plan does not have a dedicated budget for its implementation. The delivery of the actions identified in the plan depends on the resources available within the existing budgets of the Ministry of Fisheries. Supplementary funds for implementation of certain activities may be obtained from other external sources.

The successful implementation of this Plan also requires strong cooperation and collaboration among relevant stakeholders and groups incl. but not limited to fishermen, fisherman associations, boat operators, indigenous groups, conservation/ environmental bodies, recreational and game-fishing associations and research/ technical fisheries related institutions.

This section will describe specific timelines against the management actions, strategies and projects identify in this Plan 2018-2022.

DOMESTIC LONGLINE FISHERY	Current resources?	Current status?	Regulations/Notices/Fines/Conditions	New activity	Additional Resources?	Training?	2018	2019	2020
Retained species	Policy Officer, MCS Officer, By-catch Officer								
-sharks: comply with finning ban/ carcass retention; prepare NPOA; review fishing practices/ further controls	FMP, MCS	NPOA	Condition of longline licence	Revised NPOA to currently underway and expected to come into effect 1 Jan 2018.	Financial assistance	Management Plan for shark,	✓	✓	✓
Management Measures									
Regulate/ manage harvest of sharks in Tonga's EEZ:- (i) to (vii) below (note these measures are currently in the Plan:-	FMP, MCS, legal	No regulations	Limits/ offences can be regulated – develop a regulation on this or simply put in as conditions of longline licence	The division needs to decide if need to regulate – e.g. management limits/ measures below (i) to (vii)	In-house and, if appropriate, seek assistance from FFA legal team	NA	✓		
(i) by-catch shark cap is no more than 10% of total catch in any one boat fishing trip	As above	As above	As above	As above	As above	As above	✓		
(ii) ban shark targeted fishing by LL vessels in all Tonga's fisheries waters	As above	As above	As above	As above	As above	As above	✓		
(iii) shark sanctuaries within territorial waters against commercial LL fishing	As above	As above	As above	As above	As above	As above	✓		
(iv) Ban on whale shark sets and wire leaders	As above	As above	As above	As above	As above	As above	✓		
(v) No retention, transshipping, storing on vessel or landing, in whole or in part, of any oceanic whitetip shark	As above	As above	As above	As above	As above	As above	✓		

(vi) Promote live release and use of circle hooks; encourage deeper hook deployment	As above	As above	As above	As above	As above	As above	As above	✓			
(vii) encourage setting targets based on available science and shark assessment in Tonga's fisheries waters – quotas, fishing effort & other restrictions	As above	As above	As above	As above	As above	As above	As above	✓			
Technical Measures	Observers, Port samplers										
Control vessels targeting sharks	MCS, FMP	Regulations	Currently prohibited under the Plan; and it will become mandatory if pursue a regulation or adapt as condition of fishing license; e.g. revoke fishing license	Already covered under the NPOA (sharks); and possibility of a regulation or condition of fishing license is covered above FMP could review shark data and track of vessel during fishing to determine if vessel is targeting sharks	Encourage increase in observer coverage min. 5%, and reporting details on catches during port sampling or request such info from other ports if licensed vessels land their catches there	Refresh training on sharks identification	✓	✓		✓	
Decrease fishing effort where shark catch is proven sustainable - incremental cuts of license cap	MCS, FMP	NPOA	NA	Assessment of sharks in Tonga's waters relative to shark population in WCPO	NA	Refresh training on sharks identification	✓	✓		✓	
Control and manage all shark species listed in UNCLOS Annex 1 & WCPFC key shark species	MCS, FMP	NPOA	Include in a regulation or condition of license	Regular reports of catch data for these shark species	NA	Refresh training on sharks identification	✓	✓		✓	
Prohibition of targeted	MCS, FMP	Regulations	Currently	Regular monitoring of	NA	Refresh training on	✓	✓	✓	✓	

