New Zealand Country Report: Ecologically Related Species in the New Zealand Southern Bluefin Tuna Longline Fishery

Prepared for ERSWG10

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1. INTRODUCTION

Since the start of New Zealand's domestic southern bluefin tuna (SBT) fishery, handline, trolling and longline have been used to target SBT in the New Zealand Exclusive Economic Zone (EEZ). Typically all but a few tonnes of the domestic SBT catch is now taken by longline, with some variable troll catches including 5.6t in 2012.

SBT is seasonally present in New Zealand from March/April to August/September. Fishing takes place in two areas, off the east coast of the North Island north of 42^{o} S and off the west coast of the South Island south of 42^{o} S. The distribution of SBT catches is shown in Figure 1 (domestic fishery) and Figure 2 (charter fleet).

Longlining off the west coast of the South Island is almost entirely targeted at SBT. The fleet operating off the southwest coast is primarily composed of the larger –60º freezer vessels of the charter fleet. The generally heavier weather conditions off the west coast of the South Island compared to the east coast of the North Island means that fewer of the smaller domestic owned and operated vessels operate in this area. Smaller domestically owned and operated "ice boats" operate in the longline fishery off the east coast of the North Island. These vessels are typically at sea for only a few days, and land SBT both as a target and as a bycatch of bigeye target sets.

Non-target fish species such as sharks, Ray's bream, albacore and dealfish are caught in large numbers as bycatch on tuna longlines. Ten taxa of seabirds were recorded as incidental catches during 2009-10 and 5 taxa in 2010-11, with conservation status of the species ranging from Endangered to Least Concern. New Zealand fur seals were captured during fishing for SBT during 2009-10 through 2011-12, almost all of which were released alive. Whales and sea turtles also interact with surface longline fisheries for SBT from time to time, although such interactions are rare.

New Zealand has a new National Plan of Action (NPOA) in place for seabirds and is currently reviewing its NPOA for sharks. Actions to implement the NPOA Seabirds 2013 are underway. The new NPOA Sharks is expected to be finalised in 2013. Mandatory seabird mitigation measures are in place, in line with agreements in the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) and the Western and Central Pacific Fisheries Commission (WCPFC). Surface longline vessels also carry turtle mitigation equipment (line cutters, de-hookers, and nets).

Appendix I provides a brief summary of the papers submitted by New Zealand to ERSWG 10.

2. REVIEW OF SOUTHERN BLUEFIN TUNA FISHERIES IN THE NEW ZEALAND EXCLUSIVE ECONOMIC ZONE

Fleet Size and Distribution

Annual Fleet Size and Distribution

Longline fishing targeting SBT primarily occurs off the west coast of the South Island south of 42º S and along the east coast of the North Island north of 42º S. SBT also comprises a bycatch

in the bigeye target fishery in the Bay of Plenty. Figure 3 (domestic fishery) and Figure 4 (charter fleet) show the distribution of SBT effort.

The number of vessels fishing by surface longline peaked in 2002 and then declined to a low of 35 vessels in 2008, and has since increased again to 44 in 2011-12 most of which are small vessels (< 50 GRT). In 2005 and 2006 only two charter vessels fished for SBT in New Zealand fisheries waters, but this increased again to four in subsequent years.

Historical Fleet Size and Distribution

The New Zealand SBT fishery began off the west coast of the South Island as a winter small boat handline and troll fishery in the early 1980s. Most fishing by these vessels was in July and August. Since 1990, however, these methods have comprised only a minor component of the fishery as longline vessels had generally caught the SBT quota by the time the handline fishery started.

During the 1980s to mid-1990s most longlining was conducted by foreign licensed longliners from Japan. However, declining catch rates, shortened seasons of availability and reports of increased operating costs in the EEZ resulted in the foreign licensed fleet ceasing operations in 1995. Domestic longlining began in 1991 and steadily increased to over 150 vessels in 2002 before declining to a low in 2008, with a small increase thereafter.

Distribution of Catch and Effort

Table 1 gives the total estimated SBT catch by gear type since 1999. With the advent of domestic longline fishing (starting in 1991), longline effort has almost completely replaced fishing effort by trolling and handline. A small occasional SBT bycatch still occurs in other fisheries including troll and midwater trawl fisheries (see Table 1). Table 2 summarises total SBT catches by calendar year and New Zealand fishing year (1 October to 30 September).

The charter fleet primarily operates off the west coast of the South Island while smaller domestic owned and operated vessels primarily operate off the east coast of the North Island (see Figure 3 and Figure 4). The fishing season for SBT is essentially the same for both areas and generally begins in April/May and finishes in July/August.

3. FISHERIES MONITORING

Observer Coverage

Recent Observer Coverage

New Zealand has a scientific Observer Programme that covers both domestic and charter longline vessels. In most years, all trips made by the charter vessels are covered by at least one observer. The target coverage level for the domestic fleet is 10% of the effort to reflect 10% of the catch.

