

Vanuatu National Plan of Action on Sharks (2015–2018)

A National Policy for the Management
of Sharks in Vanuatu



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2014

Prepared by

Vanuatu Fisheries Department & Pacific Islands Forum Fisheries Agency

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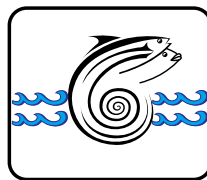
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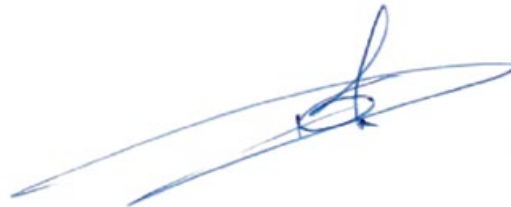
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APPROVAL OF VANUATU NATIONAL PLAN OF ACTION ON SHARKS

This Shark Plan, made in accordance with Part 4, Section 11 of the Fisheries Act, No. 10 of 2014, is hereby approved on this date.

COMMENCEMENT DATE

By virtue of powers conferred upon the Minister for Fisheries, under Sections 6(1), 10(1) and 11(5) of the Fisheries Act No. 10 of 2014, notice is hereby given that the implementation of the Vanuatu Plan of Action on Sharks will commence on29..... day of AUGUST 2014.



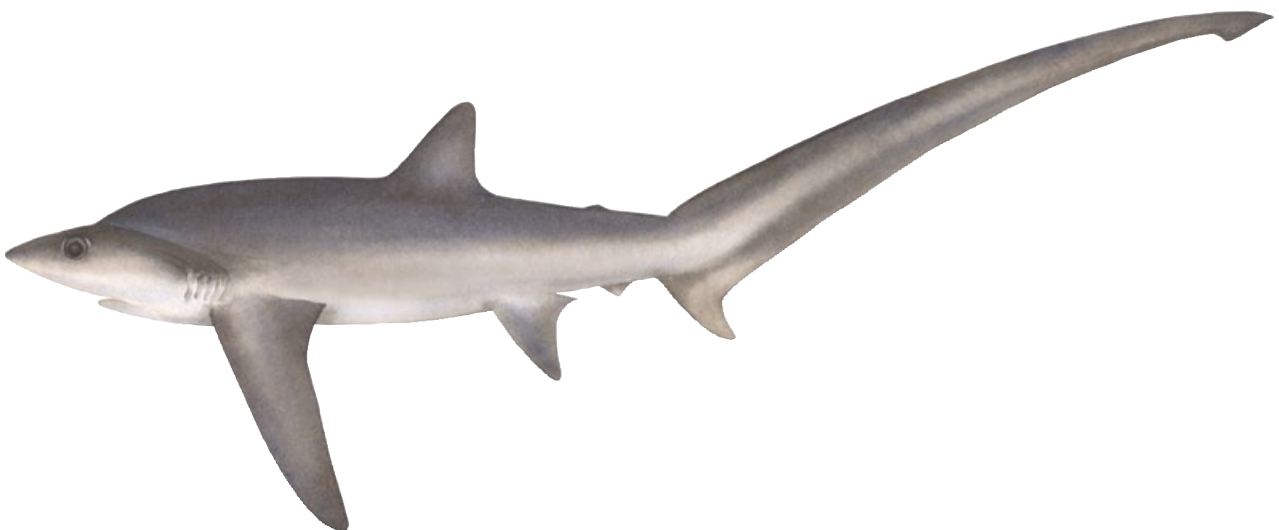
.....
Honourable David TOSUL (MP)
Minister Responsible for Fisheries

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ACRONYMS

CCRF	FAO Code of Conduct for Responsible Fisheries
CITES	Convention on International Trade in Endangered Species
CMM	Conservation and Management Measure
CMS	Convention on Migratory Species
CPUE	Catch per unit of effort
EAFM	Ecosystem approach to fisheries management
FAO	Food and Agriculture Organization of the United Nations
FD	Fisheries Department
FFA	Secretariat of the Pacific Islands Forum Fisheries Agency
FMAC	Fisheries Management Advisory Council
F_{MSY}	Level of fishing mortality that can be sustainably borne by the stock
IPOA	International Plan of Action
MCS	Monitoring, control and surveillance
MSY	Maximum sustainable yield
NPOA	National Plan of Action
OP	Operational Plan
SB_{MSY}	Spawning biomass producing maximum sustainable yield
SPC	Secretariat of the Pacific Community
TMDP	Tuna Management and Development Plan
TUFMAN	Tuna Fisheries Database Management System
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western and central Pacific Ocean



Alopias superciliosus. Illustration: Les Hata

1. PURPOSE

Consistent with the Fisheries Act No. 10 2014, this Plan:

- (i) is a policy guideline that ensures conservation, management, development and sustainable use of oceanic sharks in Vanuatu waters;
- (ii) promotes long-term biological sustainability and rational optimum and economic utilization of sharks in Vanuatu's Tuna longline fishery; and
- (iii) serves to prevent, avoid or minimize any potential adverse environmental and social impacts, effects or risks of fishing, other human activities and environmental factors on oceanic shark species.