shark fishing in territorial waters by commercial longline boats				prohibited under the Plan; and it will become mandatory if pursue a regulation or adapt as condition of fishing license; e.g. revoke fishing license & apply fines	shark catches and commercial fishing in territorial waters; apply penalties and sanctions appropriate if proven to revoke conditions of fishing licenses			sharks identification			
Operational Measures											
Improve utilization of sharks caught	MCS, FMP	Shark trunks are and fins are landed and transhipped to Asian markets – monitored via port sampling	NA – covered in the Plan	Promote cooking recipe such as fish and chips, shark curry etc., to complement traditional and subsistence use of sharks meet – to discourage discarding carcass and land sharks with fins attached	Minimal		✓	Training in variety of cooking shark meet – to encourage small scale business for locals incl. women groups, etc.	✓	✓	✓
Fully implement shark CMMs	MCS, FMP	Compliance reported through Part 1 & 2	Currently in the Plan – but have a choice of putting elements in a regulation or conditions of fishing license	Regular monitoring for compliance & reporting any implications or challenges	NA		✓	Ad hoc workshop on explaining the CMM and related matters	✓	✓	✓
Discourage waste and discards, encourage live release, controls finning	FMP (observers)	Currently implemented	Terms and conditions of fishing license??	Review licensing MTCs	NA		✓	NA	✓	✓	✓
Prepare progress report of implementation as part of FD Annual Report, Part 1&2 reports, FAO reporting	FMP, Deputy CEO,	Currently pursued	NA	NA	NA		✓	NA	✓	✓	✓
MCS Framework &	MCS, Sea Patrol										

Enforcement									
<i>Improve MCS and enforcement activities for the collection, processing, storage and marketing of sharks and related products</i>	MCS, Sea Patrol	Currently pursued but can be improved	NA	Ensure consistency, regular and routine enforcement activities	Additional resources to support the activities	If required	✓	✓	✓
<i>Dedicated fisheries by-catch officer</i>	Propose new position	Shark work in the division cuts across FMP, MCS and Science staffs	NA	Consider new position of By-catch Officer to deal with all aspects of by-catch in the domestic longline fishery; this position could be placed under and report to Senior Policy Officer	Yes	NA	✓	✓	✓
<i>Promote practical and enforceable measures in domestic fisheries</i>	MCS, FMP	Regular review of policies, plans, licensing agreements, and license conditions to assess effectiveness	NA	Regular and routine review of all policies, legislations and licensing agreements to ensure compliance and the measures delivered desired outcomes	NA	NA, and if appropriate, can seek FFA assistance	✓	✓	✓
Data Collection & Analysis									
<i>Strengthen data collection/monitoring of shark data through logsheets, port sampling, observer reports and other means</i>	Port samplers, Observers, Science staffs	Ongoing data collection and routine monitoring of shark data	NA	Support ongoing shark data collection and monitoring through timely submission of logsheets, and reports from observers and port samplers	Resources is needed to ensure consistency in data collection	From time to time, training may be required which include sharks identification	✓	✓	✓
<i>Facilitate collection/provision of shark landing data</i>	As above	As above	As above	As above	As above	As above	✓	✓	✓
<i>Maintain species-specific national record of shark catches, landings, discards</i>	As above	As above	As above	As above	As above	As above	✓	✓	✓
<i>Collect trade data on shark</i>	As above	As above	As above	As above	As above	As above	✓	✓	✓

species	(customs)	As above	As above	As above	As above	As above; computerise data in Tufman dbase for storage and analyses when brief is required by the Minister	As above	✓	✓	✓
Facilitate timely access and exchange of shark related information; facilitate training in data quality assurance	As above	As above	As above	As above	As above	As above; computerise data in Tufman dbase for storage and analyses when brief is required by the Minister	As above	✓	✓	✓
Research										
Collaborate in the implementation of WCPFC shark research plan	Science staffs, Deputy Director	None except provision of shark data in the Part 1 report	NA	Initiate research/ trial towards an assessment of shark population in Tonga EEZ	Yes, seek support from Japan Fund, SIDS fund with the WCPFC, other research institutions incl. SPC and ISSF	Training of local scientists during trial/ experimental fishing, data analyses and reporting	✓			
Facilitate/ encourage research on little known shark species	As above	As above	As above	As above	As above	As above	As above	✓		
Undertake stock assessments and research on sharks in Tonga's EEZ in collaboration with scientific bodies (e.g. SPC,, universities, etc)	As above	As above	As above	As above	As above	As above	As above	✓		
Capacity Building										
Use shark identification guides to train/ raise awareness;	MCS & science staffs	Not yet	NA	Include this during short training of fishermen, and relevant fisheries officials	Budgetary support from govt or elsewhere	Ad hoc training on the use of shark IDs	✓	✓	✓	✓
Train on shark ID and reporting, and for fishing masters how to avoid targeting sharks	MCS & science staffs	Not yet	NA	Include this during short training of fishermen, and relevant fisheries officials	Budgetary support from govt or elsewhere	Train on avoid targeting sharks	✓	✓	✓	✓
Carry out regular awareness programmes on	MCS, FMP, science staffs	Not yet	NA	Start rolling out these awareness raising activities	NA	NA	✓	✓	✓	✓