Coverage is measured in two ways, proportion of catch (in numbers of fish) observed (Table 3) and proportion of hooks observed (Table 4). In terms of catches, around 81% of the catch was

observed (and measured) in the charter fleet in 2011 and around 80% in 2012. For the domestic fleet, 8% of the catch was observed in 2011 and 9% in 2012.

In terms of effort, 74% of hooks were observed on the charter vessels in 2011, and 84% in 2012. For the domestic fleet 8% of the effort was observed in 2011 and 7% in 2012. Despite efforts to improve coverage in recent years, the small size of domestic owned and operated vessels and short trips can make it difficult for MPI to realise the 10% target for observer coverage in this fleet.

Because only one observer is present on the vessel, and the observer takes breaks during the long hauling process on the Charter vessels, it is not possible to observe all hooks on these vessels. The observer accurately reports the portions of the haul that are not observed. The proportion of the catch observed is higher than hooks observed because some unobserved catches are recorded (and sometimes measured) as they are available to the observer after their break. Unobserved catches which are measured are noted.

Observer Collection of Information

Biological Information

Observers from the scientific Observer Programme are responsible for collecting biological data on SBT and bycatch data for catch characterisation.

Length, weight (both processed and whole weights) and sex are recorded regularly for SBT and all major fish bycatch species.

Full biological information is recorded for non-fish species (e.g. seabirds, turtles, marine mammals).

Fish Bycatch Estimates

Data from the Observer Programme are used to quantify the extent of fish bycatch caught on tuna longlines in New Zealand waters. These data provide information on which species appeared as bycatch, the catch per unit effort (CPUE) of the most common species, and estimates of total catch.

Other Data Collection

Southern Bluefin Tuna

From 1 October 2004, when SBT was introduced into the quota management system (QMS), the catch monitoring and catch balancing systems in place for all other New Zealand quota species were applied to SBT. All fishers are required to furnish monthly returns of catch (in addition to furnishing log books). These monthly returns are then matched to individual holdings of catch entitlement. Financial penalties apply to fishers (on a monthly basis) who catch SBT in excess of their catch entitlement. Fishers have the opportunity to reconcile their catch entitlements up until the end of the fishing year and if they do not do so the financial penalties increase.

Fish Bycatch

Quota Species

The main fish species associated with the SBT fishery within the New Zealand EEZ were introduced into the QMS on 1 October 2004. All fishers are required to furnish monthly returns of catch for these associated species (in addition to furnishing log books). Financial penalties apply to fishers who do not furnish returns, or whose catch exceeds their annual catch entitlements.

The total allowable catch of each of the main fish bycatch species associated with New Zealand's SBT longline fishery is presented in Table 5.

Non-quota Species

Some species caught as bycatch in the SBT fishery are not managed under the QMS. Examples include albacore and striped marlin. However, fishers are required to report the catch of all retained species, including any non-QMS species, when furnishing their monthly returns. As a result, the commercial reporting requirements provide information on total catch and effort of fish bycatch in the SBT fishery. For additional information on quota and non-quota species bycatch, see section 5 further below.

4. SEABIRDS

From early 2013 data describing seabird captures in New Zealand fisheries are available on a public website (http://data.dragonfly.co.nz/psc/). The website provides a summary of protected species captures in trawl and longline fisheries, from the 2002–03 to 2010–11 fishing year (fishing years run from October 1 to September 30). At ERSWG9 New Zealand presented data up to 2008-09. In this report we present data for 2009-10 and for 2010-11. Preliminary data for the 2011 and 2012 calendar years are presented in Table 7. Mandatory and voluntary mitigation measures are described in section 7 further below.

Seabird captures in 2009-10 and 2010-11

In the 2009–10 fishing year, there were 112 observed captures of birds in SBT longline fisheries (Figure 5). Observed captures were of southern Buller's albatross (69), New Zealand white-capped albatross (30), white-chinned petrel (3), Westland petrel (3), Campbell black-browed albatross (2), wandering albatrosses (1), wandering albatross (1), smaller albatrosses (1), grey petrel (1), and Antipodean albatross (1) (Abraham and Thompson 2012a).

In the 2010–11 fishing year, there were 32 observed captures of birds in SBT longline fisheries (Figure 5). Observed captures were of southern Buller's albatross (25), New Zealand white-capped albatross (3), white-chinned petrel (2), Gibson's albatross (1), and Cape petrels (1) (Abraham and Thompson 2012b).

The birds were landed both dead and alive (Figure 5) and this indicates that birds were caught both at the set and during the haul, and mitigation techniques need to be applied during both parts of the fishing operation to avoid seabird captures. Seabirds are caught across virtually all areas in which the fishery occurs (Figures 6 and 7). Fishing effort is highly seasonal, with a peak

in May/June and the season finishing in August (Figure 8). The observer coverage generally follows the same pattern and observed captures follow a similar pattern (Figure 8).

