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PART 1: INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS

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NEW ZEALAND

NEW ZEALAND

Annual report

Part 1

Information on fisheries, statistics and research

Ministry for Primary Industries

Po Box 2526, Wellington, New Zealand 6140

Scientific data was provided to the Commission in accordance with the decision relating to the provision of scientific data to the Commission by 30 April 2020	**YES**
If no, please indicate the reason(s) and intended actions:	

Abstract

Since 2002, skipjack, which is nearly all taken by purse seine, has comprised the greatest part of the New Zealand catch of all tuna species (9,311 t in 2019), both within and beyond New Zealand fisheries waters. Yellowfin make up most of the balance of the purse seine catch and are caught largely outside of New Zealand fishery waters (172 t in 2019). Yellowfin are rarely part of the purse seine catch within New Zealand fisheries waters where the domestic purse-seine fishery targets only free schools of skipjack. The second most important component of New Zealand's domestic fisheries by volume is albacore (2,752 t in 2019) which are taken mostly by troll gear, but are also landed as target and bycatch in the longline fishery. The domestic longline fleet targets both bigeye and southern bluefin tuna and more recently swordfish, but the greatest part of the catch consists of albacore. Most highly migratory species caught commercially in New Zealand waters are exported; the destination of exports varies depending on the species. In 2019, 122.6 t of striped marlin were caught by the recreational fleet, with 59% of these tagged and released. New Zealand had one Class-5 purse seiner fishing offshore in high seas areas of the equatorial western and central Pacific Ocean (WCPO) in 2019. This vessel also fishes domestically from time to time along with up to four smaller capacity domestic-based purse seiners. Before 2016 a limited number of foreign owned longline vessels operated under charter in the NZ EEZ. Since 2016 the New Zealand longline tuna fleet has consisted only of domestically owned and operated vessels (mostly between 15 and 25 m in length). The total number of longline vessels operating in New Zealand declined from 151 vessels in 2002 to 37 in 2014 and 28 in 2019.

In 2019 blue shark was the most common non-tuna fish bycatch species observed caught in the longline fishery followed by lancetfish and porbeagle shark.

Longline vessels fishing for tuna or swordfish in New Zealand fishery waters are required to use tori lines, and may only set their lines at night unless using approved line weighting. New Zealand longline vessels fishing on the high seas south of 30°S must use two mitigation measures as specified in CMM2018-03. New Zealand longline vessels have been provided with turtle de-hooking equipment. As the purse seine fishery in New Zealand fishery waters is based on free schools of skipjack, bycatch is minimal (about 1% by mass). No interactions with non-fish bycatch (e.g. seabirds, turtles, and marine mammals) were observed in the purse seine fishery in 2018 and 2019.

New Zealand has an Observer Programme and two active domestic port sampling programmes for highly migratory species. In 2019, 8% of the longline effort (hooks) was observed, and more than 13% of the New Zealand domestic purse seine sets were observed. A considerable amount of research is directed at tunas, tuna-like and bycatch species in New Zealand. Fishers and fish receivers are required to furnish returns (monthly reports) to the Ministry for Primary Industries. New Zealand has four data collection systems in place to collect catch and effort data. New Zealand also has a system for collecting information on non-fish bycatch from fishers.

1.1 Annual Fisheries Information

1.1.1 Annual catch by species and gear in the WCPFC Convention Area

The catch of the main Highly Migratory Species taken within and beyond New Zealand fisheries waters is summarised in Table 1 and catch by gear type for 2019 is provided in Table 2 and Figure 1. Since 2002, skipjack catches taken by purse seine have comprised the greatest part of the catch of all tuna species, both inside and outside New Zealand fisheries waters. Outside New Zealand fisheries waters, yellowfin makes up most of the balance, but are rarely part of the purse seine catch inside New Zealand fisheries waters. The purse-seine fishery inside New Zealand fisheries waters exclusively targets free schools of skipjack.

Albacore are the second largest component of the tuna catch, and are taken mostly by troll gear, but also by longline. Although economically important to longline fishers in New Zealand, more than 96% of longline caught albacore in each year is bycatch. In contrast, effectively all (more than 99.99% annually) of troll caught albacore is targeted (Table 3). Troll gear also takes a small amount of skipjack with occasional catches of other tuna species.

Overall commercial landings of the longline and troll caught species have generally declined since 2002 consistent with the decline in the number of vessels operating in these fisheries.

Although longlining has mostly targeted southern bluefin, bigeye, and swordfish, the greatest part of the catch consists of albacore taken mostly as bycatch. Pacific bluefin and yellowfin tunas are also taken in small numbers in longline sets, with skipjack only rarely taken. Blue, black, and striped marlin are caught in small numbers in the domestic longline fishery. In order to protect New Zealand's sport fishery, since 1988 marlins may not be retained by commercial fishers when taken within New Zealand fisheries waters.

The striped marlin catch by recreational fishers in 2019 was estimated to be 122.6 t, with 59% of the fish tagged and released. Most International Game Fish Association world records for striped marlin are for fish caught in New Zealand. A recreational fishery for Pacific bluefin tuna has developed, but is limited by a short winter period when fish are available. In the 2019 calendar year just one Pacific bluefin tuna was landed from New Zealand fishery waters by recreational fishers.

The National Panel Survey of recreational fishers was conducted in the 2011–12 fishing year. The recreational sector was estimated to have landed 21,898 (CV 0.21) albacore in that year. Based on a mean weight of 4.2 kg this catch was estimated to be 92 t. The survey was repeated in the 2017–18 fishing year and recreational fishers were estimated to have caught 12,463 albacore with a mean weight of 4.55 kg for a catch of 57 t (CV 0.22).

The National Panel Survey for the 2011–12 fishing year estimated 92 t of skipjack tuna was landed based on an estimated 41,182 (CV 0.23) fish with a mean weight of 2.24 kg. In the 2017–18 fishing year, an estimated 54 t of skipjack tuna was landed (CV 0.17) based on an estimated 29,892 fish with a mean weight of 1.80 kg. Other pelagic species were not caught in sufficient quantities to be recorded in the survey. Recreational harvest surveys will provide estimates for tuna catch about every 5 years.

New Zealand is on the margins of yellowfin distribution and therefore will be impacted by any range contraction associated with stock decline or changed environmental conditions. Yellowfin tuna catches in New Zealand have declined significantly since the late 1990s in both commercial and recreational fisheries with a small upturn in 2015 and 2016; this overall trend is of concern to participants in both these fisheries.

1.1.2 Number of vessels by gear type, size

Approximately 140 domestically owned and operated vessels (mostly 15 to 25 m) made up the main part of the domestic commercial New Zealand tuna fishing fleet in 2019. These vessels use troll or longline gear, with some vessels using both gear types at different times of the year. Some of these vessels do a limited amount of pole and line and handline fishing, but there is no dedicated pole and line or handline fishery in New Zealand. All surface longline vessels reported in Table 4 targeted a species complex including tuna and swordfish.

A small fleet of foreign owned longline vessels on charter to New Zealand fishing companies operated in New Zealand fisheries waters from the late 1980s through 2015 (Table 4). These longliners primarily targeted southern bluefin tuna, although a mixed bag of species including other tunas and swordfish were caught. No chartered longliners have fished in New Zealand fisheries waters since 2016.

Four New Zealand flagged Class-5 and Class-6 purse seiners fished in the EEZs of Pacific Island States and on the high seas of the equatorial western and central Pacific Ocean (WCPO) through 2015, declining to two in 2016 and 2017, and to one in 2019 (Table 4). These vessels also fished part of the year within New Zealand fisheries waters targeting free swimming (unassociated) schools of skipjack.

Table 1: Estimated whole weight (t) of tuna and swordfish landed by New Zealand flagged vessels active in the WCPFC Convention Area, for years 2015 to 2019 (0 refers to catches < 500 kg). NZFW refers to catches within New Zealand fishery waters (up to 200nm off the coastline), and Extra Territorial (ET) refers to catches outside this area. The 2019 figures are preliminary. Note: the estimates presented in this Table may differ from those estimated by the SPC due to differences in the estimation procedures used for the purse seine catch.

		2015	2016	2017	2018	2019
Albacore	NZFW	2648	2186	2141	2493	2752
Thunnus alalunga	ET	0	0	0	3	0
	Total	2648	2186	2142	2496	2752
Bigeye	NZFW	81	177	97	136	50
Thunnus obesus	ET*	24	30	60	17	100
	Total	105	207	157	153	150
Pacific bluefin[&]	NZFW	16	18	14	20	23
Thunnus orientalis	ET	0	0	0	0	0
	Total	16	18	14	20	23
Skipjack	NZFW	12351	5268	5120	3817	5519
Katsuwonus pelamis	ET	6503	4913	3673	2050	3792
	Total	18853	10181	8793	5868	9311
Swordfish	NZFW	715	757	507	469	264
Xiphias gladius	ET	0	0	0	0	0
	Total	715	757	507	469	264
Yellowfin	NZFW	16	57	10	20	5
Thunnus albacares	ET*	272	74	369	964	167
	Total	288	131	379	984	172

* The ET estimates for yellowfin tuna may also include some bigeye tuna as these are not always separated on purse seine logbooks completed by fishers.

