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PART 1: INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS

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NEW ZEALAND

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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 2016	**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 (18,712t in 2015), 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 (278t in 2015). 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 (2,648 t in 2015) 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 2015, 149 t of striped marlin were caught by the recreational fleet, with 56% tagged and released.

New Zealand has four Class-6 purse seiners fishing offshore in the Exclusive Economic Zones (EEZs) of Pacific Island States and in high seas areas of the equatorial western and central Pacific Ocean (WCPO). These vessels also fish domestically from time to time along with up to seven smaller capacity domestic-based purse seiners. The number of purse-seiners has been stable at 8 vessels (four Class-6 and four smaller vessels) since 2006. The New Zealand longline tuna fleet consists of domestically owned and operated vessels (mostly between 15 and 25 m in length) and until recently a limited number of foreign owned vessels that operate under charter. The number of longline vessels operating in New Zealand has declined from 151 vessels in 2002 to 34 in 2015.

Blue shark is the most common non-tuna bycatch species in the longline fishery followed by Ray's Bream and moonfish. Reductions in longline effort since 2002 have resulted in reductions in catches of the major bycatch species to their lowest levels in 2008, with some subsequent increases. In October 2012 New Zealand reduced the Total Allowable Catch (TAC) for porbeagle and mako sharks.

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^{o}S must use two mitigation measures as specified in CMM2012-07. New Zealand longline vessels have been provided with turtle dehooking 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) have been observed in the purse seine fishery.

New Zealand has an Observer Programme and two active domestic port sampling programmes for highly migratory species. In 2015, 26% of the longline effort (hooks) was observed, and almost 20% 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 2014 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 bigeye, southern bluefin and swordfish, the greatest part of the catch consists of albacore. 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, but to protect New Zealand's sport fishery, marlins may not be retained by commercial fishers when taken within New Zealand fisheries waters.

The striped marlin catch by recreational fishers in 2015 was estimated to be 149 tonnes, with 56% 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 recreational fishery most Pacific bluefin tuna are tagged and released. Tagging data indicates good survival rates for tagged fish. Fish are generally in excess of 200 kg and several world records have been claimed in this fishery. In 2015 only three recreational charter vessel operators reported catching Pacific bluefin tuna in New Zealand fishery waters. These vessels reported a catch of 29 fish, 12 (estimated total weight 2273 kg) which were landed and 17 were tagged and released alive (estimated total weight 3265 kg).

In 2012 the recreational sector was estimated to have landed 21,898 (CV 0.21) albacore. Based on a mean weight of 4.2 kg this catch was estimated to be 92 t. The recreational National Panel Survey also 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. 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 continuously since the late 1990s in both commercial and recreational fisheries with a small upturn in 2015 and 2016; this overall trend is of great concern to New Zealand.

1.1.2 Number of vessels by gear type, size

Approximately 170 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 2015. 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.

Four New Zealand flagged Class-6 purse seiners (vessels with over 4,256 t combined hold capacity) have fished in the EEZs of Pacific Island States and on the high seas of the equatorial western and central Pacific Ocean (WCPO) since 2000. These vessels may also fish part of the year within New Zealand fisheries waters targeting free swimming (unassociated) schools of skipjack. The number of smaller capacity domestic-based purse seiners had declined to five vessels by 2009 and to four vessels in 2016.

There has been no foreign licensed access for tuna longline fishing in New Zealand fisheries waters since 1995 and only vessels operated by New Zealand companies have fished using longlines in New Zealand fisheries waters since that time. The only foreign licences issued since 1995 for fishing in New Zealand fisheries waters have been to US purse seine vessels operating under the Multilateral Treaty between the Government of the United States of America and the Governments of certain Pacific Island Countries (commonly referred to as the US Tuna Treaty).

A small fleet of foreign owned longline vessels on charter to New Zealand fishing companies have operated in New Zealand fisheries waters since the late 1980s. These longliners target southern bluefin tuna, although a mixed bag of species including other tunas and swordfish are caught. On one occasion two vessels were chartered to target albacore tuna. In 2006, three Australian flagged vessels entered the longline fishery under charter arrangements for two years, targeting bigeye tuna and swordfish.

Table 1: Estimated whole weight (t) of tuna and swordfish landed by New Zealand flagged vessels active in the WCPFC Convention Area, for years 2010 to 2015 (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 2015 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.

		2010	2011	2012	2013	2014	2015
Albacore	NZFW	2292	3205	2990	3142	2257	2648
Thunnus alalunga	ET	0	0	0	0	0	0
	Total	2292	3205	2990	3142	2257	2648
Bigeye	NZFW	132	174	154	110	122	81
Thunnus obesus	ET*	134	125	95	92	190	20
	Total	266	299	250	202	312	101
Pacific bluefin[&]	NZFW	14	28	13	24	12	16
Thunnus orientalis	ET	0	0	0	0	0	0
	Total	14	28	13	24	12	16
Skipjack	NZFW	8629	10840	9881	13312	11245	12351
Katsuwonus pelamis	ET	16530	9999	8016	10456	8137	6362
	Total	25159	20839	17897	23768	19382	18712
Swordfish	NZFW	536	739	687	778	583	715
Xiphias gladius	ET	0	0	0	0	0	0
	Total	536	739	687	778	583	715
Yellowfin	NZFW	6	3	2	1	2	16
Thunnus albacares	ET*	818	966	1042	925	942	262
	Total	824	968	1044	925	944	278

* 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 2015 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%.

2015	Longline	Troll	Handline	Pole & Line	Purse seine
Albacore	8	92	0	0	0
Bigeye tuna	74	7	0	0	20
Skipjack tuna	<1	<1	<1	0	100
Swordfish	100	0	0	0	0
Yellowfin tuna	6	<1	0	0	94

Table 3: Catch of south Pacific albacore by New Zealand vessels south of 20ºS in tonnes (raised), using surface longline, troll, or purse seine gear; and in thousands of fish (for longline and troll only, unraised), 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 2011–2015 (note that some vessels will be included in both totals).

	ALB (tonnes)			ALB (000's fish)			Number of vessels	
Year	Target	Bycatch	Total	Target	Bycatch	Total	Target	Bycatch
2011	2844	361	3205	592	41	632	161	52
2012	2735	255	2990	547	29	576	169	59
2013	2848	294	3142	518	35	553	161	43
2014	2005	251	2256	425	29	454	153	44
2015	2477	171	2648	486	20	506	132	32

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. 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 and effort is consistent 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 2011 to 2015**.

	Calendar	Total no.	Vessels size range (GRT)			
Fishing Method	**Year**	**vessels**	**0 – 50**	**51 - 200**	**201 - 500**	**500+**
Surface Longline	2011	42	25	13	3	1
	2012	43	25	14	3	1
	2013	39	21	14	3	1
	2014	37	19	14	2	2
	2015	34	17	13	2	2
			0 – 500	**501-1000**	**1001 - 1500**	**1501+**
Purse Seining	2011	9	5	0	2	2
	2012	9	5	0	2	2
	2013	9	5	0	2	2
	2014	9	5	0	2	2
	2015	8	4	0	2	2
			0-50	**51-150**		
Pole & Line	2011	0	0	0		
	2012	0	0	0		
	2013	1	1	0		
	2014	0	0	0		
	2015	0	0	0		
			0 – 50	**51 - 200**		
Troll	2011	158	135	23		
	2012	168	147	21		
	2013	161	140	21		
	2014	153	132	21		
	2015	131	108	23		
			0 – 50	**51 - 200**		
Troll season	2010-11	154	131	23		
	2011-12	125	112	13		
	2012-13	153	134	19		
	2013-14	149	130	19		
	2014-15	127	105	22		

Table 5: **Annual longline effort (000s of hooks) by target species. 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
2010	1584	1230	20	169	3003
2011	1312	1627	14	199	3152
2012	1594	1259	0	212	3065
2013	1506	854	9	354	2724
2014	1583	710	1	215	2509
2015	1563	405	0	449	2416