Seabird bycatch estimates for 2009-10 and 2010-11

As observers are only present on some fishing vessels (Figure 9), to estimate total captures in a fishery it is necessary to use statistical methods to extrapolate from the observed fishing to the unobserved fishing. The total observable captures are an estimate of the captures that would have been reported, had observers been present on all fishing vessels. There may be additional mortalities (such as birds that are struck by fishing gear but not brought on board the vessel) that are not recorded by observers. These are referred to as 'cryptic mortalities' and are not included in the estimates of total captures, nor is there any evaluation of potential survival of seabirds recorded as captured but subsequently released alive. The methods used for the estimation follow those described in technical reports on bycatch estimation for seabirds (Abraham and Thompson 2011, Abraham et al. 2013).

The proportion of hooks observed across the total fishery was around 40% in 2009-10 and 2010-11 (Figure 9).

For 2009-10 it was estimated by a statistical model that there were a total of 309 (95% c.i.: 249–392) captures in SBT longline fisheries (Figure 10) (Abraham et al. 2013). For 2010-11 it was estimated by a statistical model that there were a total of 167 (95% c.i.: 123–228) captures in SBT longline fisheries (Figure 10) (Abraham et al. 2013).

5. NON-TARGET FISH

This section summarises fish catches taken in tuna longline sets that either targeted or caught SBT. Species marked with an * are subject to catch limits under the QMS. Numbers of fish observed, and estimated numbers scaled from observer to the commercial fishing effort during the 2011 and 2012 calendar years are shown in Table 6. Catch per unit effort is also shown in Table 6. The scaled estimates provided for the domestic fleet can be considered less reliable than those of the charter fleet as they are based on lower observer coverage (Tables 3 and 4).

The species most commonly caught were blue shark* (*Prionace glauca*), Ray's bream* (*Brama brama*), and albacore (*Thunnus alalunga*).

Other non-target fish caught in relatively large numbers were (in descending order of abundance for the 2011 and 2012 years combined) porbeagle shark* (*Lamna nasus*), deepwater dogfish* (Squaliformes of various species, mostly Owstons dogfish), lancetfish (*Alepisaurus ferox* & *A. brevirostris*), swordfish* (*Xiphias gladius*), mako shark* (*Isurus oxyrinchus*), dealfish (*Trachipterus trachypterus*), escolar (*Lepidocybium flavobrunneum*), moonfish* (*Lampris guttatus*), sunfish (*Mola mola*), butterfly tuna (*Gasterochisma melampus*), bigscale pomfret (*Taractichthys longipinnis*), oilfish (*Ruvettus pretiosus*), and rudderfish (*Centrolophus niger*).

The next most abundant non-target fish species were, Pelagic stingray (*Pteroplatytrygon violacea*), school shark* (*Galeorhinus galeus*), thresher shark (*Alopias vulpinus*), and flathead pomfret (*Taractes asper*). Some other non-target tunas and billfish were caught in 2011 and

2012, including Pacific bluefin tuna* (*Thunnus orientalis*), skipjack tuna (*Katsuwonus pelamis*), and striped marlin (*Tetrapturus audax*). There were no observed captures of yellowfin tuna* (*Thunnus albacares*), a species formerly seen in the top 25 (CCSBT-ERS/1203/Annual Report - New Zealand).

Bycatch composition from the charter fleet and the domestic fleet is different. This is likely to be due to differences in waters fished, with the charter fleet mostly operating in southern waters, and the domestic vessels fishing primarily in waters north of about 40°S.

In both years the charter fleet fished predominately off the West Coast of the South Island, with 2 sets targeting bigeye in the north at the end of their fishing season and their catch composition was similar in both years.

In both 2011 and 2012, blue shark, Ray's bream, and albacore were predominant in the catches, with these three species making up 70% of the catch. Charter vessels caught mostly blue sharks and Ray's bream, with Ray's bream the most abundant species in the catch in 2011 and blue sharks higher in 2012. Blue sharks dominated the catches of the domestic vessels, followed by albacore.

Dealfish and deepwater dogfish were caught in the south by charter vessels, while domestic vessels caught porbeagle sharks, lancetfish, swordfish and mako sharks. Both fleets caught moonfish and butterfly tuna. Domestic vessels caught oilfish and escolar in the north, which were absent from charter catches. Charter vessels caught bigscale pomfret, rudderfish and flathead pomfret in the south, which were almost absent from domestic catches, although these species were seen in lower numbers than seen in previous years.

Observers onboard both the charter and domestic fleets reported on fish that were caught and subsequently discarded, and fish that were lost before they could be brought aboard the vessel. Observers also recorded whether fish were landed alive or dead (see Table 7 for shark data).