Table 2: Percentage catch by gear type for 2019 for major species taken in New Zealand tuna fisheries in the Western and Central Pacific Fisheries Commission convention area. Note: due to rounding some of these figures may add up to >100%.

2019	Longline	Troll	Handline	Pole & Line	Purse seine
Albacore	4	96	<1	0	<1
Bigeye tuna	60	<1	0	0	40
Skipjack tuna	<1	<1	<1	0	100
Swordfish	100	0	0	0	0
Yellowfin tuna	4	0	0	0	96

Table 3: Catch of south Pacific albacore by New Zealand vessels south of 20ºS in t (scaled), using surface longline, troll, or purse seine gear; and in thousands of fish (for longline and troll only, unscaled), as target and as bycatch. Number of vessels that reported a target catch and number of vessels that reported a bycatch of albacore for years 2015–2019 (note that some vessels will be included in both totals).

	ALB (t)			ALB (000's fish)			Number of vessels	
Year	Target	Bycatch	Total	Target	Bycatch	Total	Target	Bycatch
2015	2477	171	2648	347	15	361	132	32
2016	1976	209	2185	333	24	358	134	31
2017	1953	188	2141	297	19	316	108	33
2018	2254	239	2493	392	20	412	138	36
2019	2633	119	2752	441	11	451	135	29

1.1.3 Fishing patterns

Longline effort (sets) for the domestic fleet by quarter is presented in Figure 3. Total effort (hooks set) for each target species is provided in Table 5. The catch of albacore and the number of vessels involved in the troll and longline fisheries are given for each fleet in Table 6. The catch of swordfish (taken entirely by surface longline) and the number of vessels involved in that fishery are given in Table 7.

The key target species in the longline fishery are southern bluefin and bigeye tuna and swordfish. The southern bluefin tuna fishery occurs during the second quarter of the year and mostly off the east coast of the North Island and the west coast of the South Island. For the remainder of the year the fishery targets bigeye tuna and other minor target species and occurs off the east coast and northeast of the North Island. As a result of a change in management from a competitive to an individually allocated regime for southern bluefin tuna, fishers are able to delay catching their quota until later in the season when prices are better. This has led to some changes in the seasonal distribution of the fishery before and after 2004. Annual catch distributions for the longline fisheries are provided in Figure 4.

The albacore troll fishery is based mainly on the west coast of the North and South Islands and operates between December and May each year. There is considerable variation from year to year in the availability of these fish to New Zealand waters, with poorer years associated with El Nino events. Within a season, however, catch rates experienced across the fleet show little variation and the distribution of catch is consistent with that of effort between years (Figure 5).

The purse seine fishery within New Zealand fisheries waters occurs on both the east and west coasts of the North Island between January and May (Figure 6). The amount of catch/effort in a given year depends on the availability of skipjack and the presence of the larger New Zealand flagged purse seine vessels that sometimes move down from the tropics to fish within New Zealand fisheries waters during the summer.

Table 4: Number of New Zealand-registered vessels fishing for tuna in the WCPFC Convention Area by vessel size class (GRT) and gear type active in the WCPFC Convention Area, for years 2015 to 2019.

	Calendar	Total no.	Vessels size range (GRT)			
Fishing Method	**Year**	**vessels**	**0 – 50**	**51 - 200**	**201 - 500**	**500+**
Surface	2015	34	17	13	2	2
Longline	2016	32	19	13	0	0
	2017	32	18	14	0	0
	2018	34	17	17	0	0
	2019	28	14	14	0	0
Purse Seining			**0 – 500**	**501-1000**	**1001 - 1500**	**1501+**
	2015	8	4	0	2	2
	2016	6	4	0	2	0
	2017	6	4	0	2	0
	2018	5	4	0	1	0
	2019	5	4	0	1	0
Troll			**0 – 50**	**51 - 200**		
	2015	131	108	23		
	2016	134	113	21		
	2017	111	88	23		
	2018	143	110	33		
	2019	140	110	30		
Troll season			**0 – 50**	**51 - 200**		
	2014-15	127	105	22		
	2015-16	130	110	20		
	2016-17	98	82	16		
	2017-18	133	104	29		
	2018-19	134	106	28		

Table 5: **Annual longline effort (000s of hooks) by target species for years 2015 - 2019. The category other includes Pacific bluefin, yellowfin tuna, and swordfish. It should be noted that fishers record only one target species on their logsheets but are often targeting multiple species such as bigeye and albacore tuna simultaneously**.

Year	Southern bluefin	Bigeye	Albacore	Other	Total
2015	1565	406	0	450	2421
2016	1237	626	21	473	2357
2017	1227	512	4	362	2105
2018	1256	577	1	418	2252
2019	1448	325	3	202	1977

Table 6: The total number of vessels that fished for albacore (troll and surface longline), and the total catch of albacore for the domestic troll, and domestic and charter surface longline fleets in New Zealand EEZ by calendar year from 2015 - 2019. Small amounts (less than 4 t annually) were taken by other methods including pole and line, handline, and purse seine.

	NZ troll vessels		New Zealand longline vessels		Charter longline vessels	
Year	Catch (tonnes)	Vessel numbers	Catch (tonnes)	Vessel numbers	Catch (tonnes)	Vessel numbers
2015	2479.0	131	162.7	30	5.9	4
2016	1968.9	130	216.7	32	0.0	0
2017	1952.7	111	188.2	32	0.0	0
2018	2255.1	143	237.7	34	0.0	0
2019	2634.7	140	116.5	28	0.0	0

Table 7: The total number of vessels that fished for swordfish (all surface longline vessels), and the total catch of swordfish for the domestic and charter surface longline fleets in New Zealand EEZ by calendar year.

	NZ-flagged vessels south of 20ºS		Chartered vessels	
Year	Catch (tonnes)	Vessel numbers	Catch (tonnes)	Vessel numbers
2015	706.1	30	8.7	4
2016	755.4	32	0.0	0
2017	504.2	32	0.0	0
2018	468.8	34	0.0	0
2019	263.6	28	0.0	0

1.1.4 Estimated total catches of non-target, associated and dependent species

Non-target fish bycatch

For bycatch species of commercial interest, good estimates of landings are obtained from fisher records, while for less valuable species, observer data provides the best source of information. Here we provide data on major bycatch species including "key shark species" from CMM2010-07 and species of special interest for the longline and purse seine fisheries within, and adjacent to, New Zealand fisheries waters.

The major bycatch species in the longline fishery have been brought into the New Zealand Quota Management System (QMS). In recent years the overall bycatch levels for all species have been relatively consistent between years (Table 8).

Table 8: Landed catch (t) of non-target species currently managed within the QMS that are taken in tuna fisheries within New Zealand fisheries waters. Data are provided by calendar year for 2015 – 2019 and for some species may include catches from non-tuna fisheries.

Species	Scientific name	2015	2016	2017	2018	2019
Blue shark	*Prionace glauca*	148	172	119	117	103
Mako shark	*Isurus oxyrinchus*	47	72	39	35	25
Moonfish	*Lampris guttatus*	37	64	51	67	38
Porbeagle shark	*Lamna nasus*	83	42	26	56	41
Ray's bream	*Brama brama*	169	125	109	273	146

It is also possible to estimate bycatch from the longline fishery using observer records. While this is important for estimating catches of the species that are less likely to be retained or recorded, it is difficult to obtain reliable estimates from species rarely caught in longline fisheries. Observed longline trips are stratified by year, fleet, region and target species, and a CPUE (ratio of means) for each species is established from numbers of fish and numbers of hooks observed. Estimates of catches (in numbers of fish) are obtained by scaling CPUE to total hooks set by the commercial fishery per stratum and summing across strata. Those estimates of catch, the percentage of those catches retained, and an indication of the life status of discarded fish are provided in Table 9.

Table 9: Total estimated catch (numbers of fish) of common bycatch species in the New Zealand longline fishery as estimated from observer data from 2015 to 2019. Also provided is the percentage of these species retained (2019 data only) and the percentage of fish that were alive when discarded, N/A (none discarded).

