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PART 1: INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS

WCPFC-SC15-AR/CCM-19

PAPUA NEW GUINEA

NATIONAL FISHERIES AUTHORITY

ANNUAL REPORT TO THE COMMISSION

Report: **PART 1: INFORMATION ON FISHERIES, RESEARCH AND STATISTICS, 2018.**

Country: **PAPUA NEW GUINEA**

Prepared by: **National Fisheries Authority,**
Port Moresby, Papua New Guinea.

Scientific data was provided to the Commission in accordance with the decision relating to the provision of scientific data to the commission by the 30th April 2019.	**Yes**

Revision Notes:

Contents

1. Summary

The Papua New Guinea (PNG) tuna fishery is made up of both the purse-seine and longline sectors. The domestic longline vessels fish exclusively in PNG waters and until recently after almost two decades, PNG opened its waters foreign longliners. The purse-seine sector is a mix of both domestic and foreign access vessels. The domestic sector comprises the PNG flag vessels and PNG locally-based foreign which support processing facilities onshore in PNG.

Total catch estimate of target tuna species in 2018 by PNG purse seine vessels was 248,379 mt. A total of 56 vessels in the PNG national fleet (both PNG Flag and LBF vessels) were active in the WCPFC Convention area with an estimated overall effort of 7,490 fishing days. Only a total estimated catch 2,103 mt of tuna species was from the domestic tuna longline vessels fishing in 2018. A total of 14 vessels were actively fishing in PNG waters with and estimated effort of 49,744 hundred hooks. Estimated catch by foreign vessels fishing under bilateral and multilateral access agreements in PNG waters in 2018 was 87,224 mt with and estimated effort of 3,337 fishing days.

PNG is striving towards building its fishing industry; therefore fishing licenses are linked to onshore investment. At full capacity PNG is looking to processing all fish caught in PNG waters, back in PNG. The rights to fish in PNG are also linked to onshore investment.

2. Tabular Annual Fisheries Information

Table 1(a): Annual catch and effort estimates for the PNG tuna longline fleet by primary species for the WCPFC Convention Area for year 2014-2018. Source: SPC

Year		2014	2015	2016	2017	2018 (Provisional)
Effort (HHooks)		*34,464*	*25,945*	*15,057*	*40,610*	*49,744*
Tuna Catch (mt)	Albacore	323	345	80	689	236
	Bigeye	52	15	86	47	102
	Skipjack	-	1	2	2	2
	Yellowfin	1,568	891	728	1,249	1,763
	Total Tuna	1,943	1,252	896	1,987	2,103
Billfish Catch (mt)	Black Marlin	29	13	39	65	62
	Blue Marlin	153	11	44	13	54
	Striped Marlin	3	9	-	11	4
	Swordfish	114	2	6	6	26
	Total Billfish	299	35	89	95	146
Shark Catch (mt)	Blue Shark	52	-	1	3	-
	Silky Shark	215	-	-	-	2
	Hamerhead Sharks	4	-	-	-	
	Mako Shark	93	-	-	1	
	Oceanic White Tip	21	1	-	-	
	Thresher Sharks	-	-	-	-	
	Total Sharks	385	1	1	4	2

Table 1(b): Annual catch and effort estimates for the PNG purse seine fleet by primary species for the WCPFC Convention Area for 2014-2018. Source: SPC

Year		2014	2015	2016	2017	2018 (Provisional)
Effort (Fishing Days)		*6,261*	*5,629*	*5,484*	*6,962*	*7,490*
Catch (mt)	Albacore	0	0	10	10	15
	Bigeye	7,594	6,669	8,995	6,818	1,895
	Pacific Bluefin	-	-	-	-	-
	Skipjack	174,126	159,528	198,387	189,286	178,288
	Yellowfin	53,160	48,315	80,694	106,377	68,181
	Total	234,880	214,512	288,086	302,491	248,379

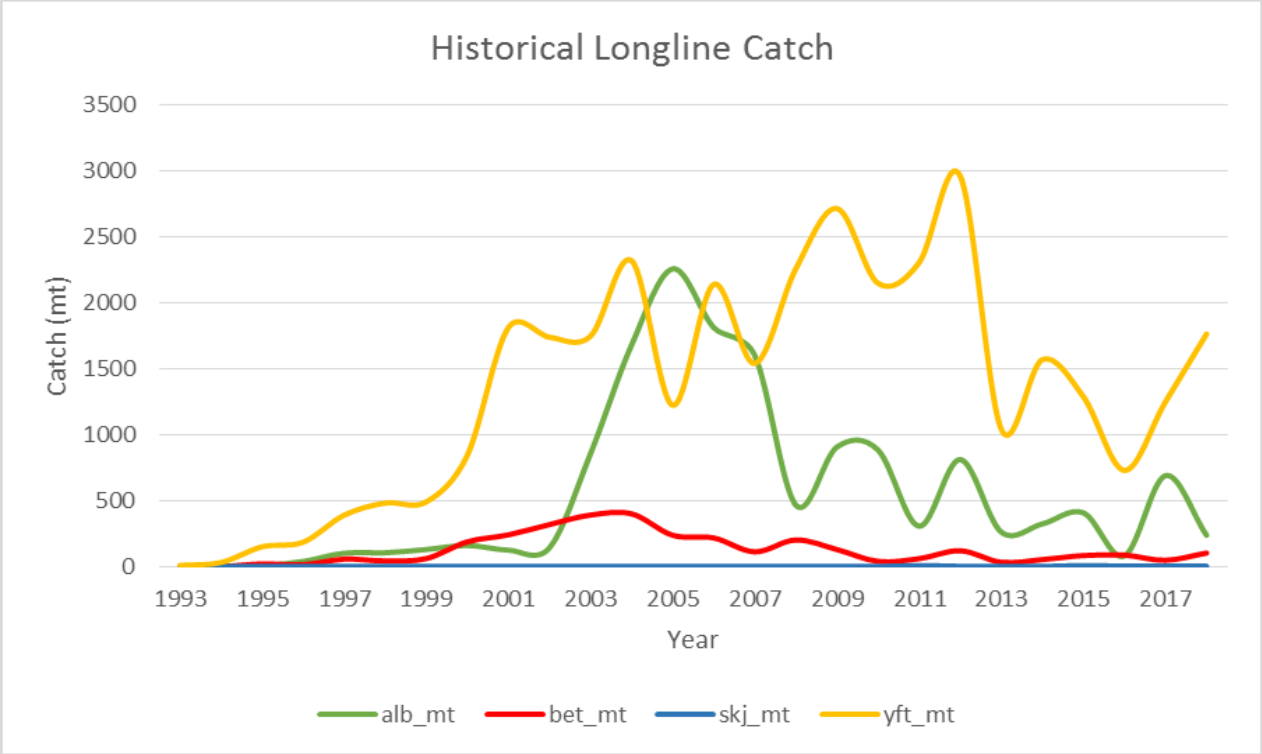

Figure 1 (a): Historical annual catch for the PNG longline fleet by primary species in the WCPFC Convention area.

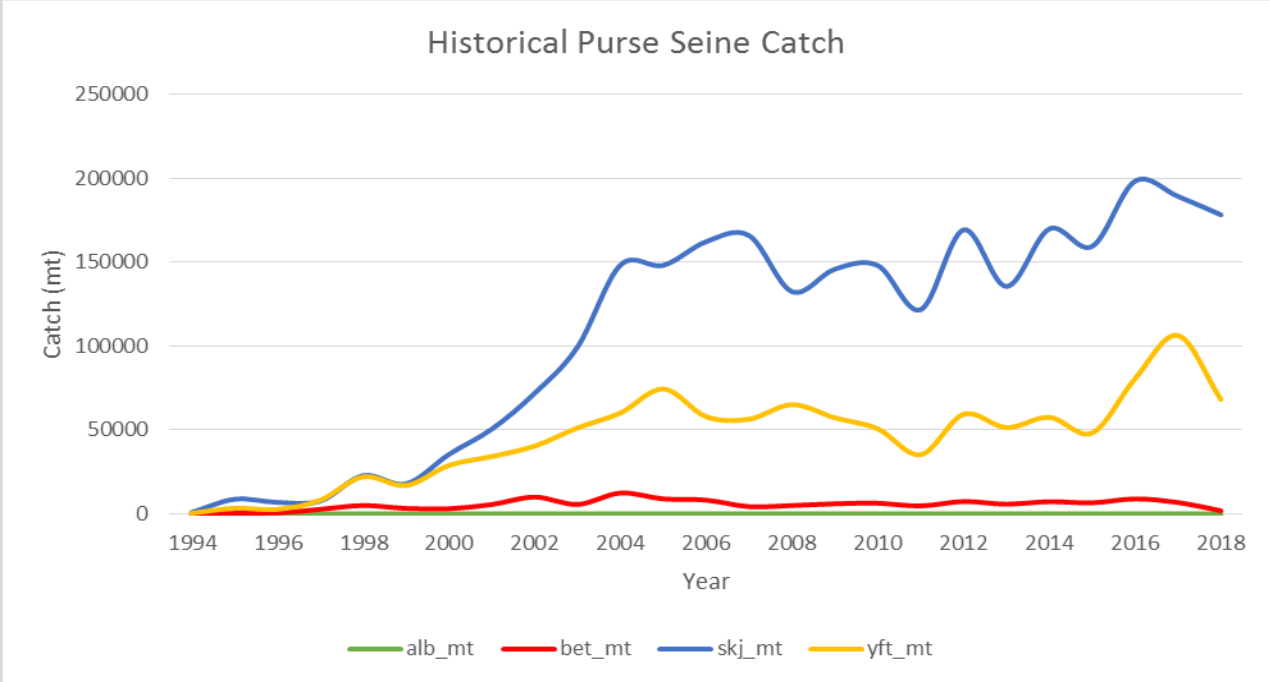

Figure 1 (b): Historical annual catch for the PNG purse seine fleet by primary species in the WCPFC Convention area.

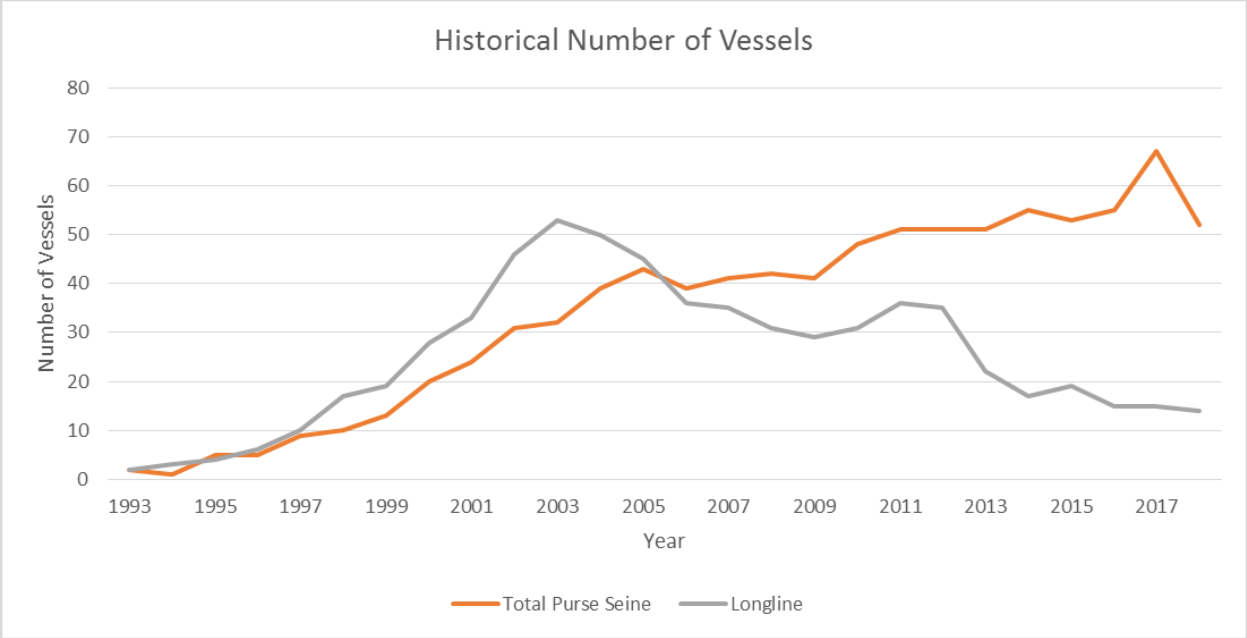

Figure 2: Historical annual vessel numbers for the PNG purse seine and longline fleet in the WCPFC Convention area.