Since their introduction into the QMS, most Ray's bream and moonfish have been retained. Blue, porbeagle and mako sharks have also been discarded less frequently since their introduction into the QMS. There were some differences between the domestic and charter fleet, with the charter fleet more likely to retain sharks. While most quota species must be retained, legislative provision exists for vessels to release blue, porbeagle, and mako sharks if alive and likely to survive. Similar provisions apply to SBT and swordfish.

The charter fleet retained most of its blue, mako, and porbeagle shark catches. Domestic vessels released or discarded much of their catch of these shark species. School shark was normally retained and thresher sharks were usually discarded although some were kept by the charter vessels.

Tunas (other than butterfly tuna) and swordfish were seldom discarded. The charter vessels kept most of the butterfly tuna they caught while domestic vessels retained about two thirds of it. Almost all of the lancetfish, deepwater dogfish, dealfish, and sunfish caught were discarded. Charter vessels discarded oilfish and rudderfish, and escolar, while domestic vessels retained the majority of oilfish, rudderfish, and escolar. Charter vessels kept about half of their bigscale pomfret.

SBT that were discarded dead were typically damaged, while live discards were mostly small fish. New Zealand makes allowance in its total allowable catch for SBT for 'other sources of fishing-related mortality', including any such discards. Most of the sharks that were discarded were alive when they were landed, although some dead sharks were discarded by domestic vessels. Porbeagle sharks did not survive as well on longlines as the other sharks. Most of the albacore, butterfly tuna, and swordfish discarded by the domestic vessels were dead when landed. The majority of the other fish bycatch species that were commonly discarded were landed alive, except for lancetfish and dealfish that were usually dead.

Observers record life status on landing but they do not record if live fish are still alive at time of discard. Fish that are landed alive and subsequently discarded are not necessarily returned to the sea alive. Many fishers retrieve their hooks prior to discarding fish and this often damages the fish and reduces its ability to survive. Some species such as dealfish do not survive the de-hooking process. As noted, while most quota species must be retained, exceptions exist for some species where they are alive and likely to survive. Non-quota species may be discarded dead or alive.

6. MARINE MAMMAL AND MARINE REPTILE BYCATCH

From late 2013 data describing all protected species captures in New Zealand fisheries will be available on a public website. The website will provide a summary of all protected species captures in trawl and longline fisheries, from the 2002–03 to 2010–11 fishing year (fishing years run from October 1 to September 30). At ERSWG9 New Zealand presented data for marine mammals and marine reptiles up to 2008-09. In this report we present data for 2009-10 and for 2010-11. Preliminary data for marine reptiles for the 2011 and 2012 calendar years are presented in Table 7.

Reporting and mitigation requirements relating to marine mammal and marine reptile bycatch are described in section 7.

Marine mammals

In the 2009–10 fishing year, there were 19 observed captures of New Zealand fur seals (*Arctocephalus forsteri*) in SBT longline fisheries (Figure 11). In the 2010–11 fishing year, there were 17 observed captures of New Zealand fur seals (*Arctocephalus forsteri*) in SBT longline fisheries (Figure 11). No estimates of total captures were made for either year. All fur seals in were released alive in 2009-10. In 2010-11 there were two fur seals reported dead. Fur seals are caught across virtually all areas in which the fishery occurs. Fishing effort is highly seasonal, with a peak in May/June and the season finishing in August (Figure 8). The observer coverage generally follows the same pattern and observed captures follow a similar pattern (Figure 8).

No other marine mammal captures were observed during fishing for SBT in 2009-10 or 2010-11 (Figure 12).

Marine reptiles

Marine reptiles are rarely encountered in New Zealand waters (Figure 13). None were observed caught in 2009-10 during fishing for SBT. In the 2010–11 fishing year, there were three

observed captures of turtles in SBT longline fisheries. Observed captures were of Leatherback turtle (2), and Olive ridley turtle (1). All were caught on the east coast of the North Island. All were released alive. No estimates of total captures were made.

7. MITIGATION MEASURES TO MINIMISE SEABIRD AND OTHER SPECIES BYCATCH

Current measures

Mandatory seabird measures for each fleet

Tori lines are mandatory as a mitigation measure in place to avoid capture of seabird species for tuna longliners in New Zealand waters. The use of tori lines was regulated in 1993. Specifications of the required minimum tori line refer to its length and attachment point, as well as the number, size and distance between streamers. These specifications were updated in 2011 to bring them in line with agreements reached in the Western and Central Pacific Fisheries Commission (Appendix II). These specifications are currently again being updated to bring them in line with more recent agreements reached in the Western and Central Pacific Fisheries Commission. In addition, fishers must set their lines at night, or, if fishing during the daytime, use approved line weighting.

Similar provisions are also outlined in high seas permit conditions for any New Zealand vessels fishing on the high seas.