Species	2015	2016	2017	2018	2019	% retained (2019)	discards % alive (2019)
Blue shark	72 480	57 210	49 924	63 618	89 377	0.1	85.9
Lancetfish	12 962	17 442	13 274	13 163	18 747	0.0	25.8
Porbeagle shark	4 058	6 566	3 101	2 594	2 883	0.0	38.1
Sunfish	770	4 849	1 648	3 648	1 982	0.8	99.2
Moonfish	3 060	3 036	2 022	2 698	1 975	93.2	75.0
Rays bream	17 555	7 758	2 421	1 579	1 949	50.8	79.2
Mako shark	2 667	4 417	1 391	2 721	1 138	5.8	61.5
Pelagic stingray	979	1 414	1 798	2 949	526	0.0	85.3
Escolar	653	669	300	594	488	83.9	66.7
Oilfish	584	281	227	602	417	77.8	100.0
Butterfly tuna	1 309	768	406	419	348	25.0	11.1
Thresher shark	177	601	260	253	193	0.0	69.2
Rudderfish	373	237	680	253	186	8.3	87.5
Striped marlin	120	550	290	247	157	0.0	81.8
School shark	88	24	59	187	116	42.9	25.0
Deepwater dogfish	545	0	32	6	90	0.0	80.0
Dealfish	842	63	72	25	23	0.0	50.0
Skipjack tuna	150	185	57	184	8	100.0	na
Big scale pomfret	59	16	17	34	0	na	na

The major bycatch species can be divided into three groups: species that are typically discarded and are usually alive (e.g. sunfish and rudderfish), species that are typically discarded and are usually dead (e.g. dealfish and lancetfish), and species that are typically retained, but may be returned to the sea (i.e. mako shark and porbeagle shark). The species listed in this last group are subject to the QMS and dead releases of these sharks count against a fisher's quota.. Blue, mako, and porbeagle sharks have usually been discarded since finning was banned in New Zealand, with the proportion alive highest for blue sharks and lowest for porbeagle sharks.

In 2019 the following observations were made on shark captures in longline fisheries:

- No spine-tailed devil or manta rays caught
- No reported silky, oceanic whitetip, great white, or whale sharks captures

Seabird bycatch

Seabirds are sometimes caught in longline fisheries, during both setting and hauling. The observed captures in 2015 - 2019 are given in Table 10. All confirmed fishing activity occurred south of 30° S. Estimates of total captures based on observer coverage are highly uncertain so the capture rates are also shown. Observed seabird captures by species for 2019 are shown in Table 11. Longline vessels fishing for tuna or swordfish in New Zealand fishery waters are required to use tori lines, and may only set their lines at night unless using approved line weighting. New Zealand longline vessels fishing on the high seas south of 30ºS must use two of the three mitigation measures (tori lines, weighted branch lies, or night setting) or approved hook shielding devices as a stand-alone measure, as specified in CMM2018-03. Observed mitigation measures used by the fleet in 2019 are shown in Table 12.

Observed seabirds captures in the surface longline fishery increased substantially in 2016 compared with previous years. The increase was primarily driven by a few high mortality incidents. No high mortality events were observed in 2017, and captures for that year decreased. In 2018, observed captures increased again, with a similar capture rate to that seen in 2016. The increase in 2018 was primarily driven by high mortality incidents on three observed trips. In 2019 the observed capture numbers decreased to 2017 levels but the capture rate remained similar to 2018 levels.

Table 10: Fishing effort, number of observed hooks, and estimated seabird capture rates by year south of 30^{o}S. For each year from 2015 -2019, 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); the capture rate (captures per thousand hooks).

Year	Fishing effort				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2015	34	2 421 191	625 673	25.8	47	0.075
2016	32	2 356 638	332 446	14.1	130	0.391
2017	32	2 104 324	330 235	15.7	57	0.173
2018	33	2 233 199	291 638	13.1	98	0.336
2019	28	1 977 487	165 149	8.4	56	0.339

Table 11: Observed seabird captures in longline fisheries in 2019. All confirmed fishing activity and observed captures occurred south of 30° S.

Common name	Scientific name	Number observed
White-capped albatross	*Thalassarche steadi*	21
Buller's albatross	*Thalassarche bulleri*	15
Westland petrel	*Procellaria westlandica*	8
White-chinned petrel	*Procellaria aequinoctialis steadi*	6
Flesh-footed shearwater	*Puffinus carneipes hullianus*	2
Buller's albatross and Pacific albatross	Thalassarche bulleri	2
Black petrel	*Procellaria parkinsoni*	1
Great albatrosses	*Diomedea* spp.	1
Total		56

Table 12: Proportion of observed mitigation types[1] used by the fleet in 2019.

	Combination of Mitigation Measures	Proportion of observed effort using mitigation type
	No mitigation measures	
	TL + NS	31.0
	TL + WB[2]	2.5
	NS + WB	
	TL + WB + NS	65.0
	SS/BC/WB/DSLS	
	SS/BC/WB/(MOD or BDB)	
	TL	1.0
Provide other combination of mitigation measures here	**NS only**	0.5
	Totals (must equal 100%)	100

[1] TL = tori line, NS = night setting, WB = weighted branch lines, SS = side setting, BC = bird curtain, BDB = blue dyed bait, DSLS = deep setting line shooter, MOD = management of offal discharge.

Sea turtle bycatch

Since 2001, 36 sea turtles have been reported by observers within New Zealand fisheries waters. Of these, 25 were leatherback turtles, two were loggerhead turtles, three were green turtles, one was an olive ridley turtle, and 5 were unidentified. In the most recent five years only 13 sea turtles have been captured in New Zealand fishery waters (Table 13), all were released alive.

Overall, sea turtle interactions are rare in the New Zealand longline fishery. Sea turtle interactions may occur throughout the year with a slight increase observed during the austral summer (November to March). All but one of the turtles caught since 2001 were released alive. The only observed turtle mortality (2001) that occurred in New Zealand fisheries waters in the past 18 years was identified as a green turtle (based on photographs taken by the observer). No turtles have been observed or reported from the purse seine or troll fisheries that operate within New Zealand fisheries waters.

Table 13: **Observed sea turtle interactions for surface longline vessels based on observer records each year from 2015 to 2019. All turtles were alive on capture and released.**

Common name	Scientific name	2015	2016	2017	2018	2019
Green turtle	Chelonia mydas	0	0	0	1	0
Leatherback turtle	Dermochelys coriacea	2	3	2	2	0
Loggerhead turtle	Caretta caretta	0	0	0	1	0
Olive ridley turtle	Lepidochelys olivacea	0	0	0	0	0
Unidentified		0	2	0	0	0
Total		2	5	2	4	0

Purse seine fisheries

Observers have been deployed on purse seine vessels since 2005 to determine levels of bycatch in the fishery that operates within New Zealand fishery waters. The catch composition for five trips covered in 2018 and 2019 is provided in Table 14 and levels of coverage are provided in Table 15. As the fishery is based on free schools of skipjack, bycatch is minimal.

The following interactions were reported in purse seine fisheries in 2019:

- Four spine-tailed devil rays were captured and released alive
- No seabirds, marine mammals or turtles were reported caught
- No oceanic whitetip sharks, silky sharks, whale sharks or great white sharks were reported caught

Table 14: Catch composition from five observed purse seine trips operating within New Zealand fisheries waters in 2018 and 2019.

Common name	Scientific name	Observed catch weight (kg)	% of catch
Skipjack tuna	*Katsuwonus pelamis*	2 221 977	99.6
Jack mackerel	*Trachurus* spp.	6120	0.3
Sunfish	*Mola mola*	1107	<0.1
Spine-tailed devil ray	*Mobula japanica*	1050	<0.1
Striped marlin	*Kajikia audax*	370	<0.1
Jellyfish		310	<0.1
Albacore tuna	*Thunnus alalunga*	300	<0.1
Blue Marlin	*Makaira mazara*	200	<0.1
Yellowfin tuna	*Thunnus albacares*	120	<0.1
Bronze whaler shark	*Carcharhinus brachyurus*	100	<0.1
School shark	*Galeorhinus galeus*	60	<0.1
Flying fish	Exocoetidae	28	<0.1
Kahawai	*Arripis trutta*	24	<0.1
Mako shark	*Isurus oxyrinchus*	10	<0.1
Giant Stargazer	*Kathetostoma giganteum*	8	<0.1
Pelagic ray	*Pteroplatytrygon violacea*	7	<0.1
Frigate tuna	*Auxis thazard*	5	<0.1
Blue mackerel	*Scomber australasicus*	4	<0.1
John Dory	*Zeus faber*	2	<0.1
Saury	*Scomberesox saurus*	2	<0.1
Frostfish	*Lepidopus caudatus*	1	<0.1

Table 15: Domestic purse seine sets observed as a percentage of sets made for 2015 to 2019.

Calendar year	No. sets observed	% sets observed	% SKJ catch
2015	102	20.9	17.5
2016	80	25.2	25.9
2017	69	23.7	21.2
2018	67	36.2	44.1
2019	36	13.7	10.4

Records from observers from the Regional Observer Programme aboard the New Zealand purse seine vessels operating in the tropical Pacific are held by SPC and are available to the Commission. New Zealand purse seine vessels operating outside the New Zealand EEZ have 100% observer coverage. We have not summarised bycatch for these vessels.

1.1.5 Other information

Following the development of domestic longlining in the early 1990s, the number of vessels in the domestic tuna fleet operating in New Zealand fisheries waters peaked in 2001 and has subsequently declined. The potential for claiming an allowance of quota on the basis of fishing history when tuna species entered the Quota Management System (QMS) is likely to have attracted participants to the fishery. As expected, the number of longline vessels targeting tuna declined once the years to be used for determining catch history were known, reducing any incentive to fish for catch history.