Table 2(a). Number of PNG longline vessels by size category, active in the WCPFC Convention area for years 2014- 2018.

Size class (GRT)	2014	2015	2016	2017	2018
0–50	3	5	6	7	-
51–200	9	15	9	15	12
201–500	-	-	-	-	2
500+	-	-	-	-	-
Total	12	20	15	22	14

Table 2(b). Number of PNG purse seine vessels by size category, active in the WCPFC Convention area for years 2014- 2018

Size class (GRT)	2014	2015	2016	2017	2018
0–500	11	3	7	7	4
501–1,000	9	8	14	14	10
1,001–1,500	28	30	37	37	33
1,500+	7	11	9	9	9
Unknown	-	1	-	-	-
Total	55	53	67	67	56

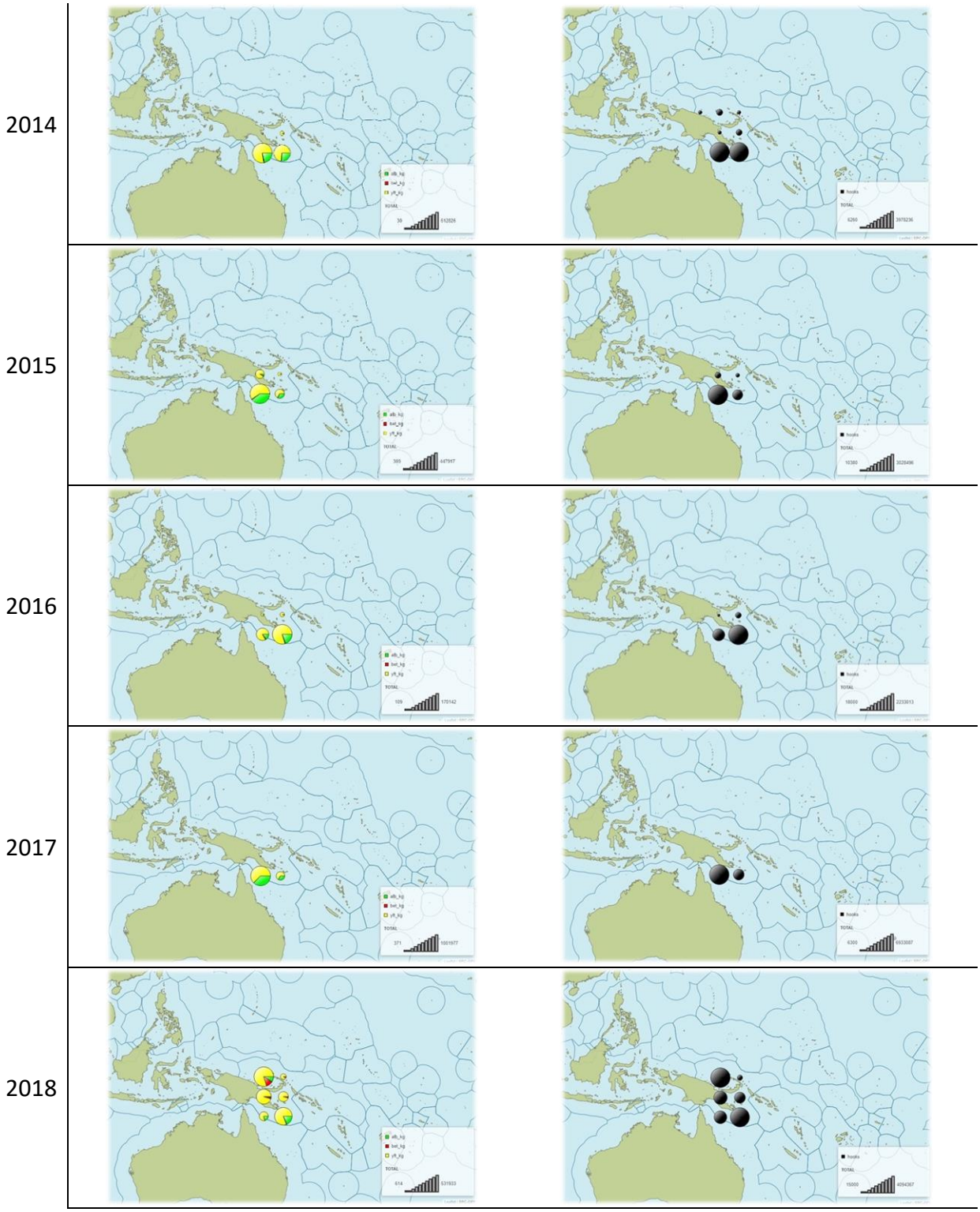

Figure 3(a). Annual distribution of target catch (ALB = "green"; BET = "red"; and YFT = "yellow") and effort by the PNG longline fleet active in the WCPFC Convention area for year 2014-2018. Source: SPC

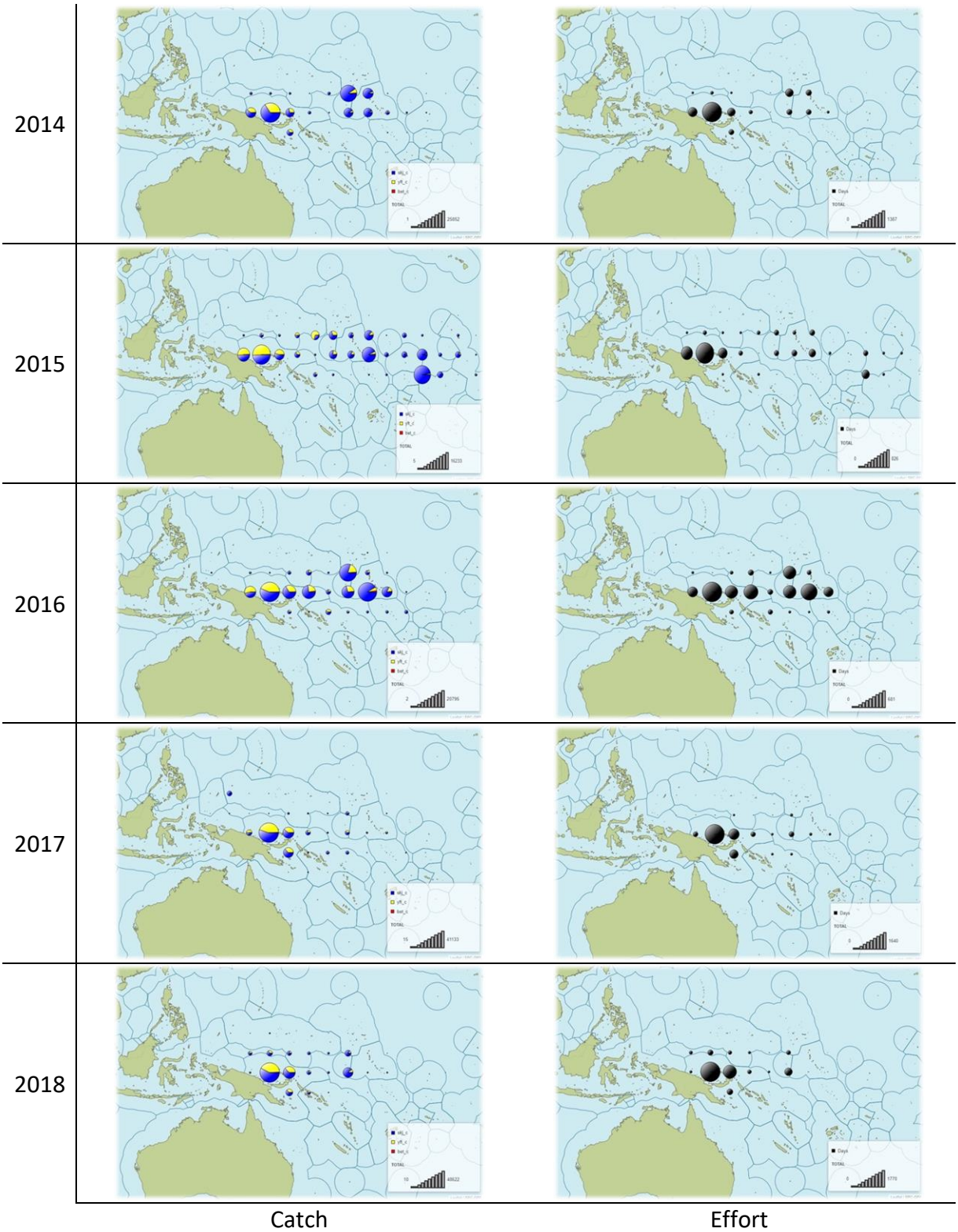

Figure 3(b). Annual distribution of target catch (SKJ = Blue; YFT = yellow; and BET = red and effort by the PNG purse seine fleet active in the WCPFC Convention area for year 2014-2018. Source: SPC

Table 3. Observed annual estimated catches of species of special interest (seabirds, turtles and marine mammals) by PNG vessels, in the WCPFC Convention Area for years 2014-2018. Source SPC.

Species	Number of Individuals				
	2014	2015	2016	2017	2018
AQUATIC MAMMALS NEI	2				
BALEEN WHALES NEI	3	2			3
BEAKED WHALES NEI	7		2	7	8
BIRD (UNIDENTIFIED)	1				
BLACK-FOOTED ALBATROSS				30	
BLUE WHALE			1		1
BOOBIES AND GANNETS NEI	1			26	
BOTTLENOSE DOLPHIN	21		68	60	114
BRYDE'S WHALE	23	13	47	21	8
COMMON DOLPHIN			32	8	
CUVIER'S BEAKED WHALE	1				1
DOLPHINS NEI			-		
FALSE KILLER WHALE	405	292	411	324	167
FIN WHALE					5
FLATBACK TURTLE		2		3	3
GINKGO-TOOTHED BEAKED WHALE	1		2	2	
GREEN TURTLE	11	13	11	9	15
HAWKSBILL TURTLE	10	7	1	504	7
HUMPBACK WHALE	1				
INDO-PACIF. BOTTLENOSE DOLPHIN		3	35	23	8
LEATHERBACK TURTLE	1		3	2	1
LOGGERHEAD TURTLE	3	6	4	4	10
LONG-BEAKED COMMON DOLPHIN	14			7	
LONG-FINNED PILOT WHALE			3		
MELON-HEADED WHALE	8	9	13	11	1
MINKE WHALE	2	5	5	1	1
OLIVE RIDLEY TURTLE	21	16	10	9	10
PACIFIC WHITE-SIDED DOLPHIN			15		
PANTROPICAL SPOTTED DOLPHIN			-	13	5
PYGMY KILLER WHALE			11		6
PYGMY SPERM WHALE					3
RISSO'S DOLPHIN	38	4	16	82	7
ROUGH-TOOTHED DOLPHIN	20	95		11	8
SEI WHALE	10	8	5	22	26
SHORT-FINNED PILOT WHALE	62	49	106	13	30
SPERM WHALE	2	1			2
SPINNER DOLPHIN	51	10	8	48	28
STRIPED DOLPHIN	6			5	75
WHALE SHARK	81	89	55	80	79
Grand Total	806	624	864	1,325	632

Table 4(a). Annual estimated catches of non-target, associated and dependent species, including sharks, by the PNG purse seine vessels in the WCPFC Convention Area, for years 2014-2018. Source: SPC