Compliance with these measures is monitored through at-sea and in-port inspections from Fisheries Officers, aerial surveillance from military aircraft, and the placement of observers on board vessels. Observer reports indicating problems with use of mitigation equipment are prioritised for follow-up with vessel operators.

In the 2012 calendar year, 4 incidents were recorded where breaches of seabird mitigation regulations may have occurred across the New Zealand surface longline fleet. None of these breaches were considered serious enough to warrant prosecution and they were dealt with by issuing a warning to the operators involved; it is also unlikely that any of the breaches was by a vessel targeting SBT.

Voluntary seabird measures for each fleet

Voluntary mitigation measures stipulated in any formal way are done so through Codes of Practice. A Code of Practice is in place for domestic tuna vessels (see Appendix II in CCSBT-ERS/1203/Annual Report - New Zealand). For charter vessels operated through the New Zealand Japan Tuna Co. Ltd., a Code of Practice is in place that stipulates a range of additional measures that can be used to reduce seabird captures. The specific measures used vary both from vessel to vessel, and in response to specific circumstances (e.g. in response to seabird captures), but include:

- One or two additional tori lines, which can help maximise the coverage of tori lines over the baited hooks;
- Various line weighting regimes;

- Bait casters (these are not a mitigation device per se but can help distribute hooks within the zone covered by the tori line);
- Offal retention;
- Particular attention to the need for and importance of mitigation measures over the period of the full moon, when captures are most likely;
- Haul mitigation including water cannons or hoses and bird curtains; and
- A catch limit for 'at risk' species of birds.

In addition, vessels are encouraged to try out mitigation methods they believe may be effective. It is also noted that vessels may need to deploy additional mitigation devices at times of high risk such as immediately before and after the full moon.

Compliance with voluntary measures is not currently recorded as part of inspection reports and therefore it is not possible to estimate the level of uptake amongst the fleet. The Code of Practice does, however, have the support of relevant commercial fishing organisations that encourage their members to abide by the measures.

Measures under development - measures to improve the safety of line weighting

The Ministry for Primary Industries, in conjunction with Birdlife International, is trialling the use of safe lead weights in the surface longline fishery to assess their effect on fish catches as well as their safety for fishers. Their effectiveness as a mitigation measure has been demonstrated elsewhere, although this will also form a component of the trials. Fisher safety represents a barrier to greater uptake of line weighting in New Zealand at present. It is anticipated the results of the trials could be presented to the next meeting of the ERSWG.

Protected species measures

All marine mammals, marine reptiles, and almost all seabird species are afforded 'protected species' status under New Zealand legislation. Certain fish species may also be afforded protected status. For example, various shark species identified as being unable to sustain any utilisation are protected under both the Wildlife Act 1953 and the Fisheries Act 1996 (great white shark, basking shark, and, from 2013, oceanic whitetip shark), or under just the Wildlife Act (deepwater nurse shark, whale shark, and manta and devil ray). The Wildlife Act protects species in New Zealand fisheries waters, whereas the powers of the Fisheries Act can be applied to New Zealand-flagged fishing vessels and nationals to extend protection to the high seas.

Take of protected species is prohibited; any accidental captures must be released, with effort taken to ensure the survival of the protected species where possible. To aid the safe release of protected species in surface longline fisheries, MPI and the Department of Conservation have made available de-hookers and line cutters. While this equipment is designed primarily for releasing turtles, it can be used for a wide range of species including larger fish and sharks, and marine mammals e.g. fur seals. Fishers are also required to report any captures of protected species on specific forms, along with the life status of the species.

Planned improvements to monitoring use of mitigation equipment

New Zealand is currently working on improvements to its observer data collection to enable easier analysis of factors that may contribute to incidental captures of protected species such

as seabirds. These improvements will also make it easier to identify for follow up any instances where mitigation equipment has not been used as mandated.

New Zealand is also undertaking work to allow better monitoring of and reporting on compliance, in line with provisions in our National Plan of Action for Seabirds, as well as in annual planning documents.

8. PUBLIC RELATIONS AND EDUCATION ACTIVITIES

The New Zealand government continues to engage with fishers to increase their awareness of bycatch issues in New Zealand fisheries. These public relations activities, education, and information exchange with respect to SBT fisheries are described below.

The primary means of engagement with surface longline fishers is through bi-annual workshops, where mitigation of captures of seabirds and other ERS are routinely discussed. The Ministry for Primary Industries continues to distribute equipment to release tangled or hooked animals (for example marine turtles) to new vessels entering the fleet, along with associated education materials. The Ministry, in conjunction with the industry organisation Seafood New Zealand, has also produced a Code of Best Practice for fishers, which is updated regularly. The latest version is in Appendix II of CCSBT-ERS/1203/Annual Report - New Zealand. The code of practice is distributed to quota holders and vessel masters, as well as licensed receivers of fish.