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. 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
2001	2736.3	326	2588.2	128	25.4	4
2002	3012.4	317	2536.9	147	7.9	4
2003	3721.2	283	2496.4	126	474.1	6
2004	3211.8	251	1232.3	95	16.0	4
2005	2808.8	213	604.4	55	29.7	2
2006	2043.4	178	479.8	53	16.4	3
2007	1735.8	136	313.7	38	42.8	6
2008	3352.3	168	372.7	31	9.8	4
2009	1793.6	166	409.5	36	12.0	4
2010	1832.5	133	457.7	40	1.8	4
2011	2786.6	162	417.7	38	1.5	4
2012	2725.7	168	261.8	39	2.8	4
2013	2835.9	160	296.1	35	7.2	4
2014	1936.6	154	299.9	33	12.7	4
2015	2424.8	131	215.0	30	7.8	4

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		Other vessels fishing within New Zealand's waters south of 20ºS		
Year	Catch (tonnes)	Vessel numbers	Catch (tonnes)	Vessel numbers	Flag	Catch (tonnes)	Vessel numbers
2001	1009.5	128	17.5	4	NA	NA	0
2002	909.0	147	11.0	4	NA	NA	0
2003	616.9	126	18.1	6	NA	NA	0
2004	528.1	95	9.9	4	NA	NA	0
2005	337.8	55	10.2	2	NA	NA	0
2006	558.7	53	22.3	3	NA	NA	0
2007	334.8	38	57.2	6	NA	NA	0
2008	343.0	31	3.0	4	NA	NA	0
2009	412.7	36	5.3	4	NA	NA	0
2010	535.1	41	0.9	3	NA	NA	0
2011	736.2	37	2.8	4	NA	NA	0
2012	679.1	39	7.7	3	NA	NA	0
2013	765.2	35	12.6	4	NA	NA	0
2014	576.7	33	6.4	4	NA	NA	0
2015	706.1	30	8.7	4	NA	NA	0

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

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). Through 2012 blue shark was the most common bycatch species retained followed by Ray's Bream (Table 8). The large reduction in blue shark landed catch in 2014 was due to a lack of markets for shark products. The large increase for Ray's Bream in 2013 and 2014 came from

fisheries other than the surface longline fisheries for tuna. In recent years the overall bycatch levels for all other species have been relatively consistent between years.

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 2011 - 2015 and for some species may include catches from non-tuna fisheries**.

Species	Scientific name	2011	2012	2013	2014	2015
Blue shark	*Prionace glauca*	785	985	661	106	148
Mako shark	*Isurus oxyrinchus*	97	95	79	49	47
Moonfish	*Lampris guttatus*	107	91	65	51	37
Porbeagle shark	*Lamna nasus*	75	52	85	74	83
Ray's bream	*Brama brama*	144	150	847	658	169

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 2012 to 2015. Also provided is the percentage of these species retained (2015 data only) and the percentage of fish that were alive when discarded, N/A (none discarded).

Species	2012	2013	2014	2015	% retained (2015)	discards % alive (2015)
Blue shark	132 925	158 736	80 118	72 480	0.3	87.0
Rays bream	19 918	13 568	4 591	17 555	95.3	13.7
Lancetfish	7 866	19 172	21 002	12 962	0.2	44.6
Porbeagle shark	7 019	9 805	5 061	4 058	5.1	64.0
Moonfish	2 363	2 470	1 655	3 060	95.6	45.5
Mako shark	3 902	3 981	4 506	2 667	16.1	72.2
Butterfly tuna	713	1 030	699	1 309	86.9	11.1
Pelagic stingray	712	1 199	684	979	0.0	97.2
Dealfish	372	237	910	842	0.4	22.9
Sunfish	3 265	1 937	1 981	770	0.0	100.0
Escolar	2 181	2 088	656	653	82.5	71.4
Oilfish	509	386	518	584	46.7	83.3
Deepwater dogfish	647	743	600	545	2.3	88.3
Rudderfish	491	362	327	373	26.9	78.9
Thresher shark	246	256	261	177	0.0	53.3
Skipjack tuna	123	240	90	150	10.0	n/a
Striped marlin	124	182	151	120	10.0	55.6
School shark	477	21	119	88	43.5	76.9
Big scale pomfret	108	67	164	59	32.5	96.3

The major bycatch species can be divided into three groups: species that are typically discarded and are usually alive (e.g. deepwater dogfish 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, blue 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. While there is a general rule prohibiting the discarding of quota species, in the case of these highly migratory sharks, specific provision has been made within the QMS to allow for the discarding of these species either alive or dead.

In 2015 the following observations were made on shark captures in longline fisheries:

- No reported oceanic whitetip, silky, or whale sharks captures
- One white pointer shark caught and released alive

Seabirds are sometimes caught in longline fisheries, during both setting and hauling. The observed captures in 2010 - 2015 are given in Table 10. All confirmed fishing activity occurred south of **30^{o}S.** Estimates based on observer coverage are highly uncertain but the capture rates are shown in Table 10. 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^{o}S must use two mitigation measures, as specified in CMM2007-04 (these provisions have been updated in line with CMM 2012-07 in 2014).

Table 10a: Fishing effort, number of observed hooks, and estimated seabird capture rates by year south of 30^{o}S. For each year from 2010 -2015, 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
2010	44	2,988,029	658,283	22.0	143	0.217
2011	42	3,153,254	666,382	21.1	41	0.062
2012	43	3,062,522	702,900	22.9	58	0.083
2013	40	2,774,214	575,190	20.7	29	0.050
2014	37	2,431,597	758,670	31.2	34	0.045
2015	34	2,321,336	714,000	30.8	38	0.053

Table 10b: Observed seabird captures in longline fisheries in 2015.

Common name	Scientific name	Number observed
Buller's albatross	*Thalassarche bulleri*	21
White-capped albatross	*Thalassarche steadi*	7
Black-browed albatross unidentified	*Thalassarche* spp.	3
Gibson's albatross	*Diomedea gibsoni*	2
White-chinned petrel	*Procellaria aequinoctialis*	2
Westland petrel	*Procellaria westlandica*	1
Flesh-footed shearwater	*Puffinus carneipes hullianus*	1
Campbell albatross	*Thalassarche impavida*	1

Since 2001, only 23 sea turtles have been reported by observers within New Zealand fisheries waters. Of these, 18 were leatherback turtles, one was a loggerhead turtle, two were green turtles and one was an olive ridley turtle. In the most recent seven years only 11 sea turtles have been captured in New Zealand fishery waters (Table 11), all were released alive.

Overall, sea turtle interactions are very 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 12 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 11: **Observed sea turtle interactions for surface longline vessels based on observer records. All turtles were alive on capture and released.**

Common name	Scientific name	2008	2009	2010	2011	2012	2013	2014	2015
Green turtle	Chelonia mydas	0	0	0	0	0	0	0	0
Leatherback turtle	Dermochelys coriacea	1	2	0	3	0	0	0	2
Loggerhead turtle	Caretta caretta	0	0	0	0	0	0	0	0
Olive ridley turtle	Lepidochelys olivacea	0	0	0	1	0	0	0	0
Unidentified		0	0	0	0	0	2	0	0
Total		1	2	0	4	0	2	0	2

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 seven trips covered in 2014 and 2015 is provided in Table 12 and levels of coverage are provided in Table 13. As the fishery is based on free schools of skipjack, bycatch is minimal. In 2014 no interactions with seabirds or turtles were observed or reported. One (1) pilot whale capture was reported in 2014, uninjured and released alive.