On 1 October 2004, bigeye, yellowfin and Pacific bluefin tuna were introduced to the QMS system with catch limits set within New Zealand fisheries waters. Several key bycatch species, namely mako, blue, porbeagle shark, moonfish, Ray's bream and swordfish were also introduced to the QMS at this time and a Total Allowable Catch (TAC) was set for each species. Southern bluefin tuna was brought into the QMS in 2004, with a catch limit that applies to catch by New Zealand flagged vessels regardless of where they fish. In 2012 New Zealand reduced the TAC for porbeagle and mako sharks.

The allocation of southern bluefin tuna quota was a further driver for rationalisation in the tuna longline fleet. A national allocation applies to New Zealand southern bluefin tuna catch and, as a result of allocation of individual shares in this fishery; many fishers received small quota allocations that rendered their operations economically unviable. Some responded to this shortfall by purchasing further quota but many chose to exit the fishery.

Recent economic conditions have also resulted in further decreases in participation in domestic longlining and trolling. These conditions include a variable New Zealand dollar and a static market value for fish product. Some companies have undertaken to enhance the value of their fishery through applying for MSC (Marine Stewardship Council) certification. The MSC certified on the 16th of May 2011 that the New Zealand troll fishery for albacore conforms to the requirements of the MSC Principles and Criteria for Sustainable Fishing. In 2017 the New Zealand albacore troll fishery was successfully re-certified. The domestic skipjack fishery was also successful in attaining MSC certification in 2017. These two certifications are active until 2022. New Zealand continues to advocate for and support work towards developing harvest strategies for the four main tuna species and, in particular, achieving the Target Reference Point for south Pacific albacore as soon as economically possible.

New Zealand fisheries are at the limits of the range of many highly migratory species. Catches vary from year to year depending on seasonal variations in highly migratory species (HMS) migrations. The availability of juvenile albacore to the troll fishery in New Zealand waters varies from year to year with larger scale climatic events indicated by the ENSO index. The future prospects for New Zealand are strongly dependent on good management of tuna resources in the WCPO, in particular on biomass of key stocks remaining at a sufficiently high level that no major changes in distribution occur.

Most tuna caught in New Zealand waters are exported and the destination of exports varies depending on the species. Large tunas caught by longline are mostly exported "chilled" to Japan, with smaller proportions exported to Australia and United States. Troll caught albacore are sent to a variety of markets and in 2019 most was exported frozen whole to Thailand followed by Spain and Vietnam. In 2019, skipjack tuna caught by NZ vessels was largely exported to Thailand, Ecuador, Mauritius and Vietnam

1.2 Research and Statistics

1.2.1 Summary of observer and port sampling programmes

New Zealand has an observer programme and two active port sampling programmes. Information on the New Zealand observer programme was provided to the Commission in June, 2009, as part of the

accreditation process for the Regional Observer Programme. The New Zealand observer programme was audited by the WCPFC in early 2012.

With respect to HMS fisheries, most observer effort is currently directed at the longline and purse seine fisheries. In the past, observer effort was also directed at the albacore troll fishery. The main aim of the latter coverage was to better understand the fishing process, and to collect catch, effort and biological samples from albacore

On longline vessels the observers collect detailed data on all fish and non-fish catch. Length or weight is collected for all specimens and most have additional data collected, e.g. sex, maturity stage and stomach contents. Data have been recorded on the stomach content information from 124,992 highly migratory fish (64,740 tuna; 9,341 billfish; 35,923 sharks and 14,988 other fish species).

Physical specimens are also often collected, e.g. hard parts for ageing. Observers make detailed records of the fishery operation, e.g. hooks per basket, use of floats, light-sticks, hook types, bait types, and snood setup. Observers also record information on the behaviour of seabirds and other non-fish species in relation to the fishing operation, e.g. whether seabirds were present during setting or hauling.

On purse seine vessels it is not possible to sample the entire catch so the observers focus on detailed sampling of the bycatch species and sub-sampling of the target species. To this end New Zealand has worked with SPC in the past to conduct trials using observers where different sampling strategies are utilised to assess the effects of sampling bias on species and length composition of the catch.

The albacore port sampling programme was established during the 1996-97 albacore fishing season. The first two years of sampling were funded through SPC, but the programme has been funded by the Ministry for Primary Industries (costs recovered from industry) since 1998-99. Sampling typically occurs at ports on the west coast of New Zealand during the austral summer. During the duration of the programme over 100,000 albacore have been sampled for length and 12% of these were also sampled for weight.

The length frequency data are provided to the Commission annually and have been incorporated into the regional assessment for south Pacific albacore.

In 2005, the Ministry for Primary Industries funded the development of a port sampling programme for swordfish and has extended this programme to include other HMS taken in the longline fishery. This includes large HMS where fish processors often collect individual processed weight data as part of their operations. It is anticipated that it may be possible to collect individual weights for up to 90% of the catch of some species. Where necessary, these data will be supplemented with information from observers, e.g. conversion factors from length to processed weight and sex-structured data for swordfish.

1.2.2 Research activities

Considerable research effort has been directed at highly migratory species in New Zealand. The Ministry for Primary Industries runs a research planning process each year which involves the updating of the Medium Term Research Plan (MTRP) for groups of species. The Ministry for Primary Industries has, in consultation with stakeholders, developed a MTRP for tunas, billfish, pelagic sharks, other fish species taken in tuna fisheries, and the gamefish tagging programme. The research plan describes the current knowledge about the species, lists all historic research (by New Zealand researchers), and sets out a five year plan for research activities. Summaries of research were initially provided to WCPFC-SC1 (as paper GN IP-2) and have been routinely reported since then in the Annual New Zealand Country Report.

Current New Zealand research on tuna and tuna-related species include:

Albacore

Stock monitoring of albacore

Analysis of albacore CPUE from the commercial troll fishery

All Highly Migratory Species

Characterisation of New Zealand tuna fisheries

Commercial catch sampling programme for HMS

Gamefish tag recapture programme

Bycatch

Characterisation of bycatch in pelagic fisheries

Estimation of non-target fish catches in the tuna longline fishery

Productivity of non-target species

Longline seabird mitigation - trials of line weighting, hook pods and tori lines

Environmental

Data collection of demographic, distributional and trophic information on selected seabirds species to allow estimation of effects of fishing on population viability

DNA database for commercial marine fish and invertebrates

The impacts of climate variability on commercial fish abundance

Climate variability and long-term trends of relevance to NZ fisheries

Estimation of bycatch and discards in longline fisheries

Ecological Risk Assessment for New Zealand fishery interaction with seabirds and mammals

Estimation of protected species captures in longline fisheries using electronic monitoring.

Modelling of impacts of fishing-related mortality on NZ seabird populations

Modelling the effects of fishing on population viability of selected seabirds

Blue shark

Indicator analyses of blue sharks

Mako shark

Electronic tagging of mako sharks

Indicator analyses of mako sharks

Age, growth and reproduction of mako sharks

Porbeagle shark

Indicator analyses of porbeagle sharks

Age, growth and reproduction of porbeagle sharks

Striped marlin

Stock monitoring of striped marlin

Analysis of CPUE for striped marlin from the recreational fishery

If you would like further details regarding any of these studies please contact John Annala (John.Annala@mpi.govt.nz).

1.2.3 Statistical data collection systems in use

In order to fish commercially in New Zealand, an individual or entity is required to hold a fishing permit. Fishing permit holders may only sell their catch to licensed receivers of fish (wharf sales of 10kg or less are permitted but must be documented). Both fishing permit holders (fishers) and fish receivers are required to furnish returns to the Ministry for Primary Industries. New Zealand has four data collection systems in place to collect catch and effort data:

- the catch and effort system for all domestic and most high seas fishing (including non-fish bycatch data);
- monthly harvest returns from fishers
- licensed fish receiver returns for fish processors, and
- a system to collect data from purse seine vessels that are using FFA/SPC logsheets for fishing on the high seas and within the zones of other countries.

These four data collection systems have not changed substantially in recent years and descriptions and details provided in the 2018 Annual Report are still current.

1.2.4 Data coverage of catch, effort and size data for all species

All fishers are required to fill in logsheets providing 100% coverage of catch and effort. In addition, for fishing within New Zealand fisheries waters we have two independent records of total catches, the monthly reporting by fishers (MHRs) and licensed fish receivers (LFRRs).

Shore-based catch monitoring of the albacore troll fishery samples about 4% of the catch by weight based on sampling about 50 landings in selected fishing seasons. Given the small number of cohorts taken in this fishery, this level of sampling provides good precision on the catch-at-length estimates (e.g. mean weighted coefficient of variation of <0.20 for catch-at-length).

Currently much of the size data from longline, purse seine, and troll fisheries for other HMS comes through the observer and port sampling programmes.

The target observer coverage rate for the longline fishery is 10% of effort, which should reflect approximately 10% of the HMS catch. After the Japanese charter vessels ceased operating in New Zealand waters after 2015, observer coverage of the domestic fleet decreased to about 15% of the reported effort for three years but then declined to less than the 10% target value in 2019 (Table 16).