Species	Catch (mt)				
	2014	2015	2016	2017	2018
BARRACUDAS NEI		0.1	0.1	0.1	0.1
BATFISHES		0	0	0.1	
BIG-SCALE POMFRET	0			0.1	
BIGEYE SCAD			0.2		
BIGEYE THRESHER SHARK				0.1	
BIGEYE TREVALLY		0	0.2	0	0.2
BLACK MARLIN	2.9	8.9	6.2	12.2	8.2
BLACKTIP SHARK		0.2		0	1.9
BLUE MARLIN	1.6	18.5	15.7	25	21.8
BLUE SEA CHUB			1.5	0	0.5
BLUE SHARK	20				0
BOTTLENOSE DOLPHIN	0.5	0.1			0.4
BRONZE WHALER SHARK			2.4	0.8	0.2
BRYDE'S WHALE				0.1	0
BULL SHARK				0.2	
BULLET TUNA	16.3	7.3	0.6	1.8	11.3
COMMON DOLPHIN				0.2	
COMMON DOLPHINFISH	2.5	11.7	4	8.1	7.9
DOLPHINS NEI		0.6	0.1	0.1	
EASTERN PACIFIC BONITO			2.7	2.1	18.4
FALSE KILLER WHALE		0.4	0.1	0.4	5.5
FRIGATE TUNA	34.4	11.1	3.3	4.4	34.7
GIANT MANTA	1.9	4.1	3.5	5.5	28.1
GOLDEN TREVALLY			0	0.2	0
GREAT BARRACUDA	1.2	0.6	0.6	1.7	0.5
GREAT HAMMERHEAD	0.1	1		0.1	0.1
GREEN TURTLE	0.1			0	0.1
GREY REEF SHARK			0	0.1	
HAWKSBILL TURTLE	0.5	0	0	0	0.1
INDO-PACIF. BOTTLENOSE DOLPHIN		0.2			0.1
INDO-PACIFIC SAILFISH	0.2	0.1	0.6	1.1	0.8
KAWAKAWA	3.3	0.1	0.8	3.9	3
LEATHERBACK TURTLE			0.1		0
LOGGERHEAD TURTLE	0			0.1	0.1
LONGFIN BATFISH			0.1	0	0.1

MACKEREL SCAD	1.6	32	95.8	54.7	44.2
MACKERELS NEI	0.6				
MANTAS DEVIL RAYS NEI	5.5	1.3	1.5	3.5	3.5
MARINE TURTLES NEI		0	0.1	0	
MELON-HEADED WHALE				0.5	
MOBULA	2.1	1.2	2	5.1	10.3
OCEAN SUNFISH	0.1	0.4	0.1	0.1	0.1
OCEAN TRIGGERFISH (SPOTTED)	0.2	3.8	19.6	22.7	12.4
OCEANIC WHITETIP SHARK	0	0.1	2	0.4	1.6
OILFISH			0.5		
OTHER FISH	513.3	187.3	78.7	15.9	3.9
PANTROPICAL SPOTTED DOLPHIN			0.1		
PELAGIC STINGRAY	0.8	0.1	0.3	0.2	0
PELAGIC THRESHER SHARK				0.1	0
PYGMY KILLER WHALE				0.5	
RAINBOW RUNNER	60	105.9	273.3	91	92.5
ROUGH-TOOTHED DOLPHIN		0.6			0.2
SHARKS RAYS SKATES ETC. NEI					0.1
SHARKS (UNIDENTIFIED)	11.1	8.8		1	2.1
SHARPTAIL MOLA	0.1	0.1	0	0.2	0.1
SHORTBILL SPEARFISH		0.1	0.1	0.1	
SILKY SHARK	28.7	69.9	127.6	309.5	342.7
SILVERTIP SHARK			0.1		0
SLENDER SUNFISH	0.2	0.1	0.1	0	
STINGRAYS BUTTERFLY RAYS NEI	0.3			0	0
STRIPED MARLIN	0.2	1.8	0.7	0.7	1.8
SWORDFISH	0.1	0	1.2	0.3	0.1
TIGER SHARK					0.6
TRIGGERFISHES DURGONS NEI	36.9	7.5	16.2	4.1	3.3
TUNAS NEI	202.5	346.2	243.2	332.5	202.4
UNICORN LEATHERJACKET FILEFISH		0		0.1	0.2
UNSPECIFIED	154	1	0.1	2	2.1
WAHOO	5.5	0.4	0.9	2.6	1.4
WHALE (UNIDENTIFIED)	0.4	1.2	2	0.3	20
WHALE SHARK	26.2	60.3	3.2	56.8	89.9
Grand Total	1135.9	895.1	912.2	973.4	979.6

Table 4(b). Annual estimated catches of non-target, associated and dependent species, including sharks, by the PNG longline vessels in the WCPFC Convention Area, for years 2014-2018. Source: SPC

Species	2014	2015	2016	2017	2018
BARRACUDAS NEI		2.771	0.444	2.868	3.798
COMMON DOLPHINFISH		0.855	0.008	0.944	0.824
INDO-PACIFIC SAILFISH	24.269	10.253	8.405	25.994	30.719
MACKEREL SCAD		0.086			
MACKERELS NEI		0.081	0.099		
MOONFISH				0.293	0.188
OILFISH	6.215	5.125	7.612	12.162	16.126
OPAH		2.463	2.516	5.239	1.442
OTHER FISH		0.016			5.297
PORBEAGLE SHARK		0.01			
SHARKS (UNIDENTIFIED)	136.727	4.412	0.121	0.425	
SHORTBILL SPEARFISH		1.377			
UNSPECIFIED	22.653	0.153		0.02	
WAHOO	21.458	13.412	29.077	52.361	32.023
Total	211.322	41.014	48.282	100.306	90.417

Table 5. Estimated annual coverage of operational catch/effort, observer and port sampling data for the PNG vessels by gear, active in the WCPFC Convention Area, for years 2014-2018. Source: SPC & NFA.

Year	Gear	Logsheet Coverage	Observer Coverage		Port Sampling Coverage
			Trip	Days	
2014	LL	95%	67%	63%	0%
	PS	68%	78%	60%	≈ 20%
2015	LL	100%	0%	0%	0%
	PS	76%	81%	67%	≈ 20%
2016	LL	100%	12%	19%	0%
	PS	77%	88%	65%	≈ 20%
2017	LL	100%	0%	0%	0%
	PS	79%	98%	45%	≈ 20%
2018	LL	100%	8%	16%	0%
	PS	80%	75%	57%	≈ 20%

3. Background

Tuna in the Papua New Guinea (PNG) national waters are caught by two main fishing methods, namely purse-seine and longline. Most of the catch (99%) is attributed to the purse-seine fishery. Purse-seining started in PNG waters in the early 1980s and has since intensified, with the 2010 catch being the highest on record (702,969 mt). The longline fishery started even earlier than the purse-seine fishery, originally only as access by foreign fleets. But in the mid-1990s a policy on domestication enabled the fishery to be a national activity only, hence doing away with access by foreign fleets. However, recently in 2015 for economic reasons, the longline fishery was reopened to interested foreign fleets.

The tuna fishery in PNG represents a balance of both domestic industry development and foreign distant water fishing nations (DWFN) access agreements. Domestic industry development is pursued by using a model whereby a fishing licence is granted on the condition that the vessels catch fish for processing facilities in-country. Vessels under this scheme are either re-flagged to PNG or are given incentives by way of reduced licence fees and allowing them to fish within archipelagic waters or sponsoring them to fish under the Federated States of Micronesia Arrangement (FSMA).

The fishery is guided by the National Tuna Fishery Management and Development Plan (NTFMDP) which establishes an overall management structure, and an application framework for all tuna fisheries. This include catch and effort controls, gear restrictions, the use of Fish Aggregating Devices (FAD) and other management tools for the purpose of tuna resource conservation and management as well as combating illegal, unregulated and unreported fishing activities (IUU). The plan is updated where necessary to conform to the country's development plans as well as regional and international obligations and agreements.

The purse-seine fishery operates within the guidelines of important regional and sub-regional arrangements such as the Parties to the Nauru Agreement (PNA), whose requirements are incorporated in the National Tuna Management and Development Plan**.**

4. Flag State Reporting

This section reports activities by the national fleet in waters of the Western and Central Pacific Fisheries Commission (WCPFC) convention area including PNG's Exclusive Economic Zone (EEZ). The national fleet comprises of domestic longline and purse seine vessels which includes purse seine vessels under charter arrangements with domestic companies.

4.1 Domestic Tuna Longline

The target catches by domestic tuna longline vessels are dominated by yellowfin tuna followed by albacore and bigeye. Since the introduction of the domestication policy in the mid 90's, catches have generally been increasing with the highest estimated catch of bigeye tuna of around 400 mt

observed in 2004; highest estimated catch of albacore of 2,256 mt was observed in 2005; and yellowfin with 2,961 mt observed in 2012 *(Figure 1a)*. Decline in overall catches was related to vessels pulling out of fishery from 53 active vessels in 2003 to 22 vessels in 2013 *(Figure 2)*. This was due to the high cost of operation since most of vessel operations were engaged to supplying the Japanese Sashimi market through airfreighted exports.

PNG still maintains a small number of active domestic tuna longline vessels which operates exclusively in PNG waters. In 2018, the estimated catch of yellowfin tuna increased to 1,763mt from 2017 estimate of 1249 mt. Catches of bigeye tuna also increased from the 2017 estimates of 47 mt to 102 mt in 2018. Catches of albacore tuna on the other hand dropped from 689 mt in 2017 to 236 mt in 2018. with an average of 877 mt in the last five years (2013-2017), (199 mt) (59 mt). Total estimated catch of primary billfishes species (black marlin, blue marlin, striped marlin and swordfish) in 2018 was 146 mt and primary shark species landed was 2 mt *(Table 1a)*. Billfishes and sharks that are caught by this fishery are mainly bycatch.

Catch and effort by the domestic longline vessels are distributed mostly to the south of the EEZ to waters below south of 10^{O}S. This was mainly due to operational reasons where the few remaining longline companies were operating out of Port Moresby and were targeting the desired fishing grounds in the south *(Figure 3a).*

4.2 Purse Seine

PNG manages a purse seine fleet made up of two categories; Domestic PNG flagged vessels and Locally-Based Foreign (LBF). LBF vessels are foreign flagged and whose activities are governed under charter arrangements with locally based companies. These vessels support onshore processing plants in the country.

Catches comprise mostly of skipjack with the highest composition, followed by yellowfin and bigeye tuna. Although, skipjack is the main target species in this fishery, yellowfin and bigeye are also commercially important. Catches by the PNG domestic fleet have generally been increasing *(Figure 1b)* as the number of vessels associated to onshore processors increased *(Figure 2).* In 2018 a total catch estimate of 178,288 mt of skipjack, 68,181 mt of yellowfin and 1,895mt of bigeye tuna was caught in the WCPFC convention area *(Table 1b).*

PNG purse seine vessels fish in the PNG waters as well as waters of other PNA member country countries under the FSM Arrangement. During the peak El Nino condition in late 2015 to early 2016, vessels activities moved to more favorable fishing grounds towards East as observed in the annual distribution of catch and effort in *Figure 3(b).*

5. Coastal State Reporting

This section reports activities in national waters by foreign fleets which comprise of tuna purse seine vessels and recently the introduction of foreign longline vessels. Activities of a domestic shark longline and a very small handline fishery are also reported in this section since all their activities are inside PNG waters.

5.1 Purse Seine - Foreign Vessels

Foreign purse seine vessels that fish in PNG waters are licensed under the conditions of access agreements between PNG and their company, fishing association or home party state and also include foreign vessels fishing under the terms of the US Treaty and FSM Arrangement. In the last five years, catches by foreign vessels fishing in PNG waters has averaged around 114,362 mt. Table 5 shows the annual catch and effort estimates for the years 2014-2018.

Table 5: Catch and effort estimates for foreign purse seiners fishing in PNG waters from 2014-2018.

Year	*Fishing Days*	Catch (mt) / Species			
		SKJ	YFT	BET	Total
2014	*8,907*	134,352	51,033	2,292	**187,677**
2015	*3,219*	49,827	23,872	1,884	**75,583**
2016	*3,201*	75,173	26,840	1,436	**103,449**
2017	*3,647*	85,645	30,597	1,636	**117,878**
2018 (Provisional)	*3,337*	72,160	14,250	814	**87,224**
Average	*6,791*	83,431	29,318	1,612	114,362

5.2 Shark Longline

The shark longline fishery was managed under a separate management plan from the tuna longline fishery. The fishery was limited to 9 vessels, setting 1,200 hooks per day with a total allowable catch of 2,000 mt dressed weight per year. All vessels in this fishery fished only in PNG waters.