2. SCOPE

The scope of this Plan:

- (i) covers all commercial fishing activities in Vanuatu waters, including those within six miles of the shore, and those waters around the islands of Matthew and Hunter, recognizing that the EEZ boundaries are not currently ratified;
- (ii) covers all fishing vessels registered to and licensed by Vanuatu wherever they fish. The Plan exempts artisanal fishing vessels that fish particularly for subsistence use.

Vanuatu has a special interest in the management of highly migratory species, including sharks bycatch in the high seas pocket to the east of the Vanuatu EEZ. This pocket will be given special consideration in the management of tuna and shark bycatches.

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, inter alia:

- (i) latest stock assessments on key shark species including available shark data in TUFMAN;
- (ii) latest decisions of the WCPFC and CITES specific to sharks;
- (iii) specific measures taken in other relevant international and regional shark instruments to which Vanuatu is a Party or a cooperating non-member;
- (iv) identify gaps and highlight specific areas of improvement and cost-effective strategic interventions, thereby increasing the Plan's effectiveness; and
- (v) socio-economic impacts on and implications for domestic developments.

4. PLANNING AND REPORTING

Vanuatu's Fisheries Department will report on the implementation of this Plan through the following means:

- (i) Vanuatu Fisheries Department Annual Report;
- (ii) Vanuatu's WCPFC Part I and 2 Reports, consistent with reporting requirements against CMM 2010-07 paras 2 and 4, CMM 2011-04 para. 3, CMM 2012-04 paras 3 and 6;
- (iii) Vanuatu report to FAO¹ COFI meetings relating to the implementation status of the IPOA and NPOA (sharks);
- (iv) Vanuatu reports to CITES meetings; and
- (v) other relevant committees and forums in which Vanuatu is a participant.

5. LEGAL CONTEXT

This Plan is prepared in accordance with the Fisheries Act No. 10 2014 Sec. 11. The Plan aligns and is consistent with the Vanuatu National Development Strategy, strategic policy directions under its revised Tuna Management Plan and other relevant fisheries policies and legislation of the government.

¹ 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.

The Plan also draws on relevant international and regional instruments such as the FAO-International Plan of Action for Sharks (IPOA-Sharks), FAO Code of Practice for Responsible Fisheries, Regional Plan of Action (Sharks) and WCPFC conservation and management measures on sharks (CMM 2010-07; CMM 2011-04; CMM 2012-04), and CITES enlisted shark species.

6. GUIDING PRINCIPLES

Drawing from the FAO IPOA-Sharks (FAO, 1999) and relevant shark-related instruments, and consistent with Fisheries Act No. 10 2014, the key guiding principles under this Shark Plan shall be:

Participation	Effective participation in shark management and contribute towards minimizing fishing mortality on shark species or stocks.
Sustaining stocks	Management and conservation strategies should aim to keep total fishing mortality for each stock within sustainable levels as adopted by the WCPFC, and the application of the precautionary approach.
Nutritional and socio-economic considerations	Management and conservation objectives and strategies should recognize that in some low-income, food-deficit communities in Vanuatu, 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.
Cooperation and integration	Require 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, the Tuna Plan and broader regional and international technical policy guidelines and measures generally on sharks or shark species.
Scientific and political actions	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 improving or restoring a favourable conservation status of sharks listed in the WCPFC CMMs related to sharks, and those listed in CITES.
Best available science on sharks	Sharks should be managed to allow for sustainable harvest where appropriate, through conservation and management measures based on the best available science advice and information.
Ecosystem and precautionary principles	This Shark Plan upholds the ecosystem and precautionary principles. Consistent with the Fisheries Act No. 10, 2014, the lack of scientific certainty should not be used as a reason for postponing measures to enhance the conservation status of sharks in Vanuatu's fisheries waters.
Monitoring and compliance	Promotes effective monitoring of fishing activities and ensures compliance with shark measures in this Plan. All licensed fishing vessels may establish, by mutual consent, verifiable reporting systems, including 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 AND STRUCTURE

This Plan was prepared through the effective participation and engagement of all stakeholders consistent with requirements of the FAO IPOA-Sharks and RPOA (sharks). The participatory approach is taken to raise the level of awareness and promote ownership of the Plan by all relevant stakeholders.

The key components of this Plan are 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 and actions over the four-year timeframe.

The effectiveness of management measures will be closely managed through the MCS framework, and the mid-term review should provide for any necessary modifications of management measures. The Fisheries Management Advisory Council (FMAC) will act as an oversight body to monitor progress of the implementation of this Plan, consistent with Sec. 9 of the Fisheries Act 2014.

8. OPERATIONAL OBJECTIVES

Further to the primary goal and purpose of the Plan outlined above, the following operational objectives are adapted from the IPOA-Sharks (FAO, 1999), the Regional Shark Plan, and also draw on the WCPFC CMM (sharks), and were revised for implementation in Vanuatu fisheries waters. On this basis, and consistent with the Vanuatu Fisheries Act No. 10 2014 and Tuna Plan, this NPOA (sharks) aims to:

- (i) ensure that shark catches from directed and non-directed fisheries are sustainable;
- (ii) minimize incidental catches of sharks and shark species, and encourage full use of dead sharks;
- (iii) contribute to the protection of biodiversity and ecosystem structure and function;
- (iv) 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);
- (v) facilitate improved identification and reporting of species-specific biological and trade data and the monitoring of shark catches;
- (vi) build research, data collection, monitoring, compliance and enforcement capacity;
- (vii) improve understanding of migratory shark populations through research, monitoring and information exchange;
- (viii) assess threats to shark populations; determine and protect critical habitats and migratory corridors and critical life stages of sharks;
- (ix) implement harvesting strategies consistent with the principles of biological sustainability and rational long-term economic use;
- (x) identify and provide special attention to vulnerable or threatened shark stocks;
- (xi) implement all technical measures of the WCPFC CMMs on sharks and specific shark species;
- (xii) improve and develop frameworks for establishing and coordinating effective consultation, involving all stakeholders in research, management and educational initiatives; and
- (xiii) increase public awareness of threats to sharks and their habitats, and enhance public participation in conservation activities.