Table 16: Hooks observed from the New Zealand longline fishery as a percentage of hooks set for 2015 – 2019. - , no fishing.

Calendar year	Domestic	Charter (Japanese)	Total
2015	6.9	80.8	25.8
2016	14.1	-	14.1
2017	15.7	-	15.7
2018	13.1	-	13.1
2019	8.4	-	8.4

The shore-based port sampling programme includes the primary species taken in longline fisheries (e.g. bigeye and yellowfin tuna and southern and Pacific bluefin tunas). The sampling programme obtained individual processed weights for more than 95% of the total landed catch in 2019 of swordfish, bigeye tuna and yellowfin tuna respectively (Table 17). The number of striped marlin caught by fleet are presented in Table 18. Over half are released alive according to observer records in commercial vessels and historical tag and release rates on sport fishing vessels.

New Zealand vessels mostly offload their catch of tunas in port but a small number of landings are transhipped in port (Table 19).

Table 17: Number and percent of swordfish and large tunas sampled for individual processed weights for calendar years 2017 to 2019. Small numbers of fish landed and exported later in the fishing year (in the subsequent calendar year) account for the percentage of catch being greater than 100%.

Calendar	Numbers of fish sampled			Percentage of catch		
Year	Swordfish	Bigeye tuna	Yellowfin tuna	Swordfish	Bigeye tuna	Yellowfin tuna
2017	4243	1552	201	76.3	84.4	76.7
2018	4278	1994	389	68.5	90.4	82.6
2019	2213	669	93	>100	95.4	>100

Table 18: Commercial discards (numbers of fish) of striped marlin in the New Zealand EEZ reported by the NZ commercial fleet (CELRs and TLCERs), and number of fish landed and tagged by the recreational fleet, by fishing year for 2014-15 to 2018-19.

Fishing	Commercial	NZ Recreational		
Year	Discarded	Landed	Tagged	Total
2014-15	371	696	1086	2153
2015-16	550	900	1658	3120
2016-17	261	516	528	1334
2017-18	168	618	686	1472
2018-19	74	507	739	1320

Table 19: Transhipment Information for New Zealand vessels for 2019.

Species	Offloaded - Total Quantity (metric tonnes)	Transhipped In Port, national Jurisdiction, etc	Transhipped Inside / Outside Convention area	Caught Inside / Outside Convention area	Product form	Fishing gear
Skipjack tuna (SKJ)	942.2	In Port	Inside	Inside	Frozen Whole	Purse Seine
Yellowfin tuna (YFN)	10.1	In Port	Inside	Inside	Frozen Whole	Purse Seine
Bigeye tuna (BET)	-	In Port	Inside	Inside	Frozen Whole	Purse Seine

Species	Offloaded - Number of Transhipments	Transhipped In Port, national Jurisdiction, etc	Transhipped Inside/Outside Convention area	Caught Inside/Outside Convention area	Fishing gear
Skipjack tuna (SKJ)	1	In Port	Inside	Inside	Purse Seine
Yellowfin tuna (YFN)	1	In Port	Inside	Inside	Purse Seine
Bigeye tuna (BET)	1	In Port	Inside	Inside	Purse Seine

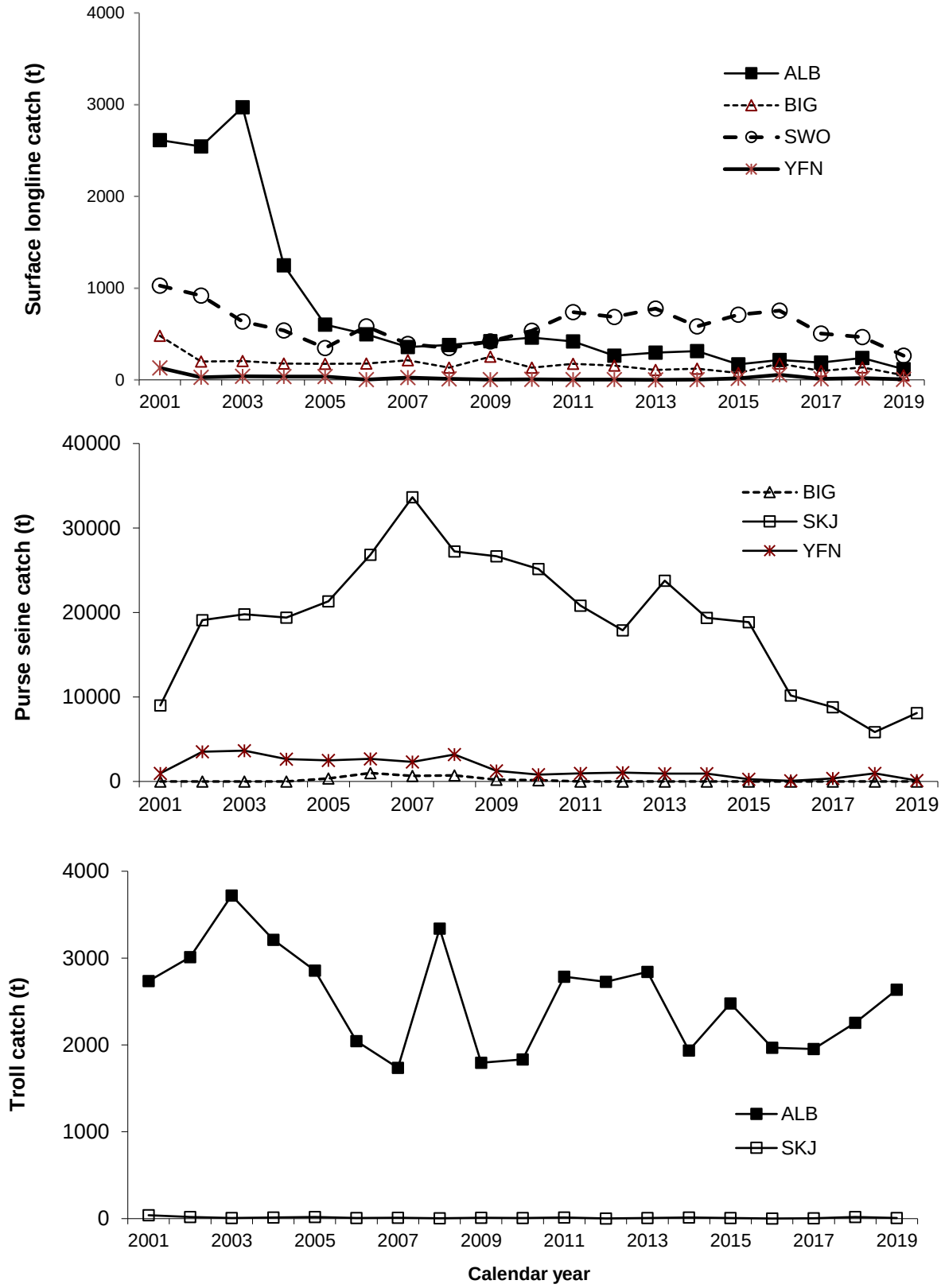

Figure 1: Historical catch (t) by gear and main species for the New Zealand longline, purse-seine and troll fleets operating in the WCPFC Convention area from 2001 to 2019.

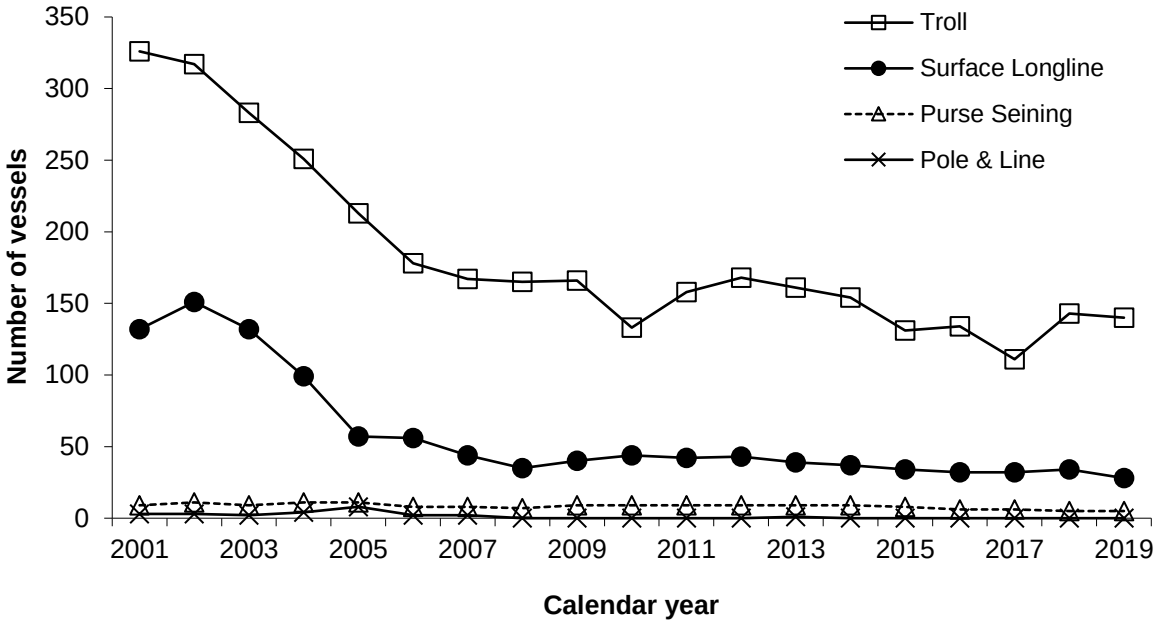

Figure 2: Historical annual vessel numbers for the New Zealand longline, purse seine, troll and pole and line fleets by gear fishing in the WCPFC Convention area from 2001 to 2019. Vessels switch gear seasonally and may be included in more than one category.