The shark fishery was closed in the first quarter of 2014 in response to the CMM 2011-04 and CMM 2013-08 which prohibited landings of Oceanic White-Tip and Silky Shark respectively. Figure 9 and 10 shows the recorded catch, number of vessels and effort (hundred hooks) since 2009. Considerable amount of tuna (mainly yellowfin) and billfishes are also caught in this fishery

as bycatch. The average estimated catch in 2010-2015 was 1,344.26 mt with 1011.47 mt being shark catches alone (Table 6).

Table 6: Annual catch estimates (mt) of shark species and effort estimate (hundred hooks) for PNG domestic shark longline fleet in waters under national jurisdiction. Data source: NFA.

Year		2010	2011	2012	2013	2014	Average
Effort (HHooks)		*22,790*	*27,934*	*20,817*	*16,367*	*6,129*	*18,808*
Catch (mt)	Blacktip Shark	18.93	2.81	1.31	5.59	7.45	9.22
	Blacktipped Reef Shark	19.75	43.98	36.53	11.17	12.79	24.85
	Blue Shark	10.21	18.93	16.08	16.59	9.38	14.24
	Galapagos Shark	0.99	0.29	0.06	2.89	2.69	1.38
	Grey Reef Shark	23.87	8.42	2.59	4.68	2.10	8.33
	Hammerhead Shark	39.15	22.34	18.64	31.06	15.09	25.26
	Oceanic White Tip	12.90	7.15	3.74	7.42	7.66	7.77
	Silky Shark	907.26	1,292.90	902.46	796.12	399.27	859.60
	Silvertip Shark	6.37	0.45	0.39	0.38	0.30	1.58
	Tiger Shark	8.76	2.15	1.21	2.16	0.16	2.89
	Shark Unidentified	71.72	80.25	52.65	54.61	22.60	56.37
	SHARK TOTAL	**1,119.90**	**1,479.66**	**1,045.64**	**932.65**	**479.48**	**1,011.47**
	Albacore	1.46	7.32	9.68	1.37	0.23	4.01
	Bigeye	3.66	2.37	10.69	18.96	15.56	10.25
	Yellowfin	140.03	173.98	205.34	112.84	25.58	131.55
	Black Marlin	10.85	4.38	3.51	9.12	2.79	6.13
	Blue Marlin	53.92	113.04	65.63	64.83	16.32	62.75
	Sailfish	43.85	65.90	35.16	28.69	9.98	36.72
	Striped Marlin	0.99	1.23	1.69	1.13	0.65	1.14
	Swordfish	49.30	77.57	86.61	56.39	21.71	58.31
	Other	36.75	21.79	20.53	26.37	4.28	21.94
	OVERALL TOTAL	**1,460.72**	**1,947.22**	**1,484.46**	**1,252.35**	**576.57**	**1,344.26**

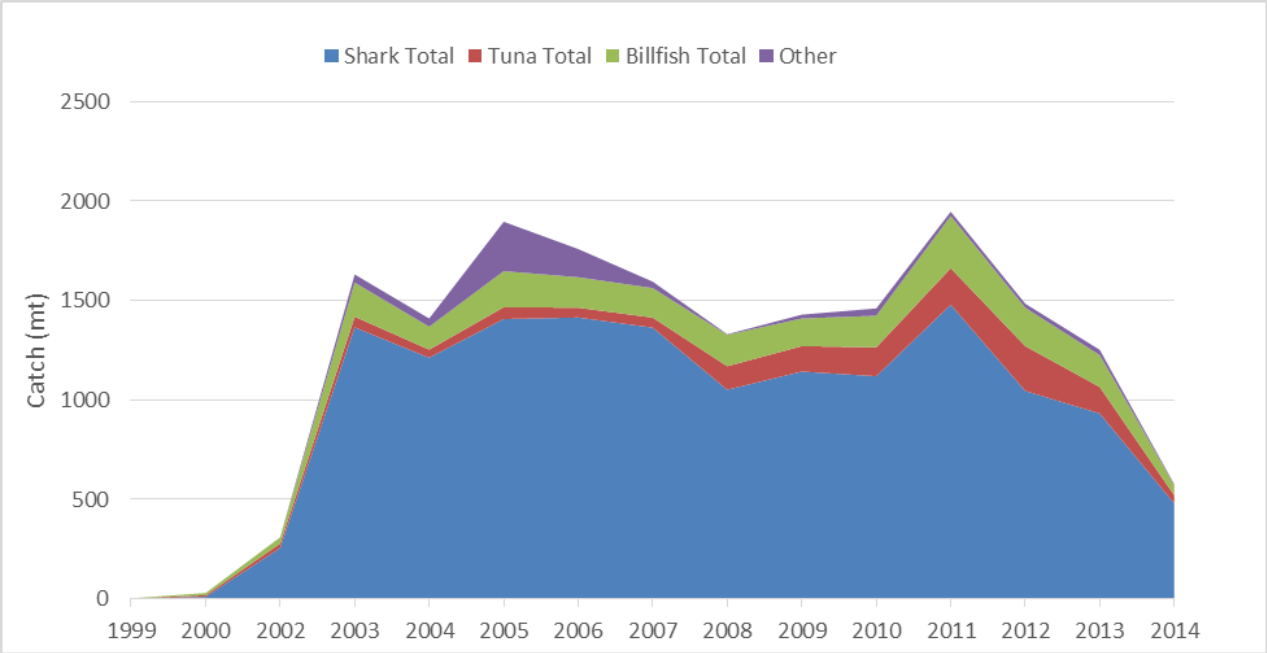

Figure 5: Catch estimate by shark longline vessels. Data source: NFA

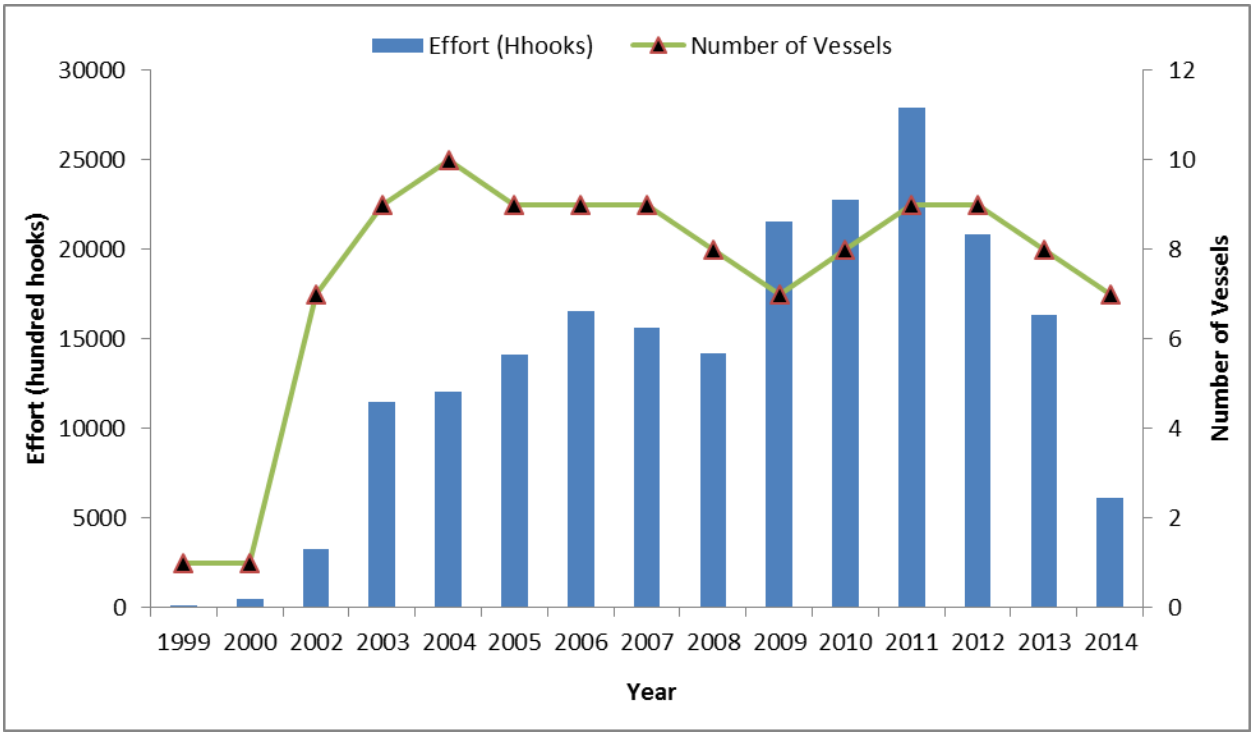

Figure 6: Effort estimates (hhooks) and the number of shark longline vessels. Data source: NFA

5.3 Handline

Since the trial of handline fishery in 2005, the number of pumpboats reduced from 10 to 5 vessels in 2009 (Kumoru, 2010). Although there was some growth potential for this fishery, most of the vessels failed to continue fishing mainly due to lack of proper business management, and the high operational cost for artisanal operators during its inception. The vessels were solely owned and operated by local fishermen. Catch by these vessels, which do not normally exceed 10 mt (estimate) per year, were sold to processing companies as well as local supermarkets. Currently, there no more pumpboats operating in PNG waters.

6. Socio – Economic Factors

Papua New Guinea is focused on building its domestic tuna industry to an extent where the generated revenue can offset that currently obtained from bilateral access fees. The government's main objective is to maximize the benefits from tuna resource to citizens and promote the involvement of nationals in the industry. A growth in the industry would provide an increase in employment opportunities, increased foreign exchange earnings for the country and direct and indirect spin-off benefits among other benefits of value-adding the tuna resources. Currently, the industry supports almost 7,000 people in direct employment and almost 2,000 indirect employments in the country of over 6 million people. New commitments and investments would triple these figures.

7. Exports

The quantity of exports in the domestic industry have been steadily increasing since the 90's to over 100,000 mt of processed products in 2012 and 2013 (Figure 11). In relation, the value of exports have also been increasing to over USD270 million in 2012. The total value estimated in 2014 was around USD218 million. This growth is in line with the country's industry development aspirations.

Most of the export products are canned and frozen tuna (Figure 12). The quantity of canned tuna exports have been increasing with more fish processed onshore and the trend is likely to continue as more processing facilities are being developed in the country.

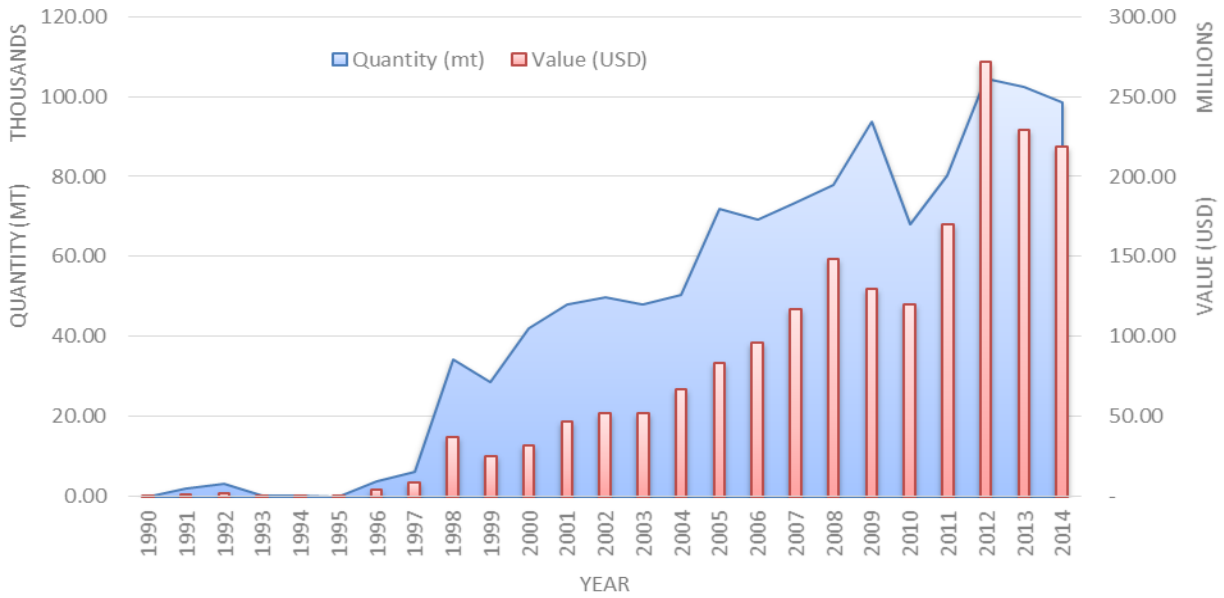

Figure 7: Quantity (mt) and value (USD) of processed tuna export products by domestic companies. Data source: NFA