In addition to Government activities, the organisation Southern Seabird Solutions (www.southernseabirds.org), formed in 2002, continued its work in education and awareness of seabird conservation. The organisation's priority projects at present include:

- An **International Mitigation Mentor Programme** to provide feedback and advice to fishers and other inventors on their mitigation ideas;
- Drawing on the knowledge of leaders in the recreational sector to find out more about the interaction between seabirds and **recreational fishing;** and
- A **Seabird Smart Training Programme** to establish and run a training programme that educates and inspires fishers to carry out seabird smart fishing practices while on the water.

9. INFORMATION ON OTHER ECOLOGICALLY RELATED SPECIES (NON-BYCATCH)

Since 1994, MPI observers aboard tuna longline vessels in New Zealand waters have recorded data on stomach contents of fish taken in longline operations. An examination of these data has been made for SBT and eight other ecologically related species and is summarised in document CCSBT-ERS/0602/8. Collection of stomach content information has continued but the more recent data has not yet been analysed. A project is currently well advanced which is analysing new data and re-analysing historic data. It is anticipated the results of the research would be presented to the next meeting of the ERSWG.

10. OTHERS

New Zealand has no information to report on ERS-related fishing activities of non-party fleets.

11. IMPLEMENTATION OF THE IPOA-SEABIRDS AND IPOA-SHARKS

National Plan of Action for Seabirds

The Minister of Conservation and the Minister of Fisheries jointly approved the first National Plan of Action (NPOA) -Seabirds in April 2004. During 2012 and early 2013, the NPOA-Seabirds was reviewed and revised and in April 2013 the Minister for Primary Industries approved a new NPOA-Seabirds (CCSBT-ERS-1308-Info-06).

The NPOA - Seabirds 2013 recognises New Zealand's unique place in the world for seabirds and our desire to be at the leading edge of international seabird conservation.

More seabirds breed in New Zealand than anywhere else in the world. New Zealand seabirds should be able to thrive in New Zealand waters and around the world without pressure from fishing-related mortality.

The long term objective of the NPOA-Seabirds 2013 is:

> New Zealand seabirds thrive without pressure from fishing related mortalities, New Zealand fishers avoid or mitigate against seabird captures and New Zealand fisheries are globally recognised as seabird friendly.

The NPOA-Seabirds 2013 sets out objectives for five years to guide management of incidental seabird catch in New Zealand fisheries. The current management approach will see the objectives achieved through integration into MPI's annual and five year plans for fisheries.

Research and information underpin management of seabird interactions with fisheries. A risk assessment approach is used to determine management priorities (CCSBT-ERS-1308-20 and CCSBT-ERS-1308-21).

Summaries of what we currently know about seabird interactions with fisheries are updated annually. Seabird captures are quantified in an online database.

National Plan of Action for the Conservation and Management of Sharks

New Zealand finalised its first NPOA-Sharks for New Zealand fisheries waters in October 2008. The NPOA-Sharks 2008 recognises that New Zealand has already taken a number of management actions in recent years to ensure the sustainable management of New Zealand shark fisheries. These actions include introducing a range of shark species into the QMS and providing complete protection for some vulnerable species. The 2008 NPOA-Sharks also identifies additional actions in order to achieve the objectives identified in the IPOA-Sharks.

A review of the NPOA-Sharks is currently underway and includes an assessment of progress against actions identified in the 2008 NPOA and the IPOA-Sharks. It is proposed for the draft

NPOA-Sharks 2013 to also follow a risk assessment approach, and to identify longer-term goals and five-year objectives to be implemented through fisheries and conservation planning processes.

12. ACKNOWLEDGEMENTS

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Abraham, E.R., Thompson, F.N., & Berkenbusch, K. (2013). Estimated capture of seabirds in New Zealand trawl and longline fisheries, 2002–03 to 2010–11. Final Research Report for Ministry for Primary Industries project PRO2010-01 (Unpublished report held by Ministry for Primary Industries, Wellington).

Table 1: The annual southern bluefin tuna catch (tonnes whole weight) for calendar years 1999 to 2012, by fishing method. Annual total catch estimates are scaled to Licensed Fish Receiver returns for 1999 to 2001, and to Monthly Harvest Returns since 2002, 0.0 = less than 100 kg. The 'Other' category is primarily midwater trawl.