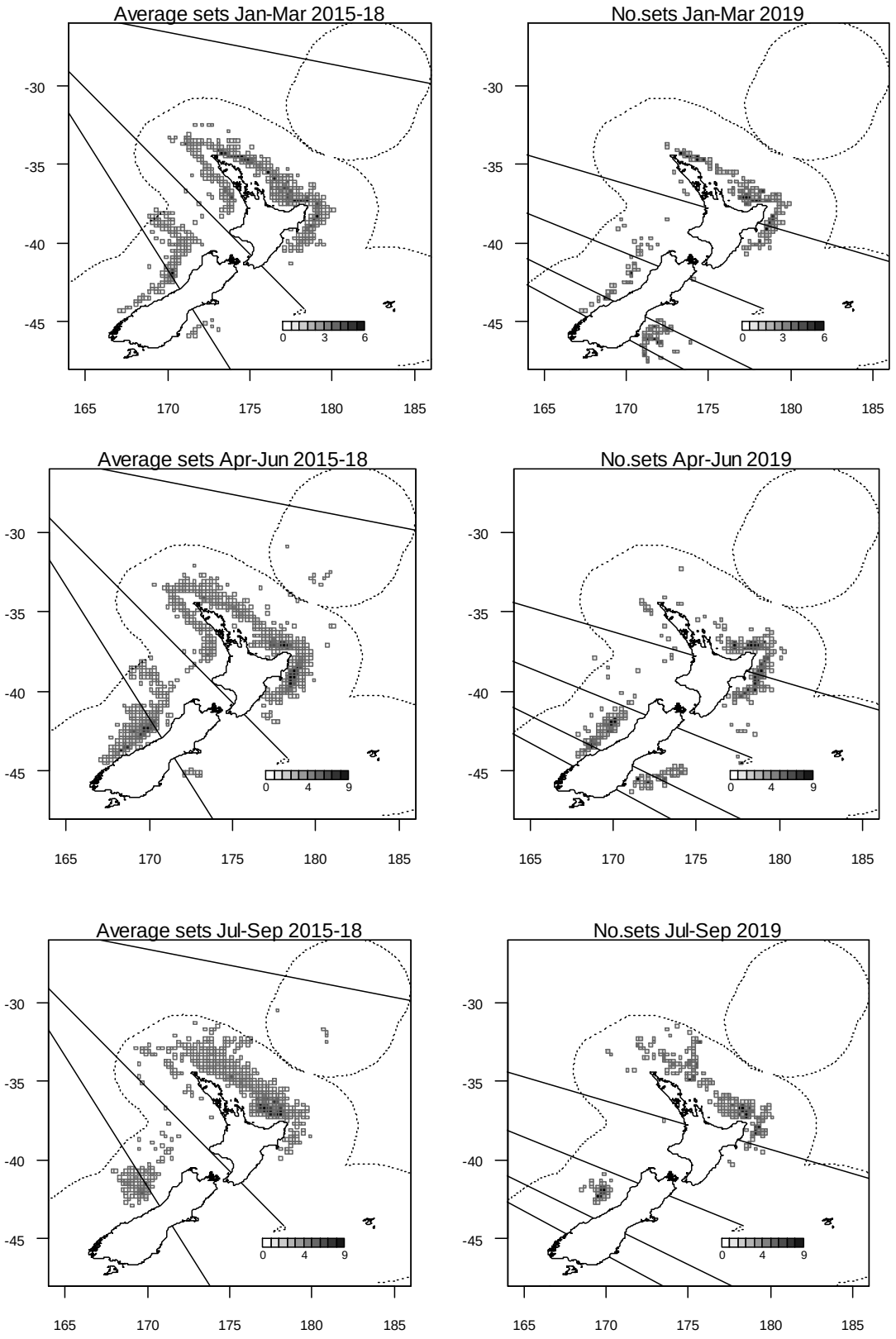

Figure 3: Distribution of effort (number of sets per 1/5 degree square) for the domestic longline fleet by quarter-year for 2015-2018 (average) and 2019 (actual).

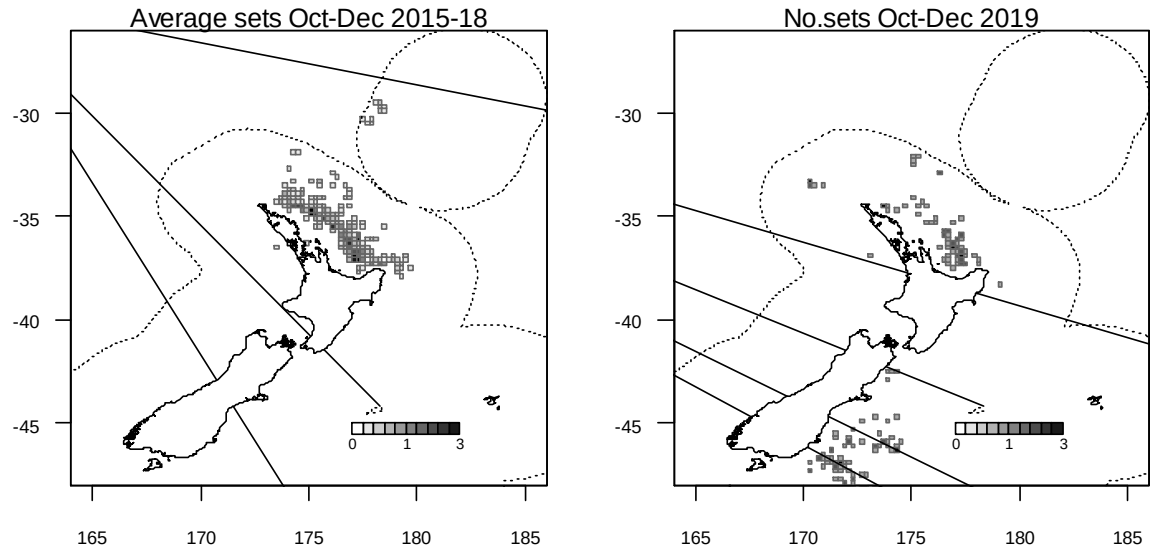

Figure 3 (continued): Distribution of effort (number of sets per 1/5 degree square) for the domestic longline fleet by quarter-year for 2015-2018 (average) and 2019 (actual).

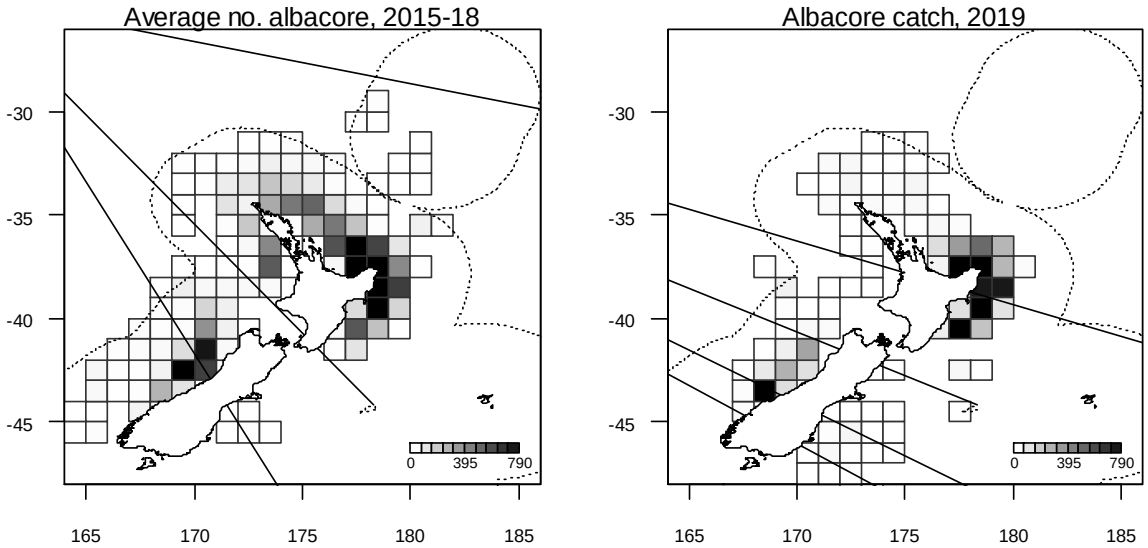

Figure 4: Distribution of longline catch (number of fish in 1 degree squares) for albacore, bigeye, and yellowfin tunas, and swordfish for 2015 to 2018 (average), and for 2019 (actual). All months and all vessels combined.