The following interactions were reported in purse seine fisheries in 2015:

- Three common dolphins were caught uninjured and released alive
- 24 silky sharks were captured and released, status unknown
- One loggerhead turtle was captured and released, status unknown
- Two seabirds were captured unharmed and released alive
- No oceanic whitetip sharks were reported caught

Table 12: **Catch composition from seven observed purse seine trips operating within New Zealand fisheries waters in 2014 and 2015.**

Common name	Scientific name	Observed catch weight (kg)	% of catch
Skipjack tuna	*Katsuwonus pelamis*	3623484	98.60
Jack mackerel	*Trachurus* spp.	32032	0.87
Sunfish	*Mola mola*	5891	0.16
Blue mackerel	*Scomber australasicus*	5768	0.16
Spine-tailed devil ray	*Mobula japanica*	1731	0.05
Jack mackerel	*Trachurus novaezelandiae*	1031	0.03
Striped marlin	*Tetrapturus audax*	805	0.02
Blue marlin	*Makaira mazara*	650	0.02
Marlin unspecified		600	0.02
Porcupine fish	*Allomycterus jaculiferus*	347	0.01
Bronze whaler shark	*Carcharhinus brachyurus*	310	0.01
Mako shark	*Isurus oxyrinchus*	295	0.01
Frigate tuna	*Auxis thazard*	290	0.01
Albacore tuna	*Thunnus alalunga*	232	0.01
Flying fish	Exocoetidae	202	0.01
Thresher shark	*Alopias vulpinus*	185	0.01
Slender tuna	*Allothunnus fallai*	177	<0.01
Salp		138	<0.01
Bigeye thresher shark	*Alopias superciliosus*	80	<0.01
Yellowfin tuna	*Thunnus albacares*	80	<0.01
Frostfish	*Lepidopus caudatus*	73	<0.01
Jellyfish		66	<0.01
Squid	Teuthoidea	52	<0.01
Giant stargazer	*Kathetostoma giganteum*	50	<0.01
Stingray	Dasyatididae	45	<0.01
Pelagic stingray	*Dasyatis guileri*	38	<0.01
Ray's bream	*Brama brama*	30	<0.01
Snapper	*Pagrus auratus*	27	<0.01
Trevally	*Pseudocaranx dentex*	25	<0.01
Leatherjacket	*Parika scaber*	17	<0.01
Smooth skate	*Dipturus innominatus*	15	<0.01
Dolphinfish	*Coryphaena hippurus*	13	<0.01
Pilotfish	*Naucrates ductor*	6	<0.01
Seaweed		5	<0.01
Unidentified		5	<0.01
Kingfish	*Seriola lalandi*	3	<0.01
Rudderfish	*Centrolophus niger*	3	<0.01
Barracouta	*Thyrsites atun*	2	<0.01
Dealfish	*Trachipterus trachypterus*	2	<0.01
Pelagic ray	*Pteroplatytrygon violacea*	2	<0.01
Octopus		1	<0.01
Pale ghost shark	*Hydrolagus bemisi*	1	<0.01
John Dory	*Zeus faber*	1	<0.01
Spotted gurnard	*Pterygotrigla picta*	1	<0.01
Louvar	*Luvaris imperialis*	1	<0.01
NZ northern arrow squid	*Nototodarus gouldi*	1	<0.01
Opah	*Lampris immaculatus*	1	<0.01

Table 13: **Domestic purse seine sets observed as a percentage of sets made for 2005 to 2015.**

Calendar year	No. sets observed	% sets observed	% SKJ catch
2005	37	4.7	4.5
2006	104	17.6	35.5
2007	77	14.8	25.2
2008	118	27.6	57.3
2009	83	10.4	33.1
2010	109	8.8	15.3
2011	125	11.9	23.8
2012	113	9.5	19.7
2013	112	9.2	19.8
2014	95	18.2	15.2
2015	102	19.6	17.5

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 May 2014, the New Zealand albacore troll fishery had its third annual audit and is currently being reassessed in 2016. The domestic skipjack fishery is also seeking MSC certification in 2016. New Zealand continues to advocate for and support work towards refining the limit reference point and adopting a target reference point for south Pacific albacore.

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 2014 most was exported to Spain and Thailand. In 2015 32% of our skipjack tuna was exported to Thailand, and 29% exported to Mauritius. The large purse seine vessels operating in the tropical Pacific unload or tranship their catch in a number of ports including Majuro, Noro, Suva and Pago Pago.

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.

The observer programme is administered by Observer Services within the Ministry for Primary Industries and training courses for new recruits are run generally once or twice a year. The frequency is dependent on attrition of observers and the number of sea-days forecast for the coming fishing year. All observer training is being aligned to fall within the New Zealand Qualifications Authority framework, completion of shore-based training, along with some at-sea assessment, results in observers receiving an internationally recognised qualification.

Prior to each trip observers receive comprehensive briefings along with relevant reference material prior to undertaking any at-sea observation of longline vessels. Observers are provided with an observer manual that includes: details of species identification, what to record for each species caught, biological sampling instructions, and details of operational data to record.

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 108,198 highly migratory fish (53,892 tuna; 7,208 billfish; 35,441 sharks and 14,613 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.

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.

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 three ports on the west coast of New Zealand during the Austral summer (December – May).

Over the duration of the programme over 83,000 albacore have been sampled for length and almost 10% of these were also sampled for weight. In addition, otoliths from smaller fish have been collected for use in other SPC research programmes. 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. For large HMS, fish processors often collect individual processed weight data as part of their operations. This programme is collating these individual fish records from the major processors. 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, list 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 and recent New Zealand research[1] on tuna and tuna-related species include:

Albacore
Stock monitoring of albacore
All HMS and Bycatch
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

[1] This includes some research undertaken independently of the Ministry for Primary Industries

The impacts of climate variability on commercial fish abundance
Climate variability and long-term trends of relevance to NZ fisheries
Ocean acidification: plankton biodiversity & productivity of calcifiers in NZ ocean region
Continuous plankton recorder project: annual transects from East Coast South Island to Ross Sea
Trends in annual acoustic backscatter (mesopelagic fish, plankton) in the Chatham Rise and subantarctic areas
Trophic study of 25 fish species important to deepwater NZ fisheries
Estimation of bycatch and discards in deepwater and middle depth trawl fisheries, longline fisheries, and scampi fisheries
Ecological risk assessment of seamounts
Ecological Risk Assessment for New Zealand fishery interaction with seabirds and mammals
Estimation of protected species captures in longline fisheries using electronic monitoring.
Estimation of the nature and extent of incidental captures of marine mammals in NZ fisheries
Estimation of the nature and extent of incidental captures of seabirds in NZ fisheries.
Estimation of the nature and extent of sea turtles captures in NZ fisheries
Identification of marine mammals captured in NZ fisheries
Modelling of impacts of fishing-related mortality on NZ seabird populations
Modelling the effects of fishing on population viability of selected seabirds
Evaluation of ecotrophic and environmental factors affecting the distribution and abundance of highly migratory species in New Zealand waters
Determination of spatial and temporal movements and trophic linkages of HMS

Great white shark

Electronic tagging of great white sharks

Blue Shark

Post release survival estimation from longline fisheries
Indicator analyses of blue sharks
Age, growth and reproduction of blue sharks

Mako shark

Electronic tagging of mako sharks
Indicator analyses of mako sharks
Age, growth and reproduction of mako sharks

Hammerhead shark

Electronic tagging of hammerhead sharks
Stock dynamics of hammerhead sharks

Porbeagle shark

Electronic tagging of porbeagle sharks
Indicator analyses of porbeagle sharks
Age, growth and reproduction of porbeagle sharks

Skipjack

Evaluation of the distribution and abundance of skipjack tuna in New Zealand waters

Southern bluefin

Catch-at-age of southern bluefin tuna

Striped Marlin

Stock monitoring of striped marlin

Manta rays

Post release survival experiments from purse seine nets

Customary research

Rapid assessment of iwi fish utilisation

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 are described below with further details provided in Appendix 1.

Catch and effort data

Catch, fishing effort, operational data and vessel information are collected on logsheets provided by each permit holder to the Ministry for Primary Industries. Tuna fisheries generally use either a Catch Effort Landing Return (CELR) or a Tuna Longline Catch Effort Return (TLCER). CELR forms are completed for each day of fishing for various gear types (e.g. handline, troll, purse seine and some longline) while TLCER forms are used only for surface longlining for tunas, and are filled out for each set. The forms are submitted monthly by the 15th of following month and the data are captured and stored on an electronic database.