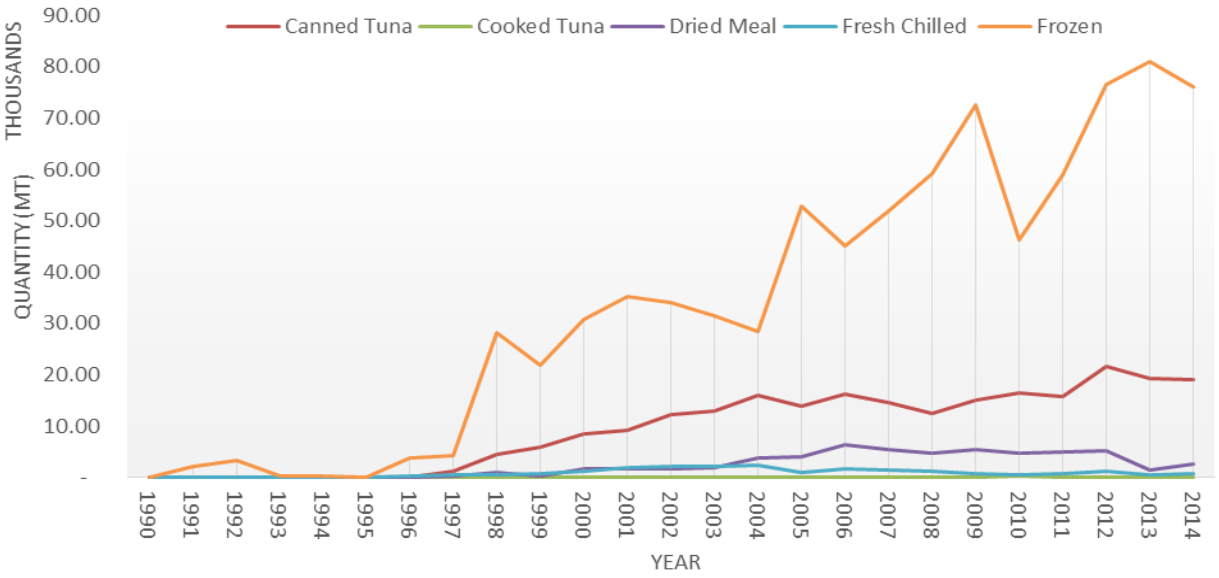

Figure 8: Quantity of exports by processed product type. Data source: NFA

8. References

Kumoru, L.2010. Annual Report to the Commission, Part 1: Information of Fisheries, Research and Statistics, WCPFC-SC6-AR/CCM18.

ADDENDUM – CMM REPORTING

Specific information as required by CMMs.

CMM Reference	Description	Response
CMM 2005-03 [North Pacific Albacore], Para 4	All CCMs shall report annually to the WCPFC Commission all catches of albacore north of the equator and all fishing effort north of the equator in fisheries directed at albacore. The reports for both catch and fishing effort shall be made by gear type. Catches shall be reported in terms of weight. Fishing effort shall be reported in terms of the most relevant measures for a given gear type, including at a minimum for all gear types, the number of vessel-days fished.* [* footnote 1: The first such report shall be due on April 30th, 2006 and shall cover calendar year 2004. Small Island Developing States will make their best efforts to comply with this first reporting deadline.] ** Note: WCPFC10 clarified that this reporting responsibility lies with the flag State*	There were no catch and effort directed at albacore north of the equator by PNG vessels in 2018
CMM 2006-04 [South West striped Marlin], Para 4	In accordance with paragraph 1, CCMs shall provide information to the Commission, by 1 July 2007, on the number of their vessels that have fished for striped marlin in the Convention area south of 15°S, during the period 2000 – 2004, and in doing so, nominate the maximum number of vessels that shall continue to be permitted to fish for striped marlin in the area south of 15°S. CCMs shall report annually to the Commission the catch levels of their fishing vessels that have taken striped marlin as a bycatch as well as the number and catch levels of vessels fishing for striped marlin in the Convention Area south of 15°S.	Not applicable. There were no PNG vessels fishing at 15°S during the period 200-2004 and no vessels are permitted to fish for striped marlin in the area south of 15°S.
CMM 2009-03 [Swordfish], Para 8	CCMs shall report to the Commission the total number of vessels that fished for swordfish and the total catch of swordfish for the following: a. vessels flying their flag anywhere in the Convention Area south of 20°S other than vessels operating under charter, lease or other similar mechanism as part of the domestic fishery of another CCM; b. vessels operating under charter, lease or other similar mechanism as part of their domestic fishery south of 20°S; and	Not applicable. There were no PNG vessels fishing south of 20°S from the period 2000-2009 and successive years till 2018.

	c. any other vessels fishing within their waters south of 20°S. This information shall be provided in Part 1of each CCM's annual report. Initially, this information will be provided in the template provided at Annex 2 for the period 2000-2009 and then updated annually. **Note: WCPFC11 confirmed a common understanding that "total catch" in this reporting requirement refers to both targeted and bycatch catches of swordfish.*	
CMM 2009-06 [Transshipment], Para 11 (ANNEX II)	CCMs shall report on all transhipment activities covered by this Measure (including transhipment activities that occur in ports or EEZs) as part of their Annual Report in accordance with the guidelines at Annex II. In doing so, CCMs shall take all reasonable steps to validate and where possible, correct information received from vessels undertaking transhipment using all available information such as catch and effort data, position data, observer reports and port monitoring data. WCPFC15 Outcome document para 48: The Commission agreed to the TCC14 recommendation that the template provided in TCC14-2018-RP03 Annex 3 be used by all applicable CCMs for their future reporting in Annual Report Part 1, as per CMM 2009-06 paragraph 11 (Attachment O of WCPFC15). **Annex 3 of RP03: Transhipment information to be provided annually by CCMs as required by CMM 2009-06 paragraph 11 in accordance with the guidelines in Annex II of the measure.** Each CCM shall include in Part 1 of its Annual Report to the Commission: (1) the **total quantities, by weight**, of highly migratory fish stocks covered by this measure that were transhipped by fishing vessels the CCM is responsible for reporting against, with those quantities broken down by:	There had been reports of Transshipment and unloading activities by PNG fleet at national ports and other ports inside the Convention Area in 2018. Refer to Table A1 & A2 for detail information.

a) offloaded and received;	b) transhipped in port, transhipped at sea in areas of national jurisdiction, and transhipped beyond areas of national jurisdiction	c) transhipped inside the Convention Area and transshipped outside the Convention Area;	d) caught inside the Convention Area and caught outside the Convention Area;	e) Species	f) Product Form	g) Fishing gear
offloaded						
received						

(2) the **number of transhipments** involving highly migratory fish stocks covered by this measure by fishing vessels that is responsible for reporting against, broken down by:

a) offloaded and received	b) transhipped in port, transhipped at sea in areas of national jurisdiction, and transhipped beyond areas of national jurisdiction	c) transhipped inside the Convention Area and transhipped outside the Convention Area	d) caught inside the Convention Area and caught outside the Convention Area	e) fishing gear
offloaded				
received				

ANNEX II
TRANSHIPMENT INFORMATION TO BE REPORTED ANNUALLY BY CCMs

Each CCM shall include in Part 1 of its Annual Report to the Commission:

	(1) the total quantities, by weight, of highly migratory fish stocks covered by this measure that were transhipped by fishing vessels the CCM is responsible for reporting against, with those quantities broken down by: a. offloaded and received; b. transhipped in port, transhipped at sea in areas of national jurisdiction, and transhipped beyond areas of national jurisdiction; c. transhipped inside the Convention Area and transshipped outside the Convention Area; d. caught inside the Convention Area and caught outside the Convention Area; e. species; f. product form; and g. fishing gear used (2) the number of transhipments involving highly migratory fish stocks covered by this measure by fishing vessels that is responsible for reporting against, broken down by: a. offloaded and received; b. transhipped in port, transhipped at sea in areas of national jurisdiction, and transhipped beyond areas of national jurisdiction; c. transhipped inside the Convention Area and transhipped outside the Convention Area; d. caught inside the Convention Area and caught outside the Convention Area; and e. fishing gear.	
CMM 2010-07 [Sharks], Para 4	Each CCM shall include key shark species*, as identified by the Scientific Committee, in their annual reporting to the Commission of annual catch and fishing effort statistics by gear type, including available historical data, in accordance with the WCPF Convention and agreed reporting procedures. CCMs shall also report annual retained and discarded catches in Part 2 of their annual report. CCMs shall as appropriate, support research and development of strategies for the avoidance of unwanted shark captures (e.g. chemical, magnetic and rare earth metal shark deterrents). *footnote 2: The key shark species are blue shark, silky shark, oceanic whitetip shark, mako sharks, and thresher sharks, porbeagle shark (south of 20°S, until	A total of 20 species of sharks had been estimated to be caught by PNG fleet in 2018. Refer to Table A3 for more information.

<table>
<tr><td></td><td>biological data shows this or another geographic limit to be appropriate) and hammerhead sharks (winghead, scalloped, great, and smooth).
*Note; Whale Sharks (Rhincodon typus) was included as a key shark species by WCPFC9 (2012)</td><td></td></tr>
<tr><td>CMM 2011-03 [Impact of PS fishing on cetaceans], Para 5</td><td>CCMs shall include in their Part 1 Annual Report any instances in which cetaceans have been encircled by the purse seine nets of their flagged vessels, reported under paragraph 2(b).</td><td>A total of 498 cetaceans had been reported as either interacted or landed in purse seine fishing operation in 2018. Refer to Table A4 for more information.</td></tr>
<tr><td>CMM 2011-04 [Oceanic whitetip sharks], Para 3</td><td>CCMs shall estimate, through data collected from observer programs and other means, the number of releases of oceanic whitetip shark, including the status upon release (dead or alive), and report this information to the WCPFC in Part 1 of their Annual Reports.</td><td>A total of 45 oceanic whitetip sharks were discarded alive while 44 were discarded dead. Refer to Table A5 for more information.</td></tr>
<tr><td>CMM 2012-04 [Whale sharks], Para 06</td><td>CCMs shall advise in their Part 1 Annual Report of any instances in which whale sharks have been encircled by the purse seine nets of their flagged vessels, including details required under paragraph 4(b).</td><td>A total of 60 whale sharks reported as interacted or landed by PNG fleet were released alive in 2018. Table A6</td></tr>
<tr><td>CMM 2013-08 [Silky sharks], Para 3</td><td>CCMs shall estimate, through data collected from observer programs and other means, the number of releases of silky shark caught in the Convention Area, including the status upon release (dead or alive), and report this information to the WCPFC in Part 1 of their Annual Reports.</td><td>A total of 11, 641 silky sharks had been recorded as discarded either dead or alive by PNG fleet in 2018. Refer to Table A7</td></tr>
<tr><td>Observer coverage (WCPFC 11 decision – para 484(b)</td><td>CCMs are to compile and include in Annual Report Part 1 to be submitted from 2015 onwards, observer coverage for their longline fleet activity in the previous calendar year, noting that revisions can be provided at the annual TCC meeting.