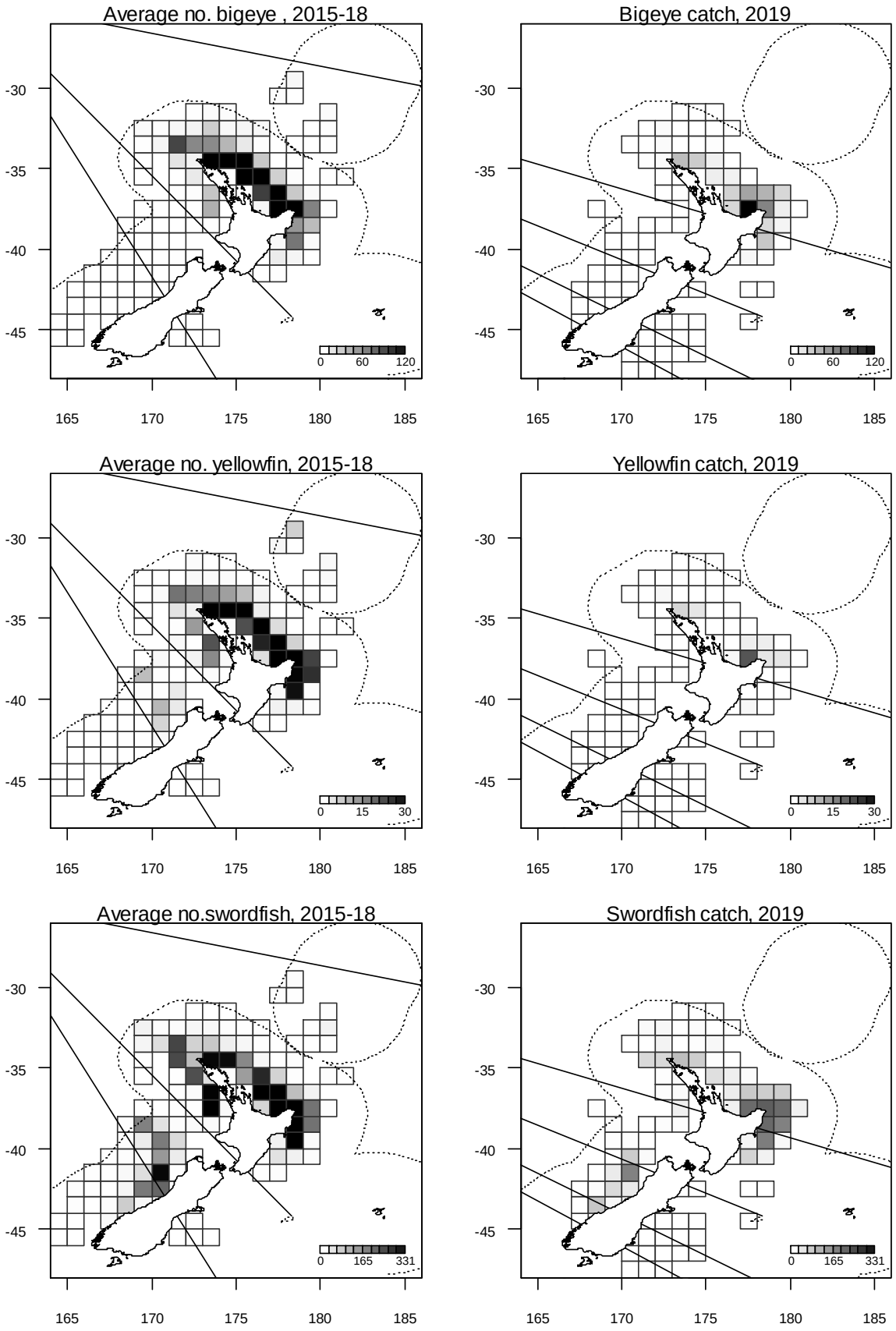

Figure 4 (continued): Distribution of longline catch (number of fish in 1 degree squares) for albacore, bigeye, and yellowfin tunas, and swordfish for 2015 to 2018 (average), and for 2019 (actual). All months and all vessels combined.

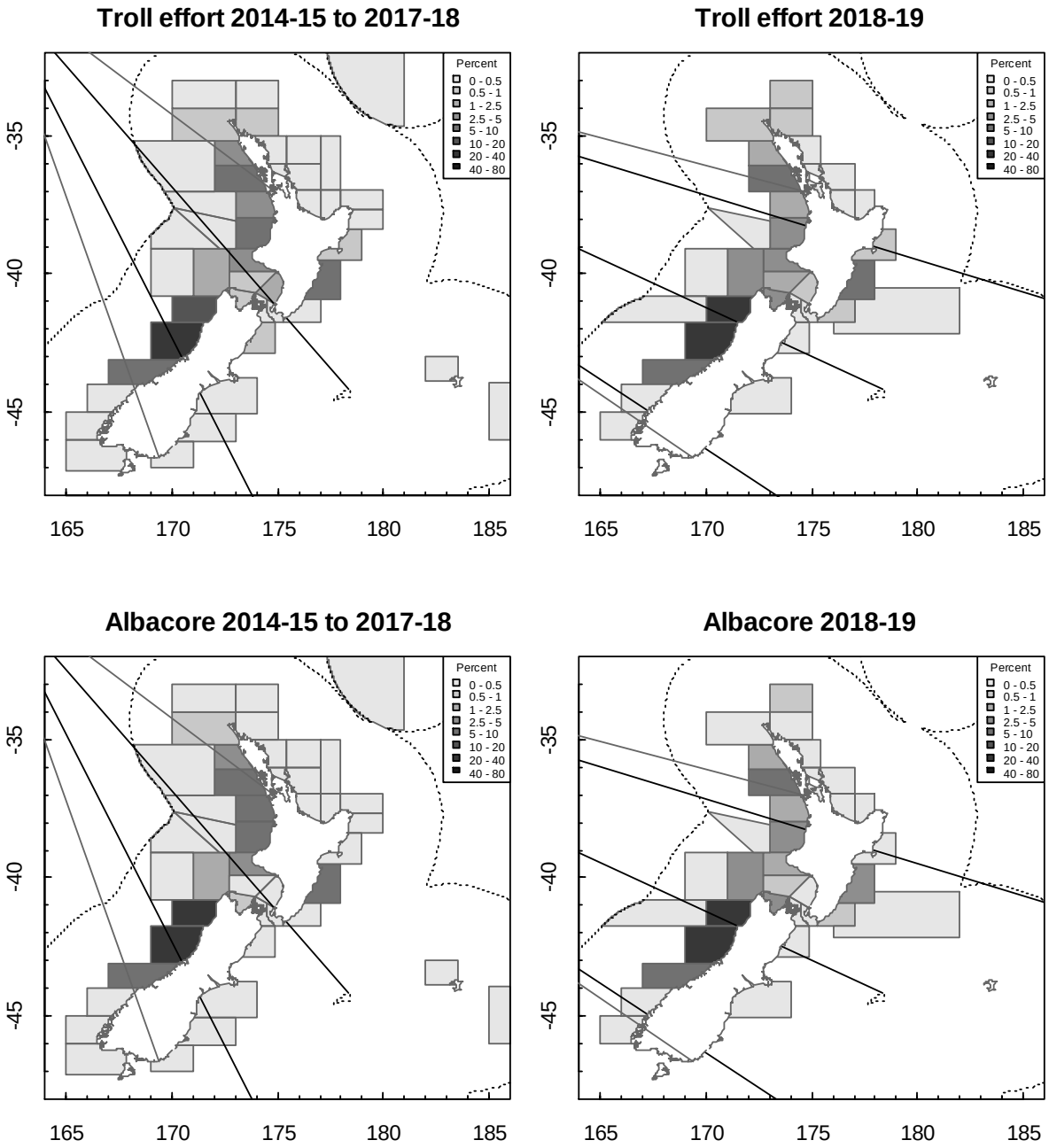

Figure 5: Distribution of troll effort (percent of vessel-days) and troll catch of albacore (percent of total catch) for 2014-15 to 2017-18 troll seasons (left) and for 2018-19 season (right); Note: Positional data for troll are reported at a NZ statistical area resolution.