Tuna landings data are compiled from the Licensed Fish Receiver Returns (LFRR) filed monthly by each Licensed Fish Receiver and Monthly Harvest Returns (MHR) filed by the fishing permit holder. Additional information on catch composition, length and weight, sex ratio, discard and on loss rate of fish, are collected by staff from the Ministry for Primary Industries Observer Programme.

Tuna fisheries catch and effort data have been collected by the Ministry for Primary Industries and its predecessor since at least 1976. CELR and TLCER data are available beginning with the third quarter of 1989 (start of the 1989–90 fishing year).

Monthly harvest return data

Monthly Harvest Returns (MHR) provide a record of the total catch (monthly harvest) taken by each fisher (permit holder), by fishstock for each calendar month. If there is no catch taken in a month then a nil return is required. The forms are submitted monthly by the 15th of the following month. These data have been collected on these forms since October 2001. Prior to 2001 similar data (but for quota species only) are available from the Quota Monitoring Returns (QMR) system.

Licensed fish receiver data

All New Zealand Licensed Fish Receivers are required to submit monthly returns (LFRRs). These returns record the quantity of each species the LFR has received from each source (permit holder) for each month. The LFRR data set provides complete coverage of all species that are landed legally in New Zealand, with some minor exceptions. Licensed Fish Receivers must submit a return within 15 days after the last day of the calendar month. If no fish have been received in a month then a nil return is required. Both QMS and non-QMS species are reported in this system. Fish that are not landed to a Licensed Fish Receiver (such as fish that are discarded or sold to the public at the wharf) are not reported through this system. Discarded fish & wharf sale fish are recorded on the landing section of a Catch Effort Landing Return or on a Catch Landing Return.

These data have been collected on these forms since January 1986.

Out of the New Zealand EEZ purse seine data
The large purse seine vessels fishing on the high seas and the zones of other countries typically fill in the regional purse seine catch effort form, or the variant used in the country in which they are fishing. When fishing in other zones, logsheets are submitted to the coastal state, who then submits them to SPC. The Ministry for Primary Industries also receives a copy from the vessel and these data are currently maintained within a database managed by the National Institute of Water and Atmospheric Research (NIWA). Each year, New Zealand coordinates with SPC to ensure that they have copies of all logsheets filled during the year.

Non-fish bycatch data
Since 2008 fishers have been required to complete a non-fish protected species bycatch reporting form to record any interactions with non-fish bycatch. Fishers are required to record incidental catches of seabirds, marine mammals, marine reptiles, corals, sponges, bryozoans, and fish species that are protected under the Wildlife Act 1953.

The form is linked to the catch effort return so that fishers do not need to duplicate information already reported. Fishers are required to report to the species level if they are able to identify the incidental catch, but if not generic group codes are permitted. Corals, sponges and bryozoans are reported by estimated weight and all other species are reported by number of individuals. The count of individuals includes whether the animals were alive and uninjured, alive and injured, or dead. Definitions of what "injured" means are provided. The Ministry for Primary Industries has prepared a species identification guide that has been distributed to fishers to assist them in their reporting obligations.

Completion of the form is a requirement under the Fisheries (Reporting) Regulations 2001. Fishers are required to use these forms to report, they must do so by a due date and may be penalised for misreporting.

Purse seine operators have agreed to apply purse seine provisions of FAO guidelines with respect to sea turtle handling and mitigation and the provisions of CMM 2008-03 by way of a code of practice.

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

As noted above, 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 coverage rate for the longline fishery is 10% of effort, which should reflect approximately 10% of the HMS catch. The coverage of the domestic component of the longline fleet is lower than the charter coverage (Table 14). Japanese longline vessels operating under charter arrangements have always carried observers, but because of the long haul time of these vessels it is not possible for these observers to observe all hooks set. As the composition of the domestic fleet becomes more stable reaching the 10% observer target for this component of the fleet will be more achievable.

Table 14: Hooks observed from the New Zealand longline fishery as a percentage of hooks set.

Calendar year	Domestic	Charter (Japanese)	Charter (Aust.)	Total
2004	2.4	90.8		21.6
2005	4.8	88.1		18.7
2006	3.2	88.7	83.0	18.0
2007	7.0	54.7	25.3	25.2
2008	9.2	44.7		18.2
2009	7.2	81.3		26.0
2010	6.9	80.9		18.7
2011	6.2	73.5		17.1
2012	5.9	84.1		20.0
2013	3.8	78.0		16.9
2014	6.9	83.5		27.0
2015	6.9	80.8		25.9

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 74%, 89%, and 98% of the total landed catch in 2014 of swordfish, bigeye tuna and yellowfin tuna respectively, and is incomplete for 2015 (Table 15). The number of striped marlin caught by fleet are presented in Table 16. 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 17).

Table 15: Number and percent of swordfish and large tunas sampled for calendar years 2014and 2015. Results for 2015 preliminary.

Calendar		Numbers of fish sampled			Percentage of catch	
Year	**Swordfish**	**Bigeye tuna**	**Yellowfin tuna**	**Swordfish**	**Bigeye tuna**	**Yellowfin tuna**
2014	6333	1716	50	74	89	98
2015	7283	2511	157	77	53	36

Table 16: Commercial landings and discards (both are numbers of fish) of striped marlin in the New Zealand EEZ reported by fishing nation (CELRs and TLCERs), and number of fish landed and tagged by the recreational fleet, by fishing year.

Fishing	Japan	Japan	Korea	Philippine	Domestic	NZ Recreational		Total
Year	Landed	Discarded	Landed	Discarded	Discarded	Landed	Tagged	
2000-01					527	422	851	1 800
2001-02					225	430	771	1 426
2002-03		3		7	205	495	671	1 371
2003-04		1			423	592	1 051	2 066
2004-05					258	834	1 348	2 440
2005-06					168	630	923	1 721
2006-07					154	688	964	1 806
2007-08		1			208	485	806	1 499
2008-09		1			241	731	1 058	2 030
2009-10					195	607	858	1 660
2010-11					269	607	725	1 601
2011-12					241	635	655	1 531
2012-13		1			227	730	745	1703
2013-14					202	620	478	1300
2014-15					371	696	953	2020

Table 17: Transhipment Information for New Zealand vessels for 2014.

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)	2277	In Port	Inside	Inside	Frozen Whole	Purse Seine
Yellowfin tuna (YFN)	227	In Port	Inside	Inside	Frozen Whole	Purse Seine
Bigeye tuna (BET)	215	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)	3	In Port	Inside	Inside	Purse Seine
Yellowfin tuna (YFN)	3	In Port	Inside	Inside	Purse Seine
Bigeye tuna (BET)	3	In Port	Inside	Inside	Purse Seine