	Fishing method				
Calendar year	Longline	Troll	Handline	Other	Total
1999	455.8	3.0	1.8	0.0	460.6
2000	379.5	0.7	0.2	0.0	380.3
2001	358.3	0.1	0.1	0.0	358.5
2002	449.7	0.6	0.0	0.0	450.3
2003	389.3	0.1	0.2	0.0	389.6
2004	391.2	1.4	0.7	0.0	393.3
2005	261.4	3.0	0.0	0.0	264.4
2006	235.9	0.1	2.2	0.0	238.2
2007	377.2	1.3	0.0	4.0	382.6
2008	318.6	0.0	0.0	0.4	319.0
2009	411.6	7.2	0.0	0.0	418.7
2010	500.6	0.1	0.0	0.0	500.7
2011	546.1	0.9		0.1	547.2
2012	769.9	5.6			775.5

Table 2: Recent catches of southern bluefin tuna in New Zealand fisheries waters (tonnes whole weight) by Calendar year and New Zealand fishing year (1 October to 30 September).

Year	Calendar year catches	Fishing year catches
1980	130.0	130.0
1981	173.0	173.0
1982	305.0	305.0
1983	132.0	132.0
1984	93.0	93.0
1985	94.0	94.0
1986	82.0	82.0
1987	59.0	59.0
1988	94.0	94.0
1989	437.2	437.1
1990	529.2	529.3
1991	164.5	164.5
1992	279.2	279.2
1993	216.6	216.3
1994	277.0	277.2
1995	436.4	434.7
1996	139.3	140.4
1997	333.7	333.4
1998	337.1	333.0
1999	460.6	457.5
2000	380.3	381.7
2001	358.5	359.2
2002	450.3	453.6
2003	389.6	391.7
2004	393.3	394.0
2005	264.4	264.0
2006	238.2	238.2
2007	382.6	383.1
2008	319.0	318.8
2009	418.5	417.3
2010	500.8	500.0
2011	547.1	547.2
2012	775.5	775.4

Table 3: Observer coverage in terms of catch (proportion of fish numbers observed) for the Charter (NZC) and domestic (NZD) fleets for 2011 and 2012.

Calendar year	NZC	NZD
2011	0.81	0.08
2012	0.80	0.09

Table 4: Observer coverage in terms of effort (proportion of hooks observed) for the Charter (NZC) and domestic (NZD) fleets for 2011 and 2012.

Calendar year	NZC	NZD
2011	0.74	0.08
2012	0.84	0.07

Table 5: Total allowable catches (TAC) of the main fish bycatch species associated with the SBT surface longline fishery within the NZ EEZ as at 1 October 2012, including Total Allowable Commercial Catch (TACC), Recreational and Customary Non-Commercial Allowances and the allowance for Other Sources of Mortality.

Fish Species	TAC (t)	TACC (t)	Recreational Allowance (t)	Customary Allowance (t)	Other Mortality (t)
Bigeye tuna	740	714	8	4	14
Blue shark	2080	1860	20	10	190
Mako shark	276	200	30	10	36
Moonfish	527	527	0	0	0
Pacific bluefin tuna	145	116	25	0.5	3.5
Porbeagle shark	129	110	6	2	11
Ray's bream	1045	980	10	5	50
Swordfish	919	885	20	10	4
Yellowfin tuna	358	263	60	30	5

Table 6: Numbers of fish estimated caught from observer data (Observed) scaled to total fishing effort (Scaled), and catch per unit effort (CPUE) for fish species caught on longline sets where southern bluefin tuna was either targeted or caught during the 2011 and 2012 calendar years.

2011	Japanese Charter			New Zealand Domestic		
	Observed	Scaled	CPUE	Observed	Scaled	CPUE
Blue shark	2 729	3 710	7.470	2 919	34 251	32.789
Rays bream	7 424	10 094	20.323	499	5 749	5.605
Albacore tuna	59	80	0.162	2 195	26 318	24.656
Porbeagle shark	83	113	0.227	499	5 955	5.605
Deepwater dogfish	403	548	1.103	0	0	0.000
Lancetfish	0	0	0.000	495	6 791	5.560
Swordfish	8	11	0.022	431	5 356	4.841
Mako shark	18	24	0.049	369	4 411	4.145
Dealfish	164	223	0.449	0	0	0.000
Escolar	0	0	0.000	152	2 205	1.707
Moonfish	22	30	0.060	131	1 573	1.472
Sunfish	6	8	0.016	113	1 447	1.269
Butterfly tuna	22	30	0.060	76	869	0.854
Bigscale pomfret	86	117	0.235	2	23	0.022
Oilfish	0	0	0.000	52	727	0.584
Rudderfish	48	65	0.131	10	127	0.112
Pelagic stingray	0	0	0.000	43	568	0.483
School shark	28	38	0.077	1	11	0.011
Thresher shark	4	5	0.011	10	131	0.112
Flathead pomfret	12	16	0.033	0	0	0.000
Pacific bluefin tuna	0	0	0.000	9	111	0.101
Skipjack tuna	0	0	0.000	8	104	0.090
Striped marlin	0	0	0.000	2	27	0.022
Yellowfin tuna	0	0	0.000	0	0	0.000

Table 6: continued.