9. KEY CHALLENGES

Vanuatu does not have a domestic shark fishery and has no intention to start one until an assessment is done on its potential. Also, there are no immediate plans to close the EEZ to tuna fishing so that no sharks are taken as bycatch. Vanuatu domestic tuna fisheries (shark-associated) generally catch shark and ray as bycatch; there has been substantial catches (~ 3–37%)² in the Vanuatu EEZ longline fishery. Shark and ray bycatch has rarely been significant in the Vanuatu-flagged purse seine fishery – the biggest issue has been several catches of whale sharks. The Vanuatu-flagged longline fishery active in the WCPFC Convention area carried no observers until 2012 (data not yet available) – no estimates can be determined.

Table 1. Summed catch and CPUE (per hundred hooks) of all species identified aboard observed longline vessels operating in Vanuatu's EEZ, 1996–2012 (Source: SPC, March 2014)

Species	Total number	%	Weight (kg)	CPUE (per 100 hooks)	
				Number	Weight
Albacore	15,582	44.34	239,721	0.9620	14.799
Yellowfin	5,599	15.93	155,008	0.3456	9.569
Skipjack	2,903	8.26	13,272	0.1796	0.821
Wahoo	1,833	5.22	17,651	0.1133	1.091
Mahi mahi / dolphinfish / dorado	1,697	4.83	13,018	0.1049	0.805
Bigeye	1,166	3.32	21,885	0.0720	1.351
Silky shark	678	1.93	19,684	0.0508	1.476
Blue shark	541	1.54	26,033	0.0339	1.629
Oceanic whitetip shark	147	0.42	7,511	0.0113	0.578
Short finned mako shark	106	0.30	8,439	0.0067	0.532
Long finned mako shark	56	0.16	4,852	0.0064	0.552

² This range is the collective weight of shark and ray bycatch relative to that of the total tuna weight over the past 10 years. However the proportions of specific shark species are relatively small: silky sharks constitute 2%, blue sharks 2%, oceanic whitetip 0.4% and mako sharks 0.4% of the total number of fish caught – details in Table 1.

For the longline fleet operating within the Vanuatu EEZ, the most common shark bycatch have been blue shark, silky shark and mako sharks. The combined estimated bycatch (by weight) of sharks and rays was less than 1,000 mt annually until 2008, after which the estimated annual total bycatch approached 3,000 mt. It is unknown the extent to which this reflects an actual increase in shark and ray bycatch, increased observer identification, or poor estimation related to highly variable raising factors³ resulting from low observer coverage.

In terms of number, silky shark are the most common bycatch species, followed by blue shark and rays. One conclusion from these data is that a broad variety of shark species are captured in sizeable quantities by the longline fishery. The fate of most sharks taken in this fishery has historically been finning, and the carcasses discarded.

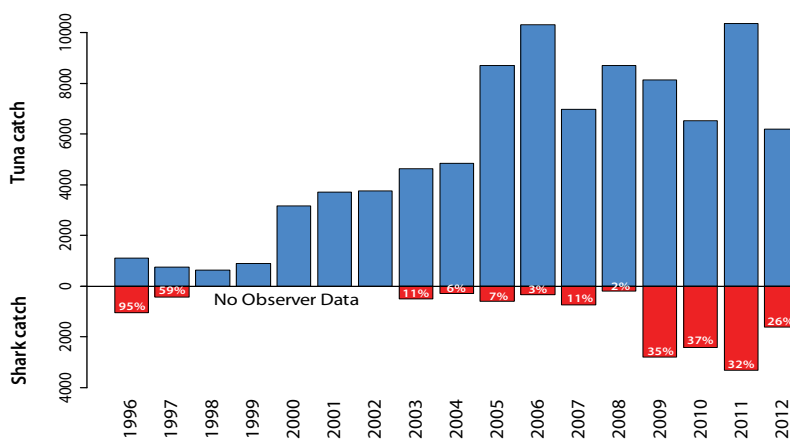


Figure 1. Shark catch relative to tuna catch (1996–2012) in the Vanuatu EEZ longline fishery (Source: SPC, March 2014)

The extent of shark bycatch in the Vanuatu-flagged longline fishery occurring outside of Vanuatu’s EEZ is poorly known. The total annual tuna catch by that fleet has been in the 10,000–15,000 mt range over the past decade, thus 10-50% larger than longline tuna catch in Vanuatu’s EEZ. There has been no available observer data from this fleet, hence no actual data with which to estimate shark levels. It is more likely, however, that the bycatch of sharks in that fishery resembles the Vanuatu EEZ longline fishery than the Vanuatu-flagged purse seine fishery. If so, shark catches within this fleet are likely to be greater than those estimated for the longline fleet operating within the Vanuatu EEZ.