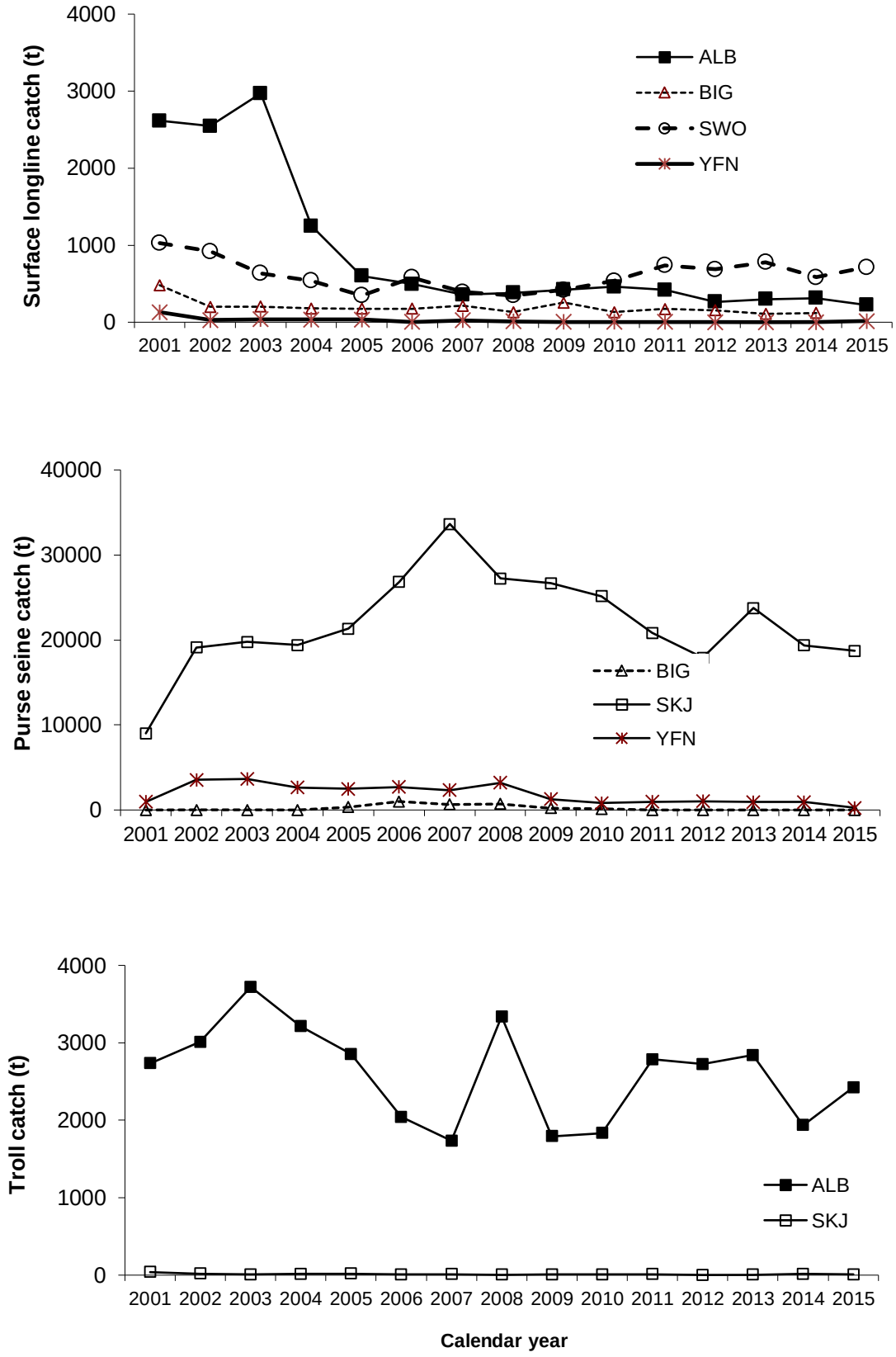

Figure 1: Historical catch (t) by gear and main species for the New Zealand longline, purse-seine and troll fleets operating in the WCPFC Convention area.

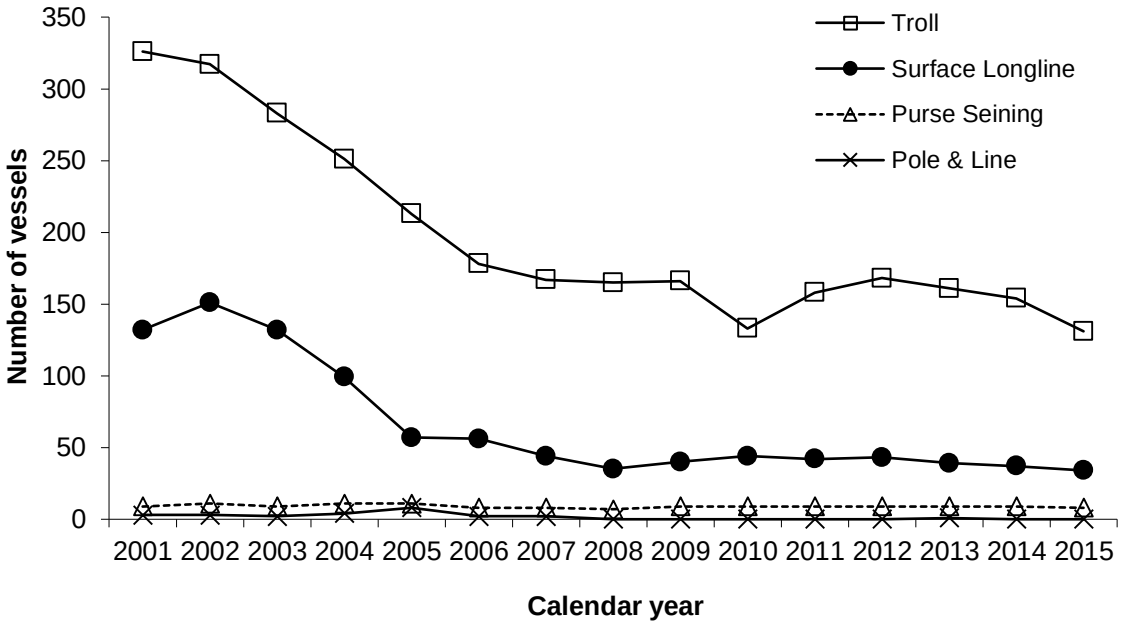

Figure 2: Historical annual vessel numbers for the New Zealand longline, purse seine, troll and pole and line fleets by gear fishing in the WCPFC Convention area. Vessels switch gear seasonally and may be included in more than one category.

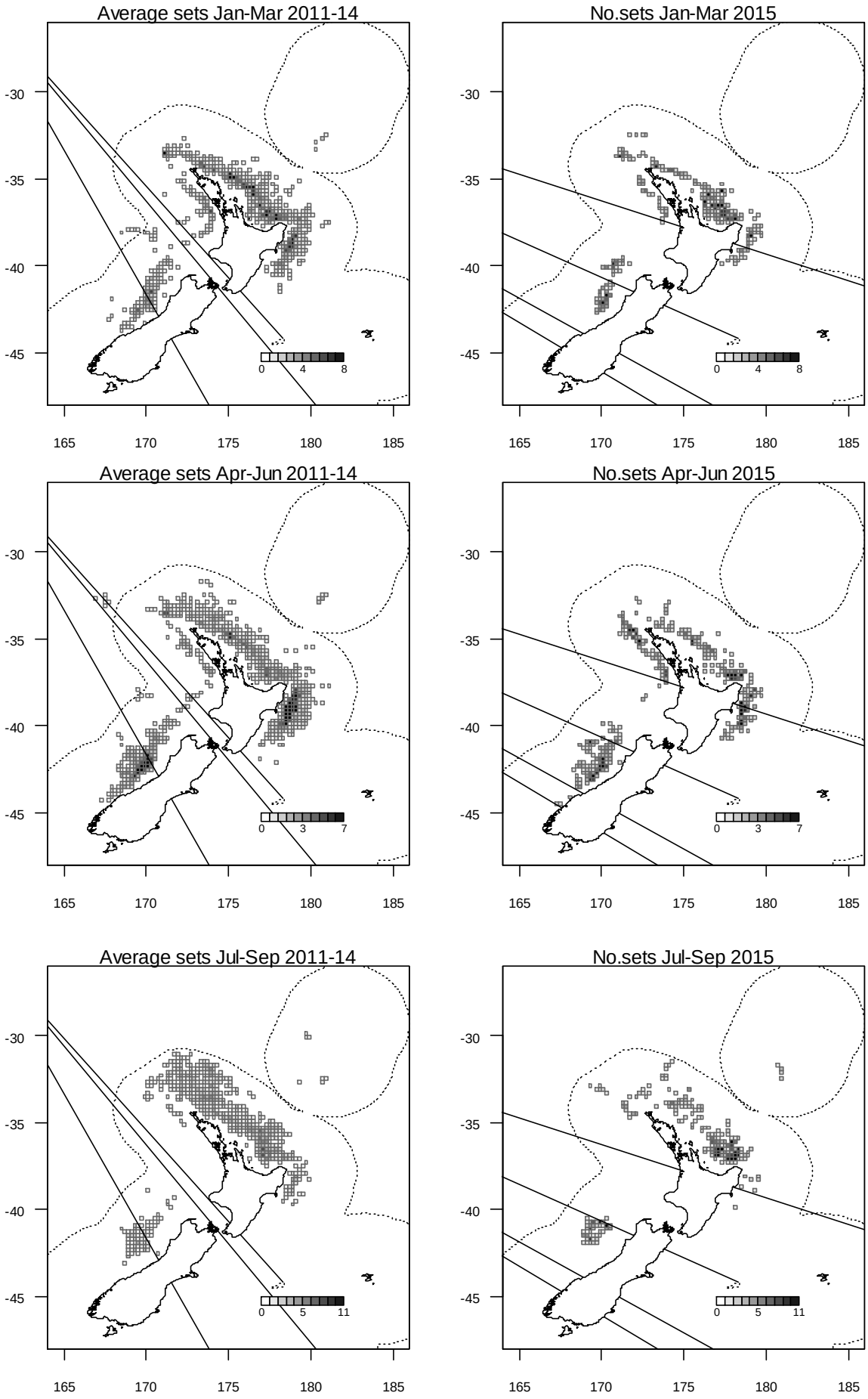
Average sets Jan-Mar 2011-14
No.sets Jan-Mar 2015
Average sets Apr-Jun 2011-14
No.sets Apr-Jun 2015
Average sets Jul-Sep 2011-14
No.sets Jul-Sep 2015
-30
-35
-40
-45
165
170
175
180
185
0
4
8
3
7
5
11