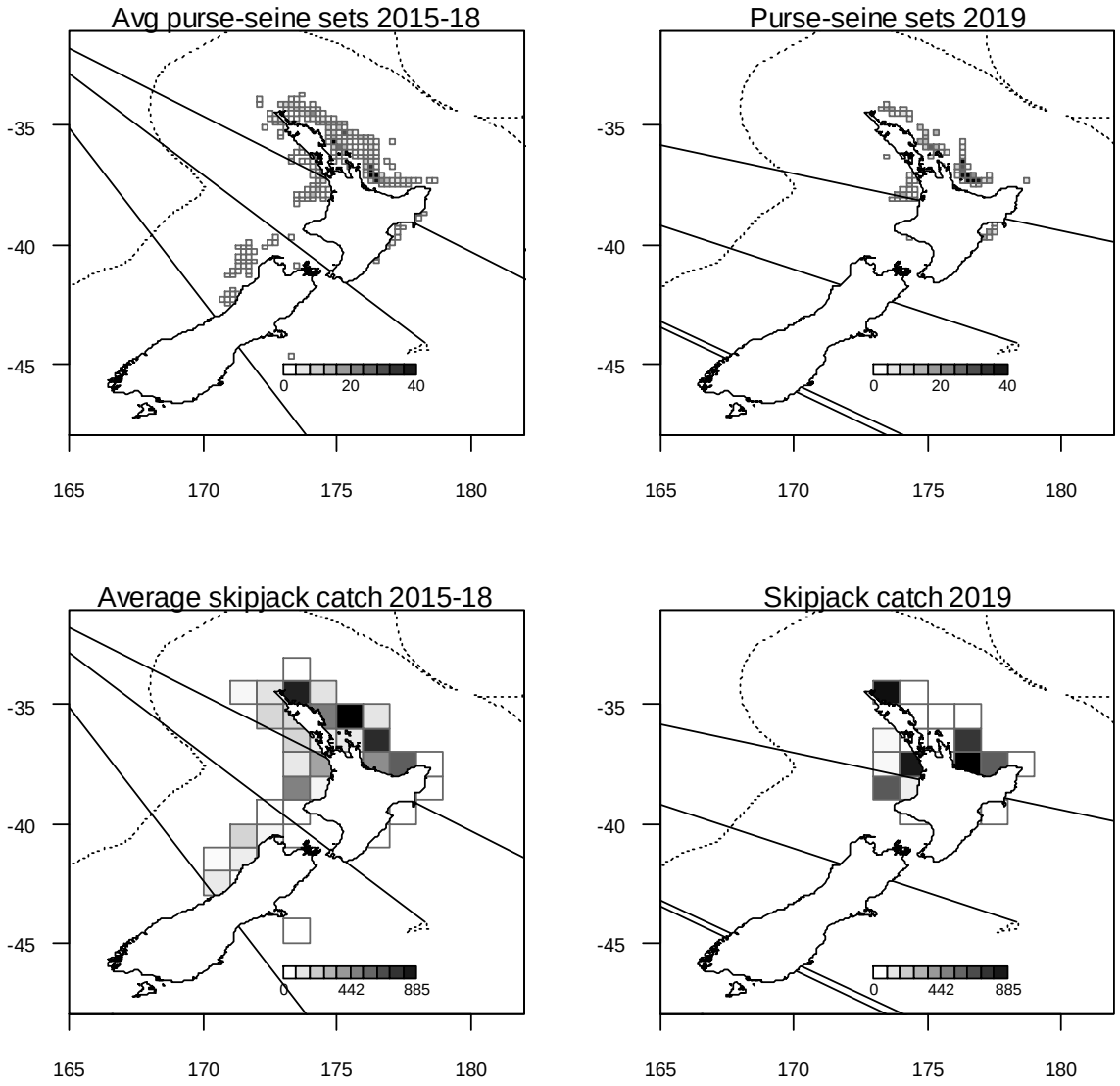

Figure 6: Distribution of purse-seine effort (number of sets per 1 degree square) and purse-seine catch of skipjack (tonnes per 1 degree square), average for 2015-18 calendar years (left) and actual for 2019 (right).

Appendix 1: Description of the types of catch, effort, and size data that are available for HMS species (source: Ministry for Primary Industries Catch Effort reference library version 2, August 2003).

Data type	Description	Years available	Comments
CELR (Catch Effort Landing Return)	The CELR is a general purpose form used for recording the taking of fish by any of a variety of methods where there is no more specific form type available. The top part of the form contains details of the fishing activity. A number of method-specific "templates" are used with the CELR form. The templates are overlaid on the standard CELR form and give instructions on filling in the form specific to particular types of method. the fishing details sections of the forms are mainly provided for the purposes of: • stock assessment- to provide a measure of catch per unit effort • policy evaluation –to determine the location and method of fishing • enforcement –to monitor activities of fishers • monitoring environmental performance – to monitor effort The catch effort returns relate details about the fishing activity (including the location of fishing) directly to an estimate of the amount of fish caught. The bottom part of the form contains landing information and records the catch that is landed, lost, discarded at sea, or retained on board after a landing. Landing information is required from all commercial fishing for all species, and hence, this is theoretically the most comprehensive source of information for commercial harvest levels in New Zealand.	January 1988 onwards	In addition to this form there is a version specifically for reporting fishing by New Zealand vessels on the high seas known as the HS-CELR (High Seas CELR). The HS-CELR is nearly identical to the standard version of the form and was introduced 1 March 2001. There are a number of limitations and problems in this data set that need to be considered: • Because there is only space on the form for the catches of five species per unit of effort, species caught in small quantities may not be reported. • The catches reported are only estimates and are not weighed. Tuna catches are reported in numbers rather than weight. Fish reported in the landing section of a CELR form usually cannot be related to any specific fishing event during a trip. If the vessel fished in several statistical areas within one trip then it is usually not possible to deduce how much of the landed catch was taken in each statistical area
CLR (Catch Landing Return)	Catch Landing Returns are completed by vessels that use a form other than a CELR to report their fishing effort. They record the catch that is landed, lost, discarded at sea, or retained on board after a landing. Landing information is required from all commercial fishing for all species, and hence, this is theoretically the most comprehensive source of information for commercial harvest levels in New Zealand.	January 1991 onwards (TLCER forms)	Fish reported in the landings form usually cannot be related any specific fishing event during a trip . If the vessel fished in several statistical areas within one trip then it is usually not possible to deduce how much of the landed catch was taken in each statistical area. The whole weights reported in the landings are calculated from the processed catch weights multiplied by a conversion factor. The calculated whole weights are therefore only as accurate as the conversion. The whole weights of

			fish that are not landed to a Licensed Fish Receiver (e.g. fish discarded or trans-shipped) have historically not been fully recorded.
TLCER (Tuna Longline Catch Effort Return)	The TLCER is required for all fishing that targets tunas using surface longlining. Data reported on the TLCER is for one set and has the date at start of set and end of haul and the time at start and end of setting and hauling. Locations (of start and end of setting) are reported in latitude and longitude. Catches of all species are recorded in number and in total processed weight.	January 1980 to June 1995 (foreign licensed vessels) March 1989 onwards (charter vessels) March 1991 onwards (domestic vessels)	In addition to this form there is a version specifically for reporting fishing by New Zealand vessels on the high seas known as the HS-TLCER (High Seas TLCER). The HS-TLCER is nearly identical to the standard version of the form and was introduced 1 March 2001. The TLCER form was redesigned to include additional information on the position and timing of setting and hauling as well as disposition of catches from April 2003.
MHR (Monthly Harvest Return)	The main purpose of the MHR is for fisheries administration. A secondary purpose is to provide an information source concerning total harvest levels of quota and non-quota species for fisheries assessment.	October 2001 onwards	MHR reports are recorded by permit holder, fishstock and month. Fine scale information such as vessel (unless the permit holder used only one vessel), statistical area or the date of fishing are not available in this dataset. The catch within and beyond the EEZ is reported. Prior to October 2001, equivalent information was collected for species subject to New Zealand's Quota Monitoring System on Quota Monitoring Returns (QMRs). This information was collected from December 1986 onwards until the QMR was replaced by the MHR in October 2001.
LFRR (Licensed Fish Receiver Returns)	The primary purpose of LFRR is for administration of the quota management system. LFRR data provides complete coverage of all species processed by licensed fish receivers. Fish not landed to a Licensed Fish Receiver (e.g. fish that are discarded) are not reported through this system.	January 1986 onwards	This dataset does not contain information about the origin of the fish apart from the quota holder. If a permit holder fishes in more than one fishstock in a month or uses more than one vessel, it may not be possible to relate the LFRR data to the landing records. This dataset is therefore useful mainly to estimate total catches for a species in a year. This dataset does not contain information about fish that was not landed to a Licensed Fish Receiver, such as fish that was discarded, eaten, sold at wharf etc.
Observer Data (from longline, purse seine, and trolling vessels)	To monitor the activities of fishing vessels operating in the New Zealand EEZ and to obtain reliable, accurate and independent catch, effort and biological information.	June 1988 onwards for longline, January 2006 onwards for Purse Seine & January 2007 for trolling vessels	This system does not cover all commercial catch. It covers a sample of the tuna fishing (about 975 observer days budgeted in 2008/09), but for the trips that are covered, more detailed information is available than is available from the commercial catch forms completed by fishers.