There are also concerns over the high level of discards of sharks. In addition to the numbers and weight of sharks, rays and other forms of bycatch, observers also often record the ‘fate’ of bycatch species, e.g. retained or discarded (for a variety of reasons). Figure 2, below, summarizes the fate data of the bycatch taken in the Vanuatu EEZ longline fishery, summed across years for a variety of species and species groups. The fate of most sharks taken in this fishery have historically been ‘finned’ and the carcasses discarded.

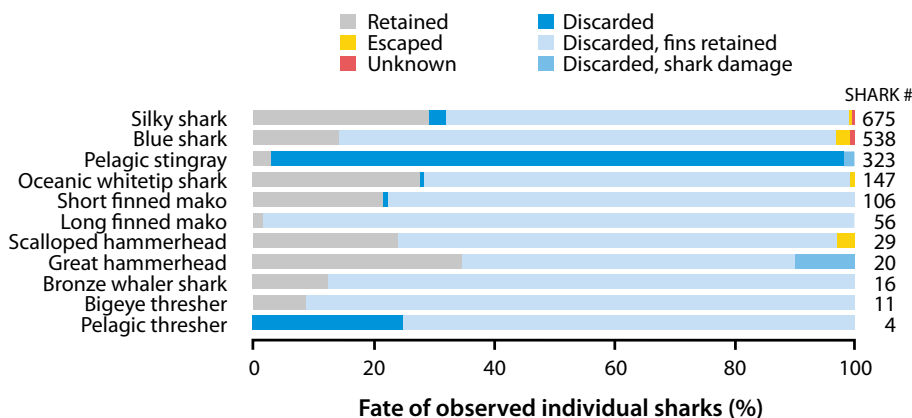


Figure 2. Fate of shark catches as recorded by observers in the Vanuatu EEZ longline fishery (Source: SPC, March 2014)

³ The raising factor is large due to low observer coverage, particularly within Vanuatu EEZ longline fishery. Resulting raised shark catch estimates likely have broad confidence bounds and hence are uncertain and therefore caution on the use of such estimates

The collection of shark data and the management of shark populations in Vanuatu's fisheries waters are essential for the broader conservation and management of key shark species in the WCPO. This collection and management is currently lacking. In particular, the Plan recognises the overfished state of several key oceanic shark species reported by the WCPFC SC9 formal session in 2013.

Vanuatu recognizes the importance of improving knowledge of sharks and the practices resulting in shark bycatches in its domestic longline fishery. The Fisheries Department identified the following challenges, which this Plan aims to address:

- (i) Inadequate data available to fisheries on catches, effort and landings of sharks.
- (ii) Difficulties in identifying shark species after landing.
- (iii) Insufficient biological and environmental data on sharks.
- (iv) Lack of funds for research and the management of sharks.
- (v) Limited coordination on the collection of information on trans-boundary, straddling, highly migratory and high seas stocks of sharks.
- (vi) Difficulty in achieving shark management goals in multispecies fisheries in which sharks are caught as incidental and bycatch.
- (vii) Diminishing catches and catch rates with increase in fishing efforts (e.g. hook and vessel numbers).
- (viii) Some vessels land their catches in Suva Port thereby making it difficult to report accurately on catch of tuna and sharks by flag and EEZ.
- (ix) Lack of skills among fishing masters to avoid shark bycatch.

10. STATUS AND DESCRIPTIONS of WCPO SHARKS

Shark stock status (WCPO region)

Shark species account for approximately 15% of the bycatch in albacore longline sets, and this may be higher in some fisheries. Chinese- and Taiwanese-owned vessels sometimes use wire traces as an alternative to monofilament leaders, with the specific intention of increasing their shark bycatch.

The main area of concern is the oceanic shark species. Lawson (2011) demonstrates an annual average of 2 million sharks caught by longline gear, with corresponding sharp declines in CPUE, estimated at 30% over the last 10 years. Clarke (2011) identified changes in exploitation patterns for many of the species caught in WCPO waters by the longline fishery. From this analysis there is increasing evidence that two of these shark species – oceanic whitetip and silky sharks – are experiencing rapid declines. Even blue shark, previously judged to be fairly robust, appears to be suffering from a reduction in average fish size.

Oceanic whitetip shark – 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.

Silky shark – is a low productivity species. The greatest impact on the stock is attributed to bycatch 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. A recent assessment concluded that estimated fishing mortality has increased to levels far in excess of F_{MSY} . The continuation of current levels of Pacific-wide fishing effort would continue to deplete the stock below SB_{MSY} . The 9th meeting of the WCPFC Scientific Committee (SC9) concluded that overfishing is occurring and that it is highly likely that the stock is in an overfished state.

South Pacific blue shark – stock assessment is expected to be completed in 2014 if the critical data gaps are adequately addressed. The South Pacific blue shark is amongst the top four shark species caught in Vanuatu fisheries waters.

Mako sharks – 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 sharks – 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 sharks – are widely distributed in latitudinal range and appear to prefer tropical warm waters, and are largely concentrated along continental shelves and coastlines, but can also be found in the deep ocean. Hammerhead sharks are at a high risk of extinction, and are a culinary delicacy in many countries. Little data exists on the bycatch of hammerheads in the WCPO and thus no formal assessment has been undertaken on the stock for consideration at the WCPFC Scientific Committee.