Figure 3: Distribution of effort (number of sets per 1/5 degree square) for the domestic longline fleet by quarter-year for 2011-2014 (average) and 2015 (actual).

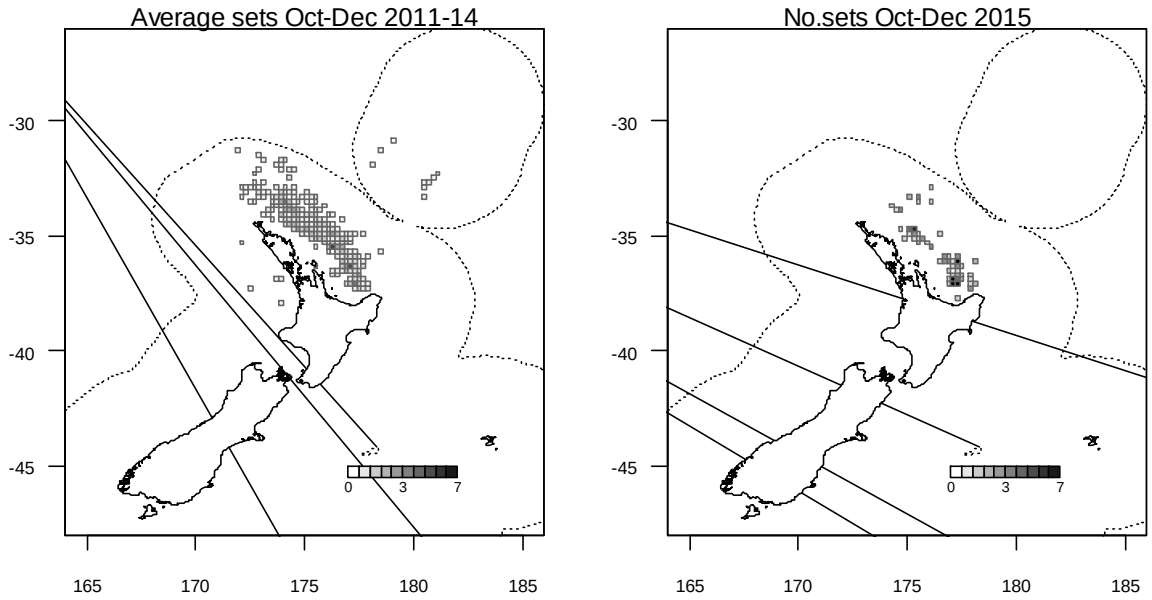

Figure 3 (continued): Distribution of effort (number of sets per 1/5 degree square) for the domestic longline fleet by quarter-year for 2011-2014(average) and 2015 (actual).

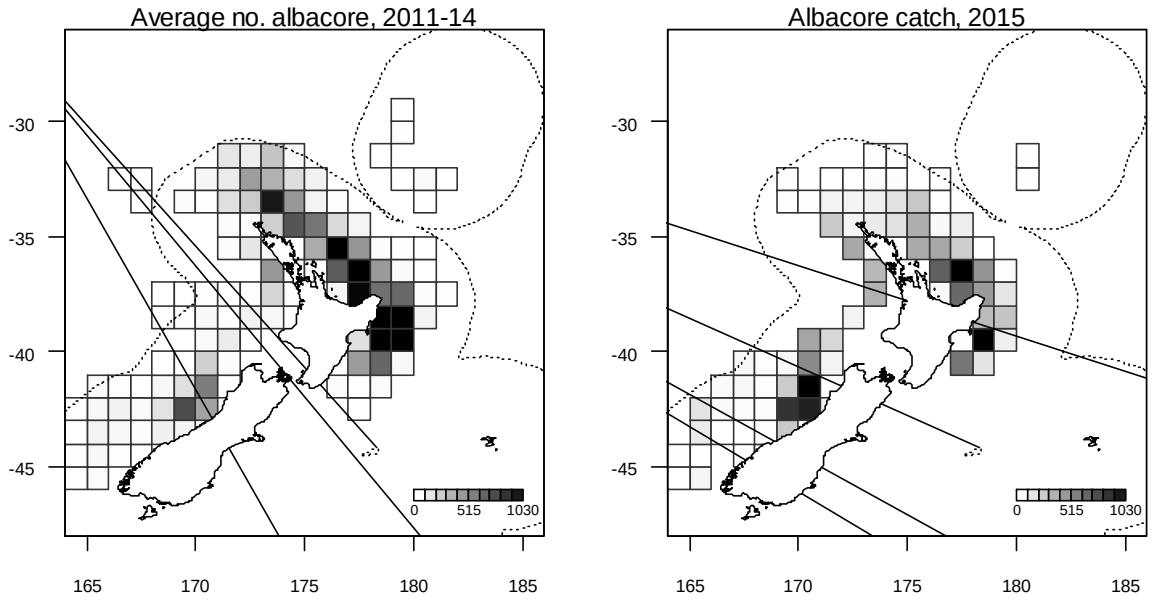

Figure 4: Distribution of longline catch (number of fish in 1 degree squares) for albacore, bigeye, and yellowfin tunas, and swordfish for 2011 to 2014 (average), and for 2015 (actual). All months and all vessels combined.