A sample report format is provided as guidance to assist CCMs with reporting (WCPFC11 Summary Report Attachment L Table 4)
<table><tr><th rowspan="2">CCM Fleet</th><th rowspan="2">Fishery</th><th colspan="3">No. of Hooks</th><th colspan="3">Days Fished</th><th colspan="3">Days at Sea</th><th colspan="3">No. of Trips</th><th rowspan="2">See NOTE</th></tr><tr><th>Total estimated</th><th>Observer</th><th>%</th><th>Total estimated</th><th>Observer</th><th>%</th><th>Total estimated</th><th>Observer</th><th>%</th><th>Total estimated</th><th>Observer</th><th>%</th></tr><tr><td>REPUBLIC OF KOREA</td><td>Distant-water</td><td></td><td></td><td></td><td></td><td></td><td></td><td>23,632</td><td>1,575</td><td>6.6 %</td><td></td><td></td><td></td><td></td></tr></table></td><td>Activities of the PNG longline vessels is exclusive to national waters, therefore, no ROP trips were done.</td></tr>
</table>

CMM 2015-02 [South Pacific Albacore] Para 4	CCMs shall report annually to the Commission the annual catch levels taken by each of their fishing vessels that has taken South Pacific albacore, as well as the number of vessels actively fishing for South Pacific albacore, in the Convention area south of 20°S. Catch by vessel shall be reported according to the following species groups: albacore tuna, bigeye tuna, yellowfin tuna, swordfish, other billfish, and sharks. Initially this information will be provided for the period 2006-2014 and then updated annually. CCMs are encouraged to provide data from periods prior to these dates.	Not applicable. There were no PNG flag vessels fishing south of 20° during the period 2006 to 2018.
CMM 2018-03 [Seabirds] Para 13	CCMs shall annually provide to the Commission, in Part 1 of their annual reports, all available information on interactions with seabirds reported or collected by observers to enable the estimation of seabird mortality in all fisheries to which the Convention applies. (see Annex 2 for Part 1 reporting template guideline). These reports shall include information on: 1. the proportion of observed effort with specific mitigation measures used; and 2. observed and reported species specific seabird bycatch rates and numbers or statistically rigorous estimates of species- specific seabird interaction rates (for longline, interactions per 1,000 hooks) and total numbers.	Refer to Table A8..

Table A1. Estimated quantity (metric tons) of tuna transhipped and landed by National Fleet in 2018.

a) offloaded and received;	b) transhipped in port, transhipped at sea in areas of national jurisdiction, and transhipped beyond areas of national jurisdiction	c) transhipped inside the Convention Area and transshipped outside the Convention Area;	d) caught inside the Convention Area and caught outside the Convention Area;	e) Species	f) Product Form	g) Fishing gear
offloaded	Port: 101,920.8 mt	Inside CA: 19, 159.73 mt	Inside CA: Refer to Table x in the report.	SKJ	Frozen	PS
	Port: 0.31 mt	-	Inside CA: Refer to Table x in the report.	SKJ	Frozen	LL
	Port: 60, 465.50 mt	Inside CA: 3,739.96 mt	Inside CA: Refer to Table x in the report.	YFT	Frozen	PS
	Port: 697.00 mt	-	Inside CA: Refer to Table x in the report.	YFT	Frozen	LL
	Port: 1,228.80 mt	Inside CA: 481.37 mt	Inside CA: Refer to Table x in the report.	BET	Frozen	PS
	Port: 95 mt	-	Inside CA: Refer to Table x in the report.	BET	Frozen	LL
received	Port: 67, 617.20 mt	-	Inside CA: Refer to Table x in the report.	SKJ	Frozen	PS
	Port: 30,231 mt	-	Inside CA: Refer to Table x in the report.	YFT	Frozen	PS
	-	-	Inside CA: Refer to Table x in the report.	YFT	Frozen	LL
	Port: 6,093.10 mt	-	Inside CA: Refer to Table x in the report.	BET	Frozen	PS
	Port: -	-	Inside CA: Refer to Table x in the report.	BET	Frozen	LL

Table A2. Estimated number of Transhipments and Landings by National Fleet in 2018.

a) offloaded and received	b) transhipped in port, transhipped at sea in areas of national jurisdiction, and transhipped beyond areas of national jurisdiction	c) transhipped inside the Convention Area and transhipped outside the Convention Area	d) caught inside the Convention Area and caught outside the Convention Area	e) fishing gear
offloaded	Ports: 491 counts.	Inside CA: 33 counts (excluding offloading at domestic ports).	Caught inside CA: Refer to Table x in the report.	PS
	Ports: 13 counts.	-	Caught inside CA: Refer to Table x in the report.	LL
received	Ports: 347 counts.	-	Caught inside CA: Refer to Table x in the report.	PS

Table A3. Estimates of shark catches by National Fleet per gear and species in 2018

Gear	Species	Number	Retained	Discarded	Finned and trunk Retained	Finned but Trunk Discarded
Purse Seine	BIGEYE THRESHER SHARK	2	0	2	0	0
Purse Seine	BLACKTIP REEF SHARK	14	0	14	0	0
Purse Seine	BLACKTIP SHARK	32	0	32	0	0
Purse Seine	BRONZE WHALER SHARK	3	0	3	0	0
Purse Seine	BULL SHARK	1	0	1	0	0
Purse Seine	GALAPAGOS SHARK	2	0	2	0	0
Purse Seine	GREAT WHITE SHARK	0	0	0	0	0
Purse Seine	LONGFIN MAKO SHARK	4	0	4	0	0
Purse Seine	OCEANIC WHITETIP SHARK	100	0	99	0	0
Purse Seine	SANDBAR SHARK	7	0	7	0	0
Purse Seine	SCALLOPED HAMMERHEAD	2	0	2	0	0
Purse Seine	SHARKS (UNIDENTIFIED)	2	0	2	0	0
Purse Seine	SHORTFIN MAKO SHARK	2	0	2	0	0
Purse Seine	SILKY SHARK	11555	4	11548	0	0
Purse Seine	SILVER-TIP SHARK	1	0	1	0	0
Purse Seine	SMOOTH HAMMERHEAD	1	0	1	0	0
Purse Seine	TIGER SHARK	1	0	1	0	0
Purse Seine	WHALE SHARK	73	0	70	0	0
Longline	BLUE SHARK	1	0	1	0	0
Longline	SILKY SHARK	31	0	31	0	0

Table A4. Estimates of number of cetacean interactions with purse seine gear in 2018 from observer data.

Gear	Flag	Species	Date	Latitude	Longitude	EEZ	FATE	Type	# of Individuals
Purse Seine	PG	BALEEN WHALES NEI	29/08/2018	0325.246S	16620.652E	NR	DPA	INTERACTION	1
Purse Seine	PG	BALEEN WHALES NEI	31/08/2018	0318.951S	16605.226E	NR	DPA	INTERACTION	1
Purse Seine	PG	BALEEN WHALES NEI	31/08/2018	0330.767S	16557.294E	NR	DPA	INTERACTION	1

Purse Seine	PG	BEAKED WHALES NEI	5/01/2018	0318.072S	14921.214E	PG	ESC	INTERACTION	8
Purse Seine	PG	BLUE WHALE	11/07/2018	0050.256N	14247.200E	PG	DPU	INTERACTION	1
Purse Seine	PG	BOTTLENOSE DOLPHIN	11/09/2018	0222.240S	15407.594E	PG	DPA	LANDED	6
Purse Seine	PG	BOTTLENOSE DOLPHIN	16/01/2018	0400.394S	15011.774E	PG	UUU	INTERACTION	20
Purse Seine	PG	BOTTLENOSE DOLPHIN	18/01/2018	0457.960S	14729.669E	PG	DPD	LANDED	20
Purse Seine	PG	BOTTLENOSE DOLPHIN	18/12/2018	0353.323S	14730.774E	PG	DPD	LANDED	6
Purse Seine	PG	BOTTLENOSE DOLPHIN	19/02/2018	0111.633N	14341.414E	PG	DUS	LANDED	1
Purse Seine	PG	BOTTLENOSE DOLPHIN	29/01/2018	0358.156S	15011.198E	PG	DPD	LANDED	1
Purse Seine	PG	BOTTLENOSE DOLPHIN	29/03/2018	0252.669S	14819.801E	PG	DPU	INTERACTION	20
Purse Seine	PG	BOTTLENOSE DOLPHIN	31/03/2018	0258.564S	14825.471E	PG	DPU	LANDED	15
Purse Seine	PG	BOTTLENOSE DOLPHIN	31/03/2018	0309.115S	14842.689E	PG	DPU	LANDED	25
Purse Seine	PG	BRYDE'S WHALE	1/04/2018	0537.240N	14559.012E	FM	DPA	INTERACTION	1
Purse Seine	PG	BRYDE'S WHALE	4/03/2018	0611.894S	15114.563E	PG	UUU	INTERACTION	1
Purse Seine	PG	BRYDE'S WHALE	7/12/2018	0952.411S	15523.563E	PG	DPA	INTERACTION	2
Purse Seine	PG	BRYDE'S WHALE	13/05/2018	0211.391S	15402.473E	PG	DPA	INTERACTION	1
Purse Seine	PG	BRYDE'S WHALE	14/01/2018	0039.188S	14736.557E	PG	DPA	INTERACTION	1
Purse Seine	PG	BRYDE'S WHALE	17/01/2018	0151.649N	15144.960E	FM	DPA	INTERACTION	1
Purse Seine	PG	BRYDE'S WHALE	20/12/2018	0029.755N	14907.505E	PG	DPA	INTERACTION	1
Purse Seine	PG	CUVIER'S BEAKED WHALE	23/05/2018	0343.185N	15818.071E	FM	DPA	INTERACTION	1
Purse Seine	PG	FALSE KILLER WHALE	1/09/2018	0314.087S	16927.695E	GL	DPU	INTERACTION	4
Purse Seine	PG	FALSE KILLER WHALE	3/05/2018	0123.149S	14754.704E	PG	DPA	INTERACTION	1
Purse Seine	PG	FALSE KILLER WHALE	4/04/2018	0355.970S	14920.994E	PG	DPU	INTERACTION	12
Purse Seine	PG	FALSE KILLER WHALE	7/08/2018	0027.451N	14502.840E	PG	DPU	INTERACTION	4
Purse Seine	PG	FALSE KILLER WHALE	7/10/2018	0100.906S	14804.071E	PG	DPD	LANDED	1
Purse Seine	PG	FALSE KILLER WHALE	9/05/2018	0142.217S	15211.083E	PG	DPA	INTERACTION	3
Purse Seine	PG	FALSE KILLER WHALE	10/04/2018	0119.288S	15351.864E	PG	DPA	LANDED	2
Purse Seine	PG	FALSE KILLER WHALE	11/09/2018	0222.240S	15407.594E	PG	DPA	LANDED	3
Purse Seine	PG	FALSE KILLER WHALE	11/09/2018	0222.240S	15407.594E	PG	DPA	LANDED	1
Purse Seine	PG	FALSE KILLER WHALE	13/11/2018	0059.934N	17605.819E	GL	DPD	LANDED	4
Purse Seine	PG	FALSE KILLER WHALE	14/12/2018	0335.836S	15143.343E	PG	DPD	LANDED	11