Table 2. Key shark species taken in longline fishery (SPC, March 2014)

Frequency	Species	Scientific name	WCPFC Key Species	IUCN Listing	CITES	CMS
Highest Incidence	Silky shark	<i>Carcharhinus falciformis</i>	•	Near Threatened		
	Blue shark	<i>Prionace glauca</i>	•	Near Threatened		
	Oceanic whitetip shark	<i>Carcharhinus longimanus</i>	•	Vulnerable	•II	
	Pelagic stringray	<i>Pteroplatytrygon violacea</i>		Least Concern		
Medium Incidence	Short finned mako	<i>Isurus oxyrinchus</i>	•	Vulnerable		•
	Long finned mako	<i>Isurus paucus</i>	•	Vulnerable		•
	Great hammerhead	<i>Sphyrna mokarran</i>	•	Endangered	•II	
	Smooth hammerhead	<i>Sphyrna zygaena</i>	•	Vulnerable	•II	
Low Incidence	Bigeye thresher	<i>Alopias superciliosus</i>	•	Vulnerable		
	Pelagic thresher	<i>Alopias pelagicus</i>	•	Vulnerable		
	Silvertip shark	<i>Carcharhinus albimarginatus</i>		Near Threatened		
	Bronze whaler shark	<i>Carcharhinus brachyurus</i>		Near Threatened		
	Blacktip shark	<i>Carcharhinus limbatus</i>		Near Threatened		
	Tiger shark	<i>Galeocerdo cuvier</i>		Near Threatened		
Rare Incidence	Galapagos shark	<i>Carcharhinus galapagensis</i>		Near Threatened		
	Grey reef shark	<i>Carcharhinus amblyrhynchos</i>		Near Threatened		
	Blacktip reef shark	<i>Carcharhinus melanopterus</i>		Near Threatened		
	Sandbar shark	<i>Carcharhinus plumbeus</i>		Vulnerable		
	Smooth hammerhead	<i>Sphyrna zygaena</i>	•	Vulnerable	•II	
	Giant manta	<i>Manta birostris</i>		Vulnerable	•II	
	Manta rays (unidentified)	<i>Manta spp.</i>		Vulnerable	•II	
	Great white shark	<i>Carcharodon carcharias</i>		Vulnerable	•II	•

WCPFC Key Species: Western Central Pacific Fisheries Commission Key Shark Species Listing (•)

IUCN: International Union for Conservation of Nature Red List of Threatened Species status

CITES: Convention on International Trade in Endangered species of Wild Flora and Fauna Appendix (•II) listing

CMS: Convention on the Conservation of Migratory Species – Listed in Annex I of CMS Memorandum of Understanding on the Conservation of Migratory Sharks (•)

Risk assessment

Shark species are highly vulnerable to fishing, and their management is also required under the FAO Code of Conduct for Responsible Fishing and the IPOA for sharks. There is some uncertainty about the stock status of many oceanic shark species in this region and there are minimal data available on the local catches and that of Vanuatu flag vessels in other jurisdictions. In 2007 stakeholders rated the risk to sustainability of sharks as medium-high.

The level of income from shark fishing may be considerable – especially for local vessels – therefore declining stocks would cause a flow-on impact to the economic outcomes generated by this group. Therefore, there needs to be a specific management plan and monitoring program instigated for these species within the Vanuatu EEZ.

Extracts from risk assessment work undertaken by SPC (Table 3) identify various oceanic shark species at medium to high risk.

Table 3. Stock conditions and/or ecological risk assessments of tuna longline bycatches.

Species	Stock condition	Ecological risk (ERA Vulnerability)
Silky shark (<i>Carcharhinus falciformis</i>)	Longline CPUEs are generally stable (Lawson, 2011). However, steep declines from peak abundances in 2006–2008 are observed in subsequent years (Clarke, 2011). The longline fishery standardized trends were declining for both sexes in all regions, with statistically significant trends for both sexes in Fijian waters (SPC Region 5) (Clarke, 2011).	Productivity – High risk Susceptibility – Medium to high risk
Oceanic whitetip shark (<i>Carcharhinus longimanus</i>)	Longline catches indicate steep declines, falling by 70% since 1998 (Lawson, 2011). These indicate very steep declines. The estimated trends in median length were declining for both sexes for all regions, with statistically significant trends for females (Clarke, 2011).	Productivity – High risk Susceptibility – Medium risk
Pelagic thresher (<i>Alopias pelagicus</i>)	Decreasing median size trends, particularly for females in Region 3 and for males and females in Region 4, both of which showed significant declines (Clarke, 2011).	Productivity – High risk Susceptibility – Medium risk
Shortfin mako shark (<i>Isurus oxyrinchus</i>)	Longline CPUE fallen by 10% since 2010 (Lawson (2011). Male mako shark median lengths appear to be at or near the length at maturity; the entire 90% confidence interval for female mako sharks lies below the length at maturity. Observer data indicates trends towards decreasing size (Clarke, 2011).	Productivity – High risk Susceptibility – Medium to High risk
Longfin mako (<i>Isurus paucus</i>)	Longline CPUE fallen by 31% since 1998.	Productivity – High risk Susceptibility – Medium to high risk
Others shark species	Data is deficient for bigeye thresher, bronze whaler, great hammerhead, smooth hammerhead and scalloped hammerhead. Scalloped and great hammerhead sharks are classified by IUCN as endangered.	Productivity – High risk Susceptibility – Medium to high risk

Source: Extracted from SPC reports.