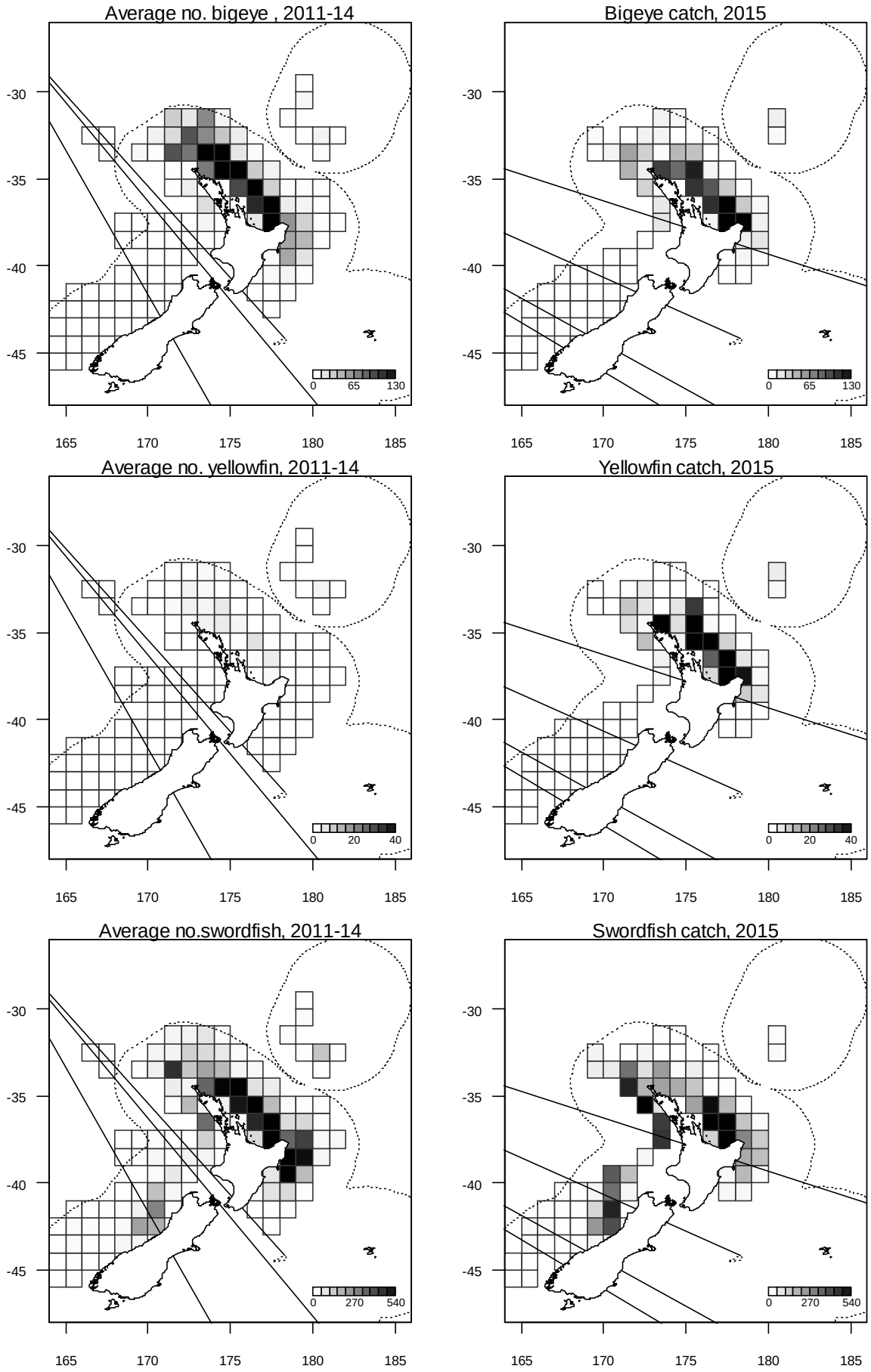
Average no. bigeye , 2011-14
Bigeye catch, 2015
Average no. yellowfin, 2011-14
Yellowfin catch, 2015
Average no.swordfish, 2011-14
Swordfish catch, 2015
-30
-35
-40
-45
165
170
175
180
185
0
65
130
20
40
270
540

Figure 4 (continued): Distribution of longline catch (number of fish in 1 degree squares) for albacore, bigeye, and yellowfin tunas, and swordfish for 2011 to 2014 (average), and for 2015 (actual). All months and all vessels combined.

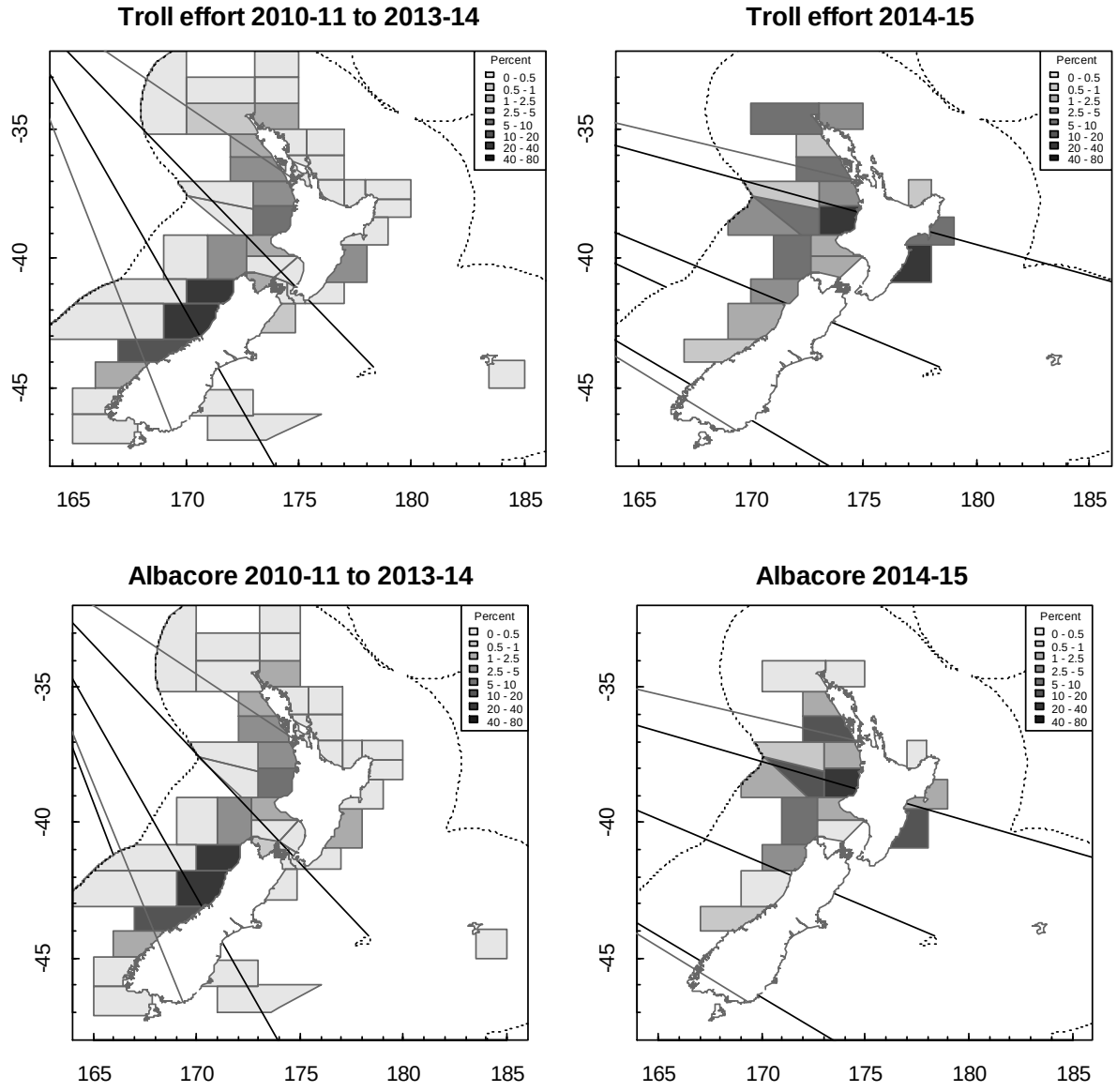

Figure 5: Distribution of troll effort (percent of vessel-days) and troll catch of albacore (percent of total catch) for 2010-11 to 2013-14 troll seasons (left) and for 2014-15 season (right); Note: Positional data for troll are reported at a NZ statistical area resolution.