Purse Seine	PG	FALSE KILLER WHALE	15/01/2018	0358.614S	15008.695E	PG	UUU	INTERACTION	20
Purse Seine	PG	FALSE KILLER WHALE	15/01/2018	0407.297S	15012.754E	PG	UUU	INTERACTION	40
Purse Seine	PG	FALSE KILLER WHALE	16/01/2018	0404.560S	15007.300E	PG	UUU	INTERACTION	10
Purse Seine	PG	FALSE KILLER WHALE	17/11/2018	0157.600N	17503.420E	GL	DPA	INTERACTION	4
Purse Seine	PG	FALSE KILLER WHALE	18/03/2018	0524.815S	15322.174E	PG	DPA	LANDED	1
Purse Seine	PG	FALSE KILLER WHALE	19/07/2018	0347.827S	15006.939E	PG	DPU	INTERACTION	1
Purse Seine	PG	FALSE KILLER WHALE	19/08/2018	0427.773S	15053.204E	PG	DPU	INTERACTION	6
Purse Seine	PG	FALSE KILLER WHALE	21/01/2018	0018.232S	14336.596E	PG	DPA	LANDED	3
Purse Seine	PG	FALSE KILLER WHALE	21/01/2018	0018.232S	14336.596E	PG	DPU	LANDED	1
Purse Seine	PG	FALSE KILLER WHALE	21/07/2018	0417.041S	15032.541E	PG	DPA	INTERACTION	1
Purse Seine	PG	FALSE KILLER WHALE	21/09/2018	0401.945N	16153.760E	FM	UUU	INTERACTION	2
Purse Seine	PG	FALSE KILLER WHALE	22/07/2018	0502.250S	15034.664E	PG	DPU	INTERACTION	6
Purse Seine	PG	FALSE KILLER WHALE	23/08/2018	0324.341S	14703.570E	PG	DPU	INTERACTION	9
Purse Seine	PG	FALSE KILLER WHALE	24/02/2018	0344.676S	15005.427E	PG	DPA	INTERACTION	2
Purse Seine	PG	FALSE KILLER WHALE	26/01/2018	0651.289S	15054.536E	PG	DPA	INTERACTION	1
Purse Seine	PG	FALSE KILLER WHALE	27/03/2018	0542.352S	15600.445E	PG	DPU	LANDED	1
Purse Seine	PG	FALSE KILLER WHALE	28/03/2018	0545.536S	15555.408E	PG	DPA	INTERACTION	2
Purse Seine	PG	FALSE KILLER WHALE	29/10/2018	0424.501S	15103.071E	PG	DPA	INTERACTION	1
Purse Seine	PG	FALSE KILLER WHALE	30/03/2018	0530.437S	15530.948E	PG	DPA	INTERACTION	1
Purse Seine	PG	FALSE KILLER WHALE	31/03/2018	0519.992S	15527.129E	PG	DPA	INTERACTION	1
Purse Seine	PG	FALSE KILLER WHALE	31/07/2018	0256.952S	15025.697E	PG	DPA	INTERACTION	3
Purse Seine	PG	FIN WHALE	11/04/2018	0352.886S	14809.859E	PG	DPA	INTERACTION	1
Purse Seine	PG	FIN WHALE	12/06/2018	0002.215N	16347.992E	NR	UUU	INTERACTION	1
Purse Seine	PG	FIN WHALE	18/10/2018	0241.984S	16818.113E	GL	DPA	INTERACTION	1
Purse Seine	PG	FIN WHALE	23/10/2018	0040.181N	15348.275E	FM	UUU	INTERACTION	1
Purse Seine	PG	FIN WHALE	28/03/2018	0525.501S	15522.801E	PG	DPA	INTERACTION	1
Purse Seine	PG	INDO-PACIF. BOTTLENOSE DOLPHIN	9/06/2018	0145.850N	14253.166E	PG	DPA	INTERACTION	1
Purse Seine	PG	INDO-PACIF. BOTTLENOSE DOLPHIN	9/06/2018	0145.850N	14253.166E	PG	DPD	INTERACTION	1
Purse Seine	PG	INDO-PACIF. BOTTLENOSE DOLPHIN	16/05/2018	0415.039S	14823.069E	PG	DPA	INTERACTION	6
Purse Seine	PG	MELON-HEADED WHALE	20/01/2018	0326.533S	14919.775E	PG	DPA	INTERACTION	1

Purse Seine	PG	MINKE WHALE	30/10/2018	0114.401S	15513.749E	PG	UUU	INTERACTION	1
Purse Seine	PG	PANTROPICAL SPOTTED DOLPHIN	14/04/2018	0305.785S	14913.938E	PG	DPD	INTERACTION	5
Purse Seine	PG	PYGMY KILLER WHALE	8/08/2018	0437.537S	15034.781E	PG	DPA	INTERACTION	5
Purse Seine	PG	PYGMY KILLER WHALE	23/01/2018	0124.225S	15100.122E	PG	DPA	INTERACTION	1
Purse Seine	PG	PYGMY SPERM WHALE	21/01/2018	0319.972S	14910.490E	PG	DPA	INTERACTION	3
Purse Seine	PG	RISSO'S DOLPHIN	3/05/2018	0112.008S	15210.277E	PG	DPA	INTERACTION	5
Purse Seine	PG	RISSO'S DOLPHIN	3/05/2018	0112.008S	15210.277E	PG	DPA	INTERACTION	2
Purse Seine	PG	ROUGH-TOOTHED DOLPHIN	15/05/2018	0418.689S	14923.052E	PG	DPD	INTERACTION	6
Purse Seine	PG	ROUGH-TOOTHED DOLPHIN	25/06/2018	0255.057S	14919.982E	PG	DPD	LANDED	2
Purse Seine	PG	SEI WHALE	2/12/2018	0712.000S	15431.140E	PG	DPA	INTERACTION	1
Purse Seine	PG	SEI WHALE	3/08/2018	0108.039S	15639.666E	FM	DPA	INTERACTION	1
Purse Seine	PG	SEI WHALE	5/08/2018	0400.04S	16822.285W	PX	DPA	INTERACTION	1
Purse Seine	PG	SEI WHALE	6/08/2018	0220.380N	15600.105E	FM	DPA	INTERACTION	2
Purse Seine	PG	SEI WHALE	9/11/2018	0058.255N	14819.936E	PG	DPA	INTERACTION	1
Purse Seine	PG	SEI WHALE	11/07/2018	0137.659N	14228.144E	PG	DPU	INTERACTION	1
Purse Seine	PG	SEI WHALE	11/12/2018	0933.279S	15538.875E	PG	DPA	INTERACTION	2
Purse Seine	PG	SEI WHALE	13/08/2018	0144.613S	15140.904E	PG	UUU	INTERACTION	1
Purse Seine	PG	SEI WHALE	13/12/2018	0940.480S	15531.177E	PG	DPA	INTERACTION	2
Purse Seine	PG	SEI WHALE	14/02/2018	0139.085S	15023.660E	PG	UUU	INTERACTION	1
Purse Seine	PG	SEI WHALE	15/01/2018	0817.019S	16323.257E	SB	DPA	INTERACTION	2
Purse Seine	PG	SEI WHALE	15/07/2018	0119.397S	16442.042E	NR	UUU	INTERACTION	1
Purse Seine	PG	SEI WHALE	16/02/2018	0019.231S	14609.358E	PG	DPA	INTERACTION	1
Purse Seine	PG	SEI WHALE	17/11/2018	0123.423N	17509.878E	GL	DPA	INTERACTION	3
Purse Seine	PG	SEI WHALE	18/11/2018	0123.335N	17456.180E	GL	DPA	INTERACTION	2
Purse Seine	PG	SEI WHALE	30/05/2018	0310.496N	16011.126E	FM	DPA	INTERACTION	3
Purse Seine	PG	SEI WHALE	30/08/2018	0326.592S	16613.717E	NR	DPA	INTERACTION	1
Purse Seine	PG	SHORT-FINNED PILOT WHALE	7/09/2018	0155.435S	16818.953E	GL	DPA	INTERACTION	1
Purse Seine	PG	SHORT-FINNED PILOT WHALE	19/02/2018	0132.511N	14310.131E	PG	DPA	INTERACTION	8
Purse Seine	PG	SHORT-FINNED PILOT WHALE	29/10/2018	0047.342S	15703.228E	FM	DPD	INTERACTION	1
Purse Seine	PG	SHORT-FINNED PILOT WHALE	31/03/2018	0258.517S	14827.986E	PG	DPU	LANDED	20

Purse Seine	PG	SPERM WHALE	3/01/2018	0333.510S	14836.919E	PG	DPU	LANDED	2
Purse Seine	PG	SPINNER DOLPHIN	21/09/2018	0335.465S	14900.303E	PG	DPA	INTERACTION	6
Purse Seine	PG	SPINNER DOLPHIN	24/01/2018	0404.630S	15005.415E	PG	DPA	LANDED	11
Purse Seine	PG	SPINNER DOLPHIN	24/05/2018	0356.200N	15847.138E	FM	DPA	INTERACTION	8
Purse Seine	PG	SPINNER DOLPHIN	24/05/2018	0356.200N	15847.138E	FM	DPA	INTERACTION	3
Purse Seine	PG	STRIPED DOLPHIN	3/06/2018	0036.176N	16650.412E	NR	DPD	LANDED	12
Purse Seine	PG	STRIPED DOLPHIN	12/07/2018	0246.500S	14316.330E	PG	DPD	LANDED	3
Purse Seine	PG	STRIPED DOLPHIN	12/07/2018	0246.500S	14316.330E	PG	DPD	INTERACTION	27
Purse Seine	PG	STRIPED DOLPHIN	12/07/2018	0246.500S	14316.330E	PG	DPD	INTERACTION	30
Purse Seine	PG	STRIPED DOLPHIN	12/07/2018	0246.500S	14316.330E	PG	DPD	INTERACTION	3

Table A5. Estimates of the number of Oceanic White Tip Sharks released dead or alive by gear type in 2018.

Gear	Flag	Species	Date	Latitude	Longitude	EEZ	FATE	Caught condition	Discard condition	# of Individuals
Purse Seine	PG	OCEANIC WHITETIP SHARK	1/04/2018	0426.023S	15446.201 E	PG	DPA	A1	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	1/07/2018	0030.444S	15315.103 E	FM	DPA	A0	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	1/09/2018	0118.038 N	15107.060 E	PG	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	2/01/2018	0353.719S	14918.723 E	PG	DPD	A3	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	2/03/2018	0032.755 N	16845.225 E	GL	DPA	-	-	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	2/07/2018	0050.947S	15336.362 E	PG	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	2/07/2018	0051.032S	15335.959 E	PG	DPA	A0	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	2/07/2018	0051.032S	15335.959 E	PG	DPD	A1	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	2/11/2018	0050.242S	15049.656 E	PG	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	3/07/2018	0054.580S	15320.852 E	PG	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	3/09/2018	0221.127 N	16937.797 E	MH	DPD	A2	D	1

Purse Seine	PG	OCEANIC WHITETIP SHARK	4/03/2018	0224.056 N	16923.106 E	MH	DPA	A1	A3	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	4/05/2018	0029.175S	15444.440 E	FM	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	5/04/2018	0350.644 N	16916.349 E	MH	DPA	A1	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	5/09/2018	0158.706S	16848.950 E	GL	DPA	A0	A0	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	6/05/2018	0051.583S	15227.049 E	PG	DPA	A1	A2	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	7/04/2018	0253.295S	14912.101 E	PG	DPD	A0	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	7/04/2018	0254.599S	14914.010 E	PG	DPA	A2	A2	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	7/04/2018	0303.534S	14812.217 E	PG	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	7/04/2018	0303.534S	14812.217 E	PG	DPU	A3	U	3
Purse Seine	PG	OCEANIC WHITETIP SHARK	8/06/2018	0104.961 N	17150.867 E	GL	DPA	A2	A2	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	11/09/2018	0352.260 N	17021.840 E	MH	UUU	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	12/05/2018	0127.578S	16730.100 E	NR	DPA	A1	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	12/05/2018	0151.497S	15145.173 E	PG	DPA	A0	A3	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	12/09/2018	0243.380 N	17105.700 E	GL	DPD	-	-	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	14/05/2018	0045.763S	14809.334 E	PG	DPD	D	D	5
Purse Seine	PG	OCEANIC WHITETIP SHARK	15/03/2018	0011.520 N	16758.181 E	NR	DPA	A1	A1	8
Purse Seine	PG	OCEANIC WHITETIP SHARK	15/07/2018	0121.074S	16441.451 E	NR	DUS	-	-	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	15/08/2018	0420.385S	15016.095 E	PG	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	16/05/2018	0041.413S	15640.675 E	FM	DUS	-	-	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	17/05/2018	0038.915S	15639.142 E	FM	DUS	-	-	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	17/07/2018	0055.822S	16428.756 E	NR	DPD	A2	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	17/08/2018	0405.731S	15019.841 E	PG	DPA	A3	A3	4