11. STRATEGIC POLICY INTERVENTIONS

The strategic management framework on sharks draws on the FAO Technical Guidelines on the Conservation and Management of Sharks (FAO, 1999), RPOA (sharks), CMM 2010-07, CMM 2011-04, CMM 2012-04 and CMM 2013-08. Under this Plan, the strategies for achieving the above objectives outlined in earlier sections include the following:

Management measures

- (i) Regulate or manage the harvest of sharks in Vanuatu waters using the following combination of measures:
 - Shark catches are to be no more than 10% of total catch in any one fishing trip (Art.7, 10(3),30, FAO, TMP).
 - Ban shark targeted fishing by longline vessels in all Vanuatu’s fisheries waters.
 - Establish shark sanctuaries within territorial and archipelagic waters, including prohibitions against commercial fishing.
 - Commercial fishing is prohibited in any area within three nautical miles from the centre of all underwater seamounts located in Vanuatu’s fisheries waters. Where two or more seamounts are in close proximity, the distance of three nautical miles shall be measured from the centre of the nearest seamount.
 - Finning control of 5%⁴, but with fins naturally attached (CMM 2010-07).
 - Ban the use of wire leaders and sets on whale sharks (CMM 2011-04).
 - Prohibition of retention, transshipping and storing on a fishing vessel, or landing in whole or in part, of any oceanic whitetip shark (CMM 2011-04, CMM 2013-08).

⁴ The ratio of fins to carcass is 5% wet weight, such that if 100 tonnes of sharks are landed the fins must weigh no more than five tonnes.

- Promotion of live release in a manner that results in as little harm to the shark as possible; and the use of circle hooks (UN Res. 62/177, CMM 2013-08).
 - No setting on a school of tuna associated with a whale shark if the animal is sighted prior to the commencement of the set (CMM 2012-04).
 - Encourage deeper hook deployment during longline fishing.
- (ii) Encourage setting targets based on the best available science for fish quotas, fishing effort and other restrictions to help achieve sustainable use.

Technical measures

- (iii) Ascertain control and, if appropriate, restrictions over access of fishing vessels targeting sharks, which is not allowed in Vanuatu's EEZ.
- (iv) Decrease fishing effort where shark catch is proven unsustainable or exceeds the proportion of shark catches allowed in any one fishing trip.
- (v) Effective control and management of UNCLOS Annex 1, WCPFC key shark species and CITES Appendix 2 listed shark species, through close monitoring of catches and ensuring compliance with specific measures and limits in this Plan:
- UNCLOS Annex 1 – bluntnose sixgill (*Hexanchus griseus*), basking shark (*Cetorhinus maximus*), thresher sharks (Family Alopiidae, 3 species), whale shark (*Rhincodon typus*), requiem sharks (Family Carcharhinidae, 52 species), hammerhead sharks (Family Sphyrnidae, 9 species) and lamnid sharks (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 sharks, and whale sharks.
 - CITES-listed shark species, Appendix 2 – pelagic sharks (basking, great white, oceanic whitetip, porbeagle, scalloped, and greater/smooth hammerhead sharks).

Operational measures

- (vi) Improve the utilization of sharks caught.
- (vii) Implement elements of the WCPFC CMM 2010-07, CMM 2011-04, CMM 2012-04 and CMM 2013-08: discourage waste and discards, encourage live release, control finning (i.e. cutting of a shark's fins and discarding its carcass at sea).
- (viii) Prepare and submit a report on the progress of the assessment, development and implementation of Vanuatu Shark Plan as part of the Fisheries Department Annual Report, WCPFC Scientific Committee Part 1 Annual Report, and biennial reporting to FAO on the Code of Conduct for Responsible Fisheries.

MCS framework and enforcement

- (ix) Improve MCS and enforcement activities for the collection, processing, storage and marketing of sharks and shark-related products in the catching and processing sub-sectors.
- (x) Establish a position for a dedicated fisheries officer (bycatch) responsible for all bycatch species, including sharks.
- (xi) Promote practical and enforceable measures, including those provided for under this Plan (e.g. technical, operational and management) within the Vanuatu longline fishery.

Data collection and analysis

- (xii) Improve and strengthen data collection and monitoring of shark data, including logsheets, port sampling, observer reports, etc.
- (xiii) Facilitate the collection and provision of shark landing data from all Vanuatu fishing vessels and licensed vessels active in Vanuatu's EEZ and, flag vessels active elsewhere in the WCPO.
- (xiv) Create and maintain species-specific national records of shark catches, landings and discards.
- (xv) If applicable, obtain utilization and trade data on shark species.
- (xvi) Facilitate the timely access to and exchange of information necessary to coordinate conservation and management measures, and facilitate training in data quality.