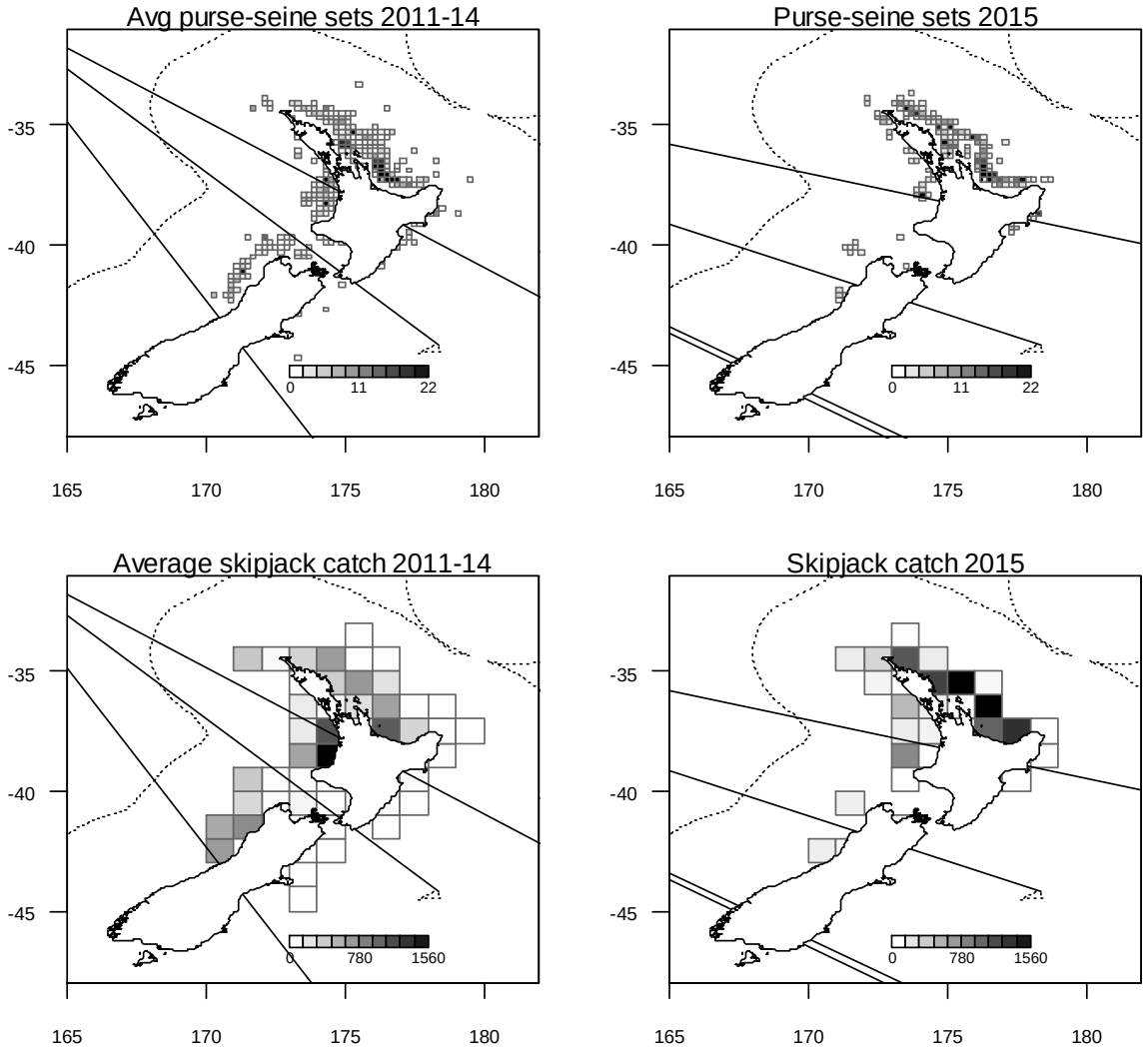

Figure 6: Distribution of purse-seine effort (number of sets per 1 degree square) and purse-seine catch of skipjack (tonnes per 1 degree square), average for 2011-14 calendar years (left) and actual for 2015 (right).

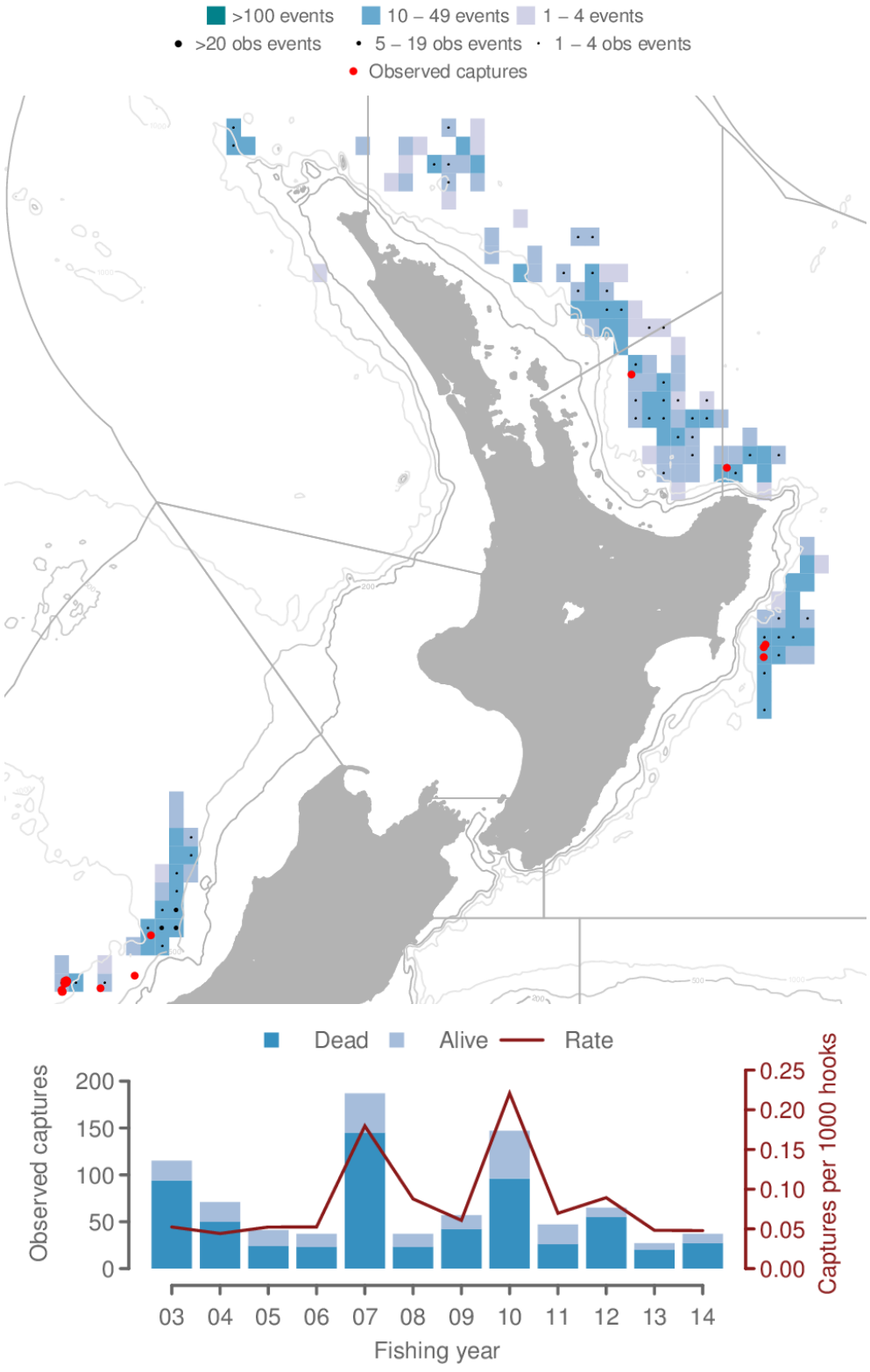

Figure 7: All sea bird captures in surface longline fisheries. Top - Mapped effort and captures from 2013–14 fishing year; and bottom - Observed seabird captures and capture rates. For methods see Abraham, E.R.; Thompson, F.N. (2011). Summary of the capture of seabirds, marine mammals, and turtles in New Zealand commercial fisheries, 1998–99 to 2008–09. *New Zealand Aquatic Environment and Biodiversity Report No. 80. 170 pp.*

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	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	January 1980 to June 1995 (foreign	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).

Catch Effort Return)	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.	licensed vessels) March 1989 onwards (charter vessels) March 1991 onwards (domestic vessels)	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.