Purse Seine	PG	OCEANIC WHITETIP SHARK	18/03/2018	0032.285 N	16756.475 E	NR	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	18/05/2018	0036.450S	15609.863 E	FM	DPA	-	-	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	18/08/2018	0447.326S	15014.179 E	PG	DPA	A2	A2	11
Purse Seine	PG	OCEANIC WHITETIP SHARK	18/08/2018	0447.326S	15014.179 E	PG	DPD	D	D	4
Purse Seine	PG	OCEANIC WHITETIP SHARK	19/05/2018	0036.830S	15609.685 E	FM	DUS	-	-	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	19/05/2018	0049.115S	15529.692 E	FM	DUS	-	-	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	19/07/2018	0056.973S	16355.676 E	NR	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	19/07/2018	0102.287S	16358.367 E	NR	DPD	U	D	2
Purse Seine	PG	OCEANIC WHITETIP SHARK	20/03/2018	0203.301 N	16743.049 E	NR	DPA	A1	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	20/05/2018	0227.281S	16458.959 E	NR	DPD	D	D	3
Purse Seine	PG	OCEANIC WHITETIP SHARK	20/07/2018	0103.938S	16346.650 E	NR	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	20/10/2018	0234.444S	16539.286 E	NR	DPA	A1	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	20/12/2018	0049.391S	15336.083 E	PG	DPA	A1	A2	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	21/02/2018	0036.517 N	17633.862 E	GL	DPD	D	D	6
Purse Seine	PG	OCEANIC WHITETIP SHARK	22/02/2018	0155.177S	16633.135 E	NR	DPA	A1	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	22/03/2018	0503.898S	15534.601 E	PG	DPD	A1	D	2
Purse Seine	PG	OCEANIC WHITETIP SHARK	22/05/2018	0332.795 N	15825.400 E	FM	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	22/06/2018	0036.519 N	15025.909 E	PG	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	23/01/2018	0123.190S	15113.221 E	PG	DPA	A2	A2	2
Purse Seine	PG	OCEANIC WHITETIP SHARK	23/03/2018	0505.989S	15553.069 E	PG	DPD	-	-	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	23/03/2018	0507.072S	15531.219 E	PG	DPU	A1	U	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	23/06/2018	0013.085 N	15018.949 E	PG	DPD	D	D	1

Purse Seine	PG	OCEANIC WHITETIP SHARK	24/01/2018	0131.032S	15056.537E	PG	DPA	A1	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	24/01/2018	0158.011S	14935.586E	PG	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	24/03/2018	0010.343S	16812.594E	NR	DPA	A3	A3	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	24/03/2018	0517.859S	15543.204E	PG	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	24/03/2018	0524.450S	15517.650E	PG	DPD	A3	D	3
Purse Seine	PG	OCEANIC WHITETIP SHARK	24/06/2018	0007.755N	15537.652E	FM	DUS	A0	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	24/12/2018	0045.330N	15409.395E	FM	DPA	A2	A2	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	25/02/2018	0040.02S	14205.342E	PG	DPD	U	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	25/03/2018	0157.227S	15604.996E	PG	DPA	A1	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	26/03/2018	0033.800S	14950.781E	PG	DPA	A2	A2	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	26/03/2018	0540.530S	15603.988E	PG	DPA	A1	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	26/03/2018	0540.719S	15602.466E	PG	DPA	A1	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	27/02/2018	0007.24S	16854.267E	GL	DPA	A1	A3	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	27/03/2018	0036.160N	16705.350E	NR	DPA	A3	A3	2
Purse Seine	PG	OCEANIC WHITETIP SHARK	27/03/2018	0207.963S	15540.310E	PG	DPA	A1	A1	3
Purse Seine	PG	OCEANIC WHITETIP SHARK	27/06/2018	0032.610S	15120.885E	PG	DPA	A1	A2	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	27/06/2018	0037.155S	15027.929E	PG	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	27/07/2018	0402.321S	14900.132E	PG	DPD	D	D	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	28/02/2018	0029.720N	16839.312E	GL	DPA	-	-	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	29/03/2018	0024.068N	16649.997E	NR	DPA	A1	A1	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	30/10/2018	0114.401S	15513.749E	PG	DPA	A1	A0	1
Purse Seine	PG	OCEANIC WHITETIP SHARK	30/11/2018	0238.104S	17325.280E	GL	DPA	A1	A1	1

Purse Seine	PG	OCEANIC WHITETIP SHARK	31/08/2018	0231.881 N	16946.145 E	MH	DPD	-	-	1

Table A6. Number of instances of Whale Sharks interaction with purse seine gear in 2018 by PNG fleet.

Flag	Date	Latitude	Longitude	EEZ	FATE	Type	# of Individuals	Metric tons	Est
PG	22/01/2018	0124.114S	15158.313E	PG	DPA	INTERACTION	1	4	1
PG	24/02/2018	0254.878S	14436.403E	PG	DPA	LANDED	0	0	0
PG	24/02/2018	0254.878S	14436.403E	PG	DPA	LANDED	1	0.5	1
PG	24/01/2018	0055.279S	14719.913E	PG	DPU	LANDED	0	0	0
PG	24/01/2018	0055.279S	14719.913E	PG	DPA	INTERACTION	1	5	1
PG	26/04/2018	0132.584N	14531.824E	PG	DPA	INTERACTION	1	2	1
PG	18/03/2018	0523.483S	15321.428E	PG	DPA	INTERACTION	1	0.8	1
PG	19/03/2018	0518.558S	15336.952E	PG	DPA	INTERACTION	1	0.5	1
PG	22/02/2018	0155.177S	16633.135E	NR	DPS	LANDED	1	0.06	1
PG	27/04/2018	0212.817N	14509.810E	PG	UUU	LANDED	0	0	0
PG	7/04/2018	0039.563N	15015.560E	PG	DPA	INTERACTION	1	4	1
PG	18/02/2018	0044.388N	14303.675E	PG	DPA	INTERACTION	1	0	1
PG	25/06/2018	0001.586N	15714.113E	FM	DPA	LANDED	1	0.2	1
PG	27/06/2018	0010.018S	15539.497E	FM	UUU	INTERACTION	1	0	1
PG	19/03/2018	0516.909S	15335.101E	PG	DPA	INTERACTION	1	10	1
PG	28/04/2018	0443.651N	14119.675E	FM	DPA	INTERACTION	1	15	1
PG	6/06/2018	0213.600N	14417.587E	PG	DPA	INTERACTION	1	0.53	1
PG	9/06/2018	0130.226N	14249.717E	PG	DPA	LANDED	1	0.2	1
PG	10/05/2018	0119.249S	15050.750E	PG	DPA	LANDED	1	0.05	1
PG	13/05/2018	0212.026S	15403.796E	PG	DPA	LANDED	1	0.15	1
PG	24/07/2018	0420.575N	14954.865E	FM	DPU	LANDED	5	0	5
PG	15/11/2018	0224.380S	16528.493E	NR	DPA	LANDED	1	0.08	1
PG	24/12/2018	0227.620S	15348.616E	PG	DPA	LANDED	1	2	1
PG	2/03/2018	0614.362S	15244.529E	PG	DPA	INTERACTION	1	5	1
PG	27/04/2018	0213.100N	14509.484E	PG	DPA	INTERACTION	1	5	1
PG	22/02/2018	0625.16S	15223.561E	PG	DPA	INTERACTION	1	4.5	1
PG	16/04/2018	0130.513S	14714.478E	PG	DPA	INTERACTION	1	0.08	1
PG	4/04/2018	0157.138S	15143.948E	PG	DPA	LANDED	1	1.5	1
PG	26/05/2018	0112.403N	14447.913E	PG	DPA	LANDED	1	0.4	1
PG	9/04/2018	0025.353N	14906.777E	PG	DPA	LANDED	1	1	1
PG	14/09/2018	0040.524N	14914.520E	PG	DPA	INTERACTION	1	2	1
PG	2/03/2018	0704.486S	15323.084E	PG	DPA	LANDED	1	0	1

PG	6/03/2018	0753.460S	15319.475E	PG	DPA	LANDED	1	0	1
PG	30/08/2018	0058.148N	15022.803E	PG	DPA	INTERACTION	1	18	1
PG	10/04/2018	0408.154S	14751.335E	PG	DPA	INTERACTION	1	0.8	1
PG	26/06/2018	0023.639S	15341.782E	FM	DPA	INTERACTION	1	8	1
PG	18/02/2018	0435.147N	14256.200E	FM	DPA	INTERACTION	1	5	1
PG	14/01/2018	0234.003S	14911.863E	PG	DPA	INTERACTION	1	0.1	1
PG	11/01/2018	0029.718N	14909.458E	PG	DPA	INTERACTION	1	1	1
PG	6/01/2018	0359.953S	14900.786E	PG	DPA	INTERACTION	1	0.12	1
PG	12/01/2018	0055.457N	14914.754E	PG	DPA	INTERACTION	1	5	1
PG	2/01/2018	0405.075S	15101.456E	PG	DPA	INTERACTION	1	0	1
PG	22/01/2018	0139.748S	14731.961E	PG	DPA	LANDED	1	0.05	1
PG	9/04/2018	0316.194S	14824.012E	PG	DCF	INTERACTION	1	1	1
PG	21/03/2018	0520.187S	15545.034E	PG	DPA	LANDED	1	0	1
PG	12/03/2018	0736.231S	15248.821E	PG	DPA	INTERACTION	2	40	2
PG	12/03/2018	0736.231S	15248.821E	PG	DPD	INTERACTION	1	0.4	1
PG	26/06/2018	0012.354S	15550.185E	FM	UUU	INTERACTION	1	0	1
PG	16/06/2018	0136.595S	16351.829E	NR	DPA	INTERACTION	1	10	1
PG	1/06/2018	0520.637N	14411.622E	FM	DPA	INTERACTION	1	0.5	1
PG	3/06/2018	0457.040N	14323.298E	FM	DPA	INTERACTION	1	0.45	1
PG	26/07/2018	0251.464N	16848.393E	MH	DPA	INTERACTION	1	10	1
PG	4/09/2018	0148.570S	16813.471E	GL	DPA	INTERACTION	1	0.5	1
PG	27/02/2018	0330.487S	15000.812E	PG	DPA	INTERACTION	1	4	1
PG	29/04/2018	0212.813N	14434.325E	PG	DPA	INTERACTION	1	5	1
PG	2/03/2018	0613.614S	15245.067E	PG	DPA	INTERACTION	1	5	1
PG	19/04/2018	0027.122S	14559.724E	PG	DUS	LANDED	2	0.05	2
PG	21/05/2018	0529.089N	13813.006E	FM	UUU	INTERACTION	1	5	1
PG	21/05/2018	0513.302N	13814.048E	FM	DPA	LANDED	1	2	1
PG	31/08/2018	0103.768N	15021.212E	PG	DPA	INTERACTION	1	1	1
PG	1/09/2018	0118.038N	15107.060E	PG	DPA	INTERACTION	1	10	1
PG	8/04/2018	0031.851N	14949.744E	PG	DPA	LANDED	1	0.5	1
PG	11/04/2018	0053.790N	14906.111E	PG	DPA	INTERACTION	1	20	1
PG	18/05/2018	0100.203S	14553.583E	PG	DPA	LANDED	1	0.3	1
PG	16/02/2018	0028.776S	14540.826E	PG	DPA	INTERACTION	1	0.1	1
PG	2/03/2018	0710.173S	15336.905E	PG	DPA	LANDED	1	0	1
PG	11/07/2018	0102.458N	14435.156E	PG	DPA	INTERACTION	1	0	1
PG	22/06/2018	0007.662N	15001.836E	PG	DPA	LANDED	1	0.5	1
PG	12/03/2018	0039.280N	14952.672E	PG	DPA	INTERACTION	1	2.5	1
PG	20/12/2018	0044.443N	14938.224E	PG	DPA	INTERACTION	1	5	1

Table A7. Estimates of number of silky sharks released by gear from PNG Fleet in 2014-2018.

Year	Gear	Alive	Dead	Unknown	Total
2014	LL	180	108	12	300
2014	PS	41	3957	17	4015
2015	PS	2241	2998	177	5416
2016	PS	1717	5620	0	7337
2017	PS	234	449	55	738
2018	LL	-	-	15	15
2018	PS	2,683	6,185	1,558	11,641

Table A8. Effort, observed and estimated seabird captures by fishing year for PNG [23^{O}N – 25^{O}S[1]]. For each year, the table gives the total number of hooks; the number of observed hooks; observer coverage (the percentage of hooks that were observed); the number of observed captures (both dead and alive); and the capture rate (captures per thousand hooks).

Year	No. of Vessels	Total Hooks	Hooks Observed	% Hooks Observed	No. of Birds	Capture Rate
2014	12	3,446,400	219,024.00	6%	1	0.004565709
2015	20	2,594,500	0	0%	0	0
2016	15	1,505,700	33,500.00	2%	0	0
2017	22	4,061,000	0	0%	0	0
2018	14	4,974,400	795,904.00	16%	0	0