Research

- (xvii) Collaborate and assist in the implementation of the WCPFC Shark Research Plan.
- (xviii) Facilitate and encourage research on shark species.
- (xix) Promote and coordinate stock assessments and research in collaboration with appropriate management and scientific bodies, to estimate the potential for a shark fishery and, to explore options for setting future hard limits.

Capacity building

- (xx) Use shark identification guides and train and raise awareness among stakeholders, particularly observers, crews, skippers and boat operators. Train fishing masters on methods that avoid targeting shark;
- (xxi) Conduct regular awareness programmes, including radio, newspaper, posters, seminars, school talks and seminars, targeting schools and communities, associations and general fisheries awareness outreach programmes;
- (xxii) Seek assistance through SPC's OFP, WCPFC Secretariat, FAO and others, in relation to the production of information and educational material in local languages.
- (xxiii) Cooperate with relevant agencies and institutions to facilitate the work conducted in relation to this Plan; raise the profile of implementation in fisheries forums and committee meetings.
- (xxiv) Build/strengthen overall capacity in research, data collection, monitoring, compliance and enforcement.

12. IMPLEMENTATION PLAN AND 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 Fisheries Department. Supplementary funds for the implementation of certain activities may be obtained from other sources. It is unrealistic to expect that all of the issues identified in this Plan will be fully addressed by the Fisheries Department over the life of the Plan. The successful implementation of this Plan will require strong cooperation among relevant stakeholders and groups, including but not limited to fishers, fishers' associations, boat operators, indigenous groups, conservation/environmental bodies, recreational and game-fishing associations and research/technical fisheries related institutions.



Carcharhinus albimarginatus. Photo: Pascale Chabanet (IRD)

Table 4. Specific timelines against the management actions, strategies and projects identified in this Plan, for implementation in the period 2015 to 2018.

Management actions, strategies and projects	Current resources	Current status	Regulations/Notices/Fines/Conditions	New activity	Additional resources	Training	2015	2016	2017	2018
DOMESTIC LONGLINE FISHERY										
Retained species	Policy Officer, MCS Officer									
-sharks: comply with finning ban/carcass retention; prepare NPOA; review fishing practices/further controls	FMP, MCS	No NPOA	Condition of longline licence	NPOA to be developed (currently underway and expected to come into effect 1 Jan 2014)	Financial assistance	Management Plan for shark; completed attachment at FFA, May 2013	✓	✓	✓	✓
Management measures										
(MCS staffs, science staff, policy staff, observers, port samplers)										
Regulate/manage harvest of sharks in Vanuatu'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 make condition 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) bycatch shark cap is not 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 Vanuatu'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) finning control, 5% with fins naturally attached	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	✓			
(vii) encourage setting targets based on available science and shark assessment in Vanuatu's fisheries waters – quotas, fishing effort and other restrictions	As above	As above	As above	As above	As above	As above	✓			
Technical measures										
(MCS staffs, science staff, policy staff, observers, port samplers)										
Control vessels targeting sharks	MCS, FMP	22 licences out of 50 cap	Currently prohibited under the Plan; and it will become mandatory if pursue a regulation or adopt as condition of fishing licence; e.g. revoke fishing licence	Already covered under the NPOA (sharks); and possibility of a regulation or condition of fishing licence is covered above	Encourage increase in observer coverage min. 5%, and reporting details on catches during port sampling or request such information from other ports if licensed vessels land their catches there	Refresh training on sharks identification	✓	✓	✓	✓
			FMP could review shark data and track of vessel during fishing to determine if vessel is targeting sharks							

Management actions, strategies and projects	Current resources	Current status	Regulations/notices/fines/conditions	New activity	Additional resources	Training	2015	2016	2017	2018
Decrease fishing effort where shark catch is proven sustainable - incremental cuts of licence cap	MCS, FMP	22 licences out of 50 cap	NA	Assessment of sharks in Vanuatu's waters relative to shark population in WCPD	NA	Refresh training on sharks identification	✓	✓	✓	✓
Control and manage all shark species listed in UNCLOS Annex 1 and WCPFC key shark species - incremental cuts of licence cap	MCS, FMP	22 licences out of 50 cap	Include in a regulation or condition of licence	Regular reports of catch data for these shark species	NA	Refresh training on sharks identification	✓	✓	✓	✓
Prohibition of targeted shark fishing in territorial waters by commercial longline boats	MCS, FMP	22 licences out of 50 cap	Currently prohibited under the Plan; and it will become mandatory if pursue a regulation or adopt as condition of fishing licence; e.g. revoke fishing licence and apply fines	Regular monitoring of shark catches and commercial fishing in territorial waters; apply penalties and sanctions appropriate, if proven, to revoke conditions of fishing licences	NA	Refresh training on sharks identification	✓	✓	✓	✓
Operational measures										
(Director, legal, observers, port samplers, policy/management staff, local agencies/boat operators)										
Improve utilization of sharks caught	MCS, FMP, Extension	Shark trunks and fins are landed and transhipped to Asian markets – monitored via port sampling	NA – covered in the Plan	Promote cooking recipes such as fish and chips, shark curry etc., to complement traditional and subsistence use of sharks meat – to discourage discarding carcass and land sharks with fins attached	Minimal	Training in cooking shark meat – to encourage small-scale business for locals, including women's groups, etc.	✓			
Fully implement shark CMMS	MCS, FMP	Compliance reported through Part 1 and 2	Currently in the Plan – but have a choice of putting elements in a regulation or conditions of fishing licence	Regular monitoring for compliance and 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 licence	Review licence minimum terms and conditions	NA	NA	✓	✓	✓	✓
Prepare progress report of implementation as part of FD Annual Report, Part 1 & 2 reports, FAO reporting	FMP, Director	Currently pursued	NA	NA	NA	NA	✓	✓	✓	✓
Prepare an MOU with Fiji to allow collection and reporting of catches (including sharks) landed by licensed vessels in Vanuatu's EEZ, and the data sent back to Vanuatu Fisheries Division	FMP, Director/ Legal	Draft	NA	FFA legal advisor can assist local fisheries advisor	NA	Possible arrangements to allow transfer of data collected in Suva Port back to Vanuatu Fisheries Division	✓			
MCS framework and enforcement										
(MCS staff, sea patrol, policy/management staff, local agencies/boat operators)										
Improve MCS and enforcement activities for the collection, processing, storage and marketing of sharks and related products	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	✓	✓	✓	✓

Management actions, strategies and projects	Current resources	Current status	Regulations/notices/fines/conditions	New activity	Additional resources	Training	2015	2016	2017	2018
Dedicated fisheries bycatch officer	Propose new position	Shark work in the division cuts across FMP, MCS and science staff	NA	Consider new position of Bycatch Officer to deal with all aspects of bycatch in the domestic longline fishery; this position could be placed under and report to Senior Policy Officer	Yes	NA	✓	✓	✓	✓
Promote practical and enforceable measures in domestic fisheries	MCS, FMP	Regular review of policies, plans, licensing agreements, and licence conditions to assess effectiveness	NA	Regular and routine review of all policies, legislation and licensing agreements to ensure compliance and that the measures delivered desired outcomes	NA	NA, and if appropriate, can seek FFA assistance	✓	✓	✓	✓
Data collection and analysis (Observers, port samplers, science staff, local agencies/boat operators)										
Strengthen data collection/monitoring of shark data through logsheets, port sampling, observer reports and other means	Port samplers, Observers, science staff	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 are needed to ensure consistency in data collection	From time to time, training may be required which include sharks identification	✓	✓	✓	✓
Facilitate collection/provision of shark landing data	As above	As above	As above	As above	As above	As above	✓	✓	✓	✓
Maintain species-specific national record of shark catches, landings, discards	As above	As above	As above	As above	As above	As above	✓	✓	✓	✓
Collect trade data on shark species	As above (customs)	As above	As above	As above	As above	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: computerise data in TUFMAN database for storage and analyses when brief is required by the Minister	As above	✓	✓	✓	✓
Research										
Collaborate in the implementation of WCPFC shark-research plan	Science staff, Deputy Director	None except provision of shark data in the Part 1 report	NA	Initiate research/trial towards an assessment of shark population in Vanuatu EEZ	Yes, seek support from Japan Fund, SIDS fund with the WCPFC, other research institutions, including 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	✓			

Management actions, strategies and projects	Current resources	Current status	Regulations/notices/finances/conditions	New activity	Additional resources	Training	2015	2016	2017	2018
Undertake stock assessments and research on sharks in Vanuatu's EEZ in collaboration with scientific bodies (e.g. SPC, universities, etc)	As above	As above	As above	As above	As above	As above	✓			
Capacity building										
Use shark identification guides to train/raise awareness	MCS and science staffs	Not yet	NA	Include this during brief training of fishers, and relevant fisheries officials	Budgetary support from government 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 and science staffs	Not yet	NA	Include this during short training of fishermen, and relevant fisheries officials	Budgetary support from government or elsewhere	Training on how to avoid targeting sharks	✓	✓	✓	✓
Carry out regular awareness programmes on radio, newspaper, posters, seminars, school talks and seminars	MCS, FMP, science staff	Not yet	NA	Start rolling out these awareness-raising activities	NA	NA	✓	✓	✓	✓
Seek assistance from WCPFC and SPC Secretariats and FAO in the production of information and education materials on sharks translated into Vanuatu language	MCS, FMP, science staff	As above	NA	Work on this activity commencing 2014	NA	NA	✓			
Raise the profile of implementing this plan by cooperating with relevant agencies	MCS, FMP, science staff	As above	NA	Regular updates on shark work in Vanuatu in various forums, including advisory committees	NA	NA	✓	✓	✓	✓
Build/strengthen capacity in shark research, data collection, monitoring, compliance and enforcement	MCS, FMP, science staff	ongoing	NA	As above	Resources needed to continue this work	Yes	✓	✓	✓	✓

13. REFERENCES

- Clarke S., Harley S., Hoyle S. and Rice J. 2011. An Indicator-based Analysis of Key Shark Species based on Data held by SPC-OFP. EB-WP-02, WCPFC Scientific Committee Fifth Regular Session, 10–21 August 2009, Port-Vila, Vanuatu. [<http://www.wcpfc.int/node/2123>]
- Lawson T. 2011. Estimation of Catch Rates and Catches of Key Shark Species in Tuna Fisheries of the Western and Central Pacific Ocean Using Observer Data. EB-IP-02, WCPFC Scientific Committee Fifth Regular Session, 10–21 August 2009, Port-Vila, Vanuatu. [<http://www.wcpfc.int/node/2777>]



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