2012	Japanese Charter			New Zealand Domestic		
	Observed	Scaled	CPUE	Observed	Scaled	CPUE
Blue shark	5 798	6 895	12.581	6 839	74 242	62.652
Rays bream	3 089	3 673	6.703	1 404	14 623	12.862
Albacore tuna	113	134	0.245	672	7 712	6.156
Porbeagle shark	84	100	0.182	491	4 691	4.498
Deepwater dogfish	544	647	1.180	0	0	0.000
Lancetfish	2	2	0.004	375	5 950	3.435
Swordfish	26	31	0.056	357	3 901	3.270
Mako shark	24	29	0.052	202	2 020	1.851
Dealfish	237	282	0.514	3	53	0.027
Escolar	13	15	0.028	82	1 217	0.751
Moonfish	25	30	0.054	56	577	0.513
Sunfish	11	13	0.024	71	1 284	0.650
Butterfly tuna	17	20	0.037	67	580	0.614
Bigscale pomfret	84	100	0.182	1	8	0.009
Oilfish	0	0	0.000	48	336	0.440
Rudderfish	29	34	0.063	7	206	0.064
School shark	25	30	0.054	4	70	0.037
Pelagic stingray	3	4	0.007	12	376	0.110
Thresher shark	2	2	0.004	11	86	0.101
Flathead pomfret	14	17	0.030	0	0	0.000
Pacific bluefin tuna	1	1	0.002	5	49	0.046
Skipjack tuna	0	0	0.000	0	0	0.000
Striped marlin	0	0	0.000	2	11	0.018
Yellowfin tuna	0	0	0.000	0	0	0.000

Table 7: Number of observed ERS interactions and assumed mortality during 2012 and 2011 (by calendar year). Mortality is dead when arriving at vessel and assumed mortality is derived from the number of observed dead specimens divided by number of observed hooks (thousands) multiplied by total number of hooks set (thousands). Note that this will be an underestimate for some sharks (especially blue sharks) due to unknown life status when sharks were tallied (i.e. the figures reflect life status at haul, not subsequent fate i.e. retained or released and if released, whether likely to survive).

Year	**2012**		Japanese charter		NZ domestic	
Total number of hooks set			548040		1339164	
Percentage hooks observed			84.1		8.2	
Group	Common name	Scientific name	Observed interactions	Assumed mortality	Observed interactions	Assumed mortality
Seabirds	Buller's albatross	*Thalassarche bulleri*	27	24	1	12
	Black petrel	*Procellaria parkinsoni*	0		1	12
	Campbell albatross	*Thalassarche impavida*	0		1	12
	Grey petrel	*Procellaria cinerea*	0		2	25
	Black-browed albatross	*Thalassarche* spp.	0		5	61
	Salvin's albatross	*Thalassarche salvini*	0		1	12
	Wandering albatross	*Diomedea* spp.	0		3	37
	White-capped albatross	*Thalassarche steadi*	6	6	1	12
Sharks	Blue shark	*Prionace glauca*	5 798	452	6 839	4 785
	Mako shark	*Isurus oxyrinchus*	24	4	202	871
	Porbeagle shark	*Lamna nasus*	84	25	491	2122
	Thresher shark	*Alopias vulpinus*	2	1	11	12
	Bronze whaler shark	*Carcharhinus brachyurus*	0		1	12
	Dogfish		544	100	0	
	Skates and rays		3	0	12	0
Turtles	All species		0		0	

Table 7: continued

Year	**2011**		Japanese charter		NZ domestic	
Total number of hooks set			496670		1088065	
Percentage hooks observed			73.6		8.2	
Group	Common name	Scientific name	Observed interactions	Assumed mortality	Observed interactions	Assumed mortality
Seabirds	Buller's albatross	*Thalassarche bulleri*	24	12	1	12
	Southern cape pigeon	*Daption capensis capense*	0		1	0
	Great albatrosses	Diomedea spp.	0		1	12
	Sooty shearwater	*Puffinus griseus*	1	0	0	
	Wandering albatross	*Diomedea* spp.	0		1	12
	White-chinned petrel	*Procellaria aequinoctialis steadi*	1	1	0	
	White-capped albatross	*Thalassarche steadi*	3	3	0	
Sharks	Blue shark	*Prionace glauca*	2729	147	2919	2 248
	Mako shark	*Isurus oxyrinchus*	18	0	369	1 222
	Porbeagle shark	*Lamna nasus*	83	27	499	2 578
	Thresher shark	*Alopias vulpinus*	4	1	10	12
	Bronze whaler shark	*Carcharhinus brachyurus*	0		6	12
	Dogfish		403	68	0	
	Skates and rays		0		45	12
	Shark unspecified		0		24	37
Turtles	Leatherback turtle	*Dermochelys coriacea*	0		2	0
	Green turtle	*Chelonia mydas*	0		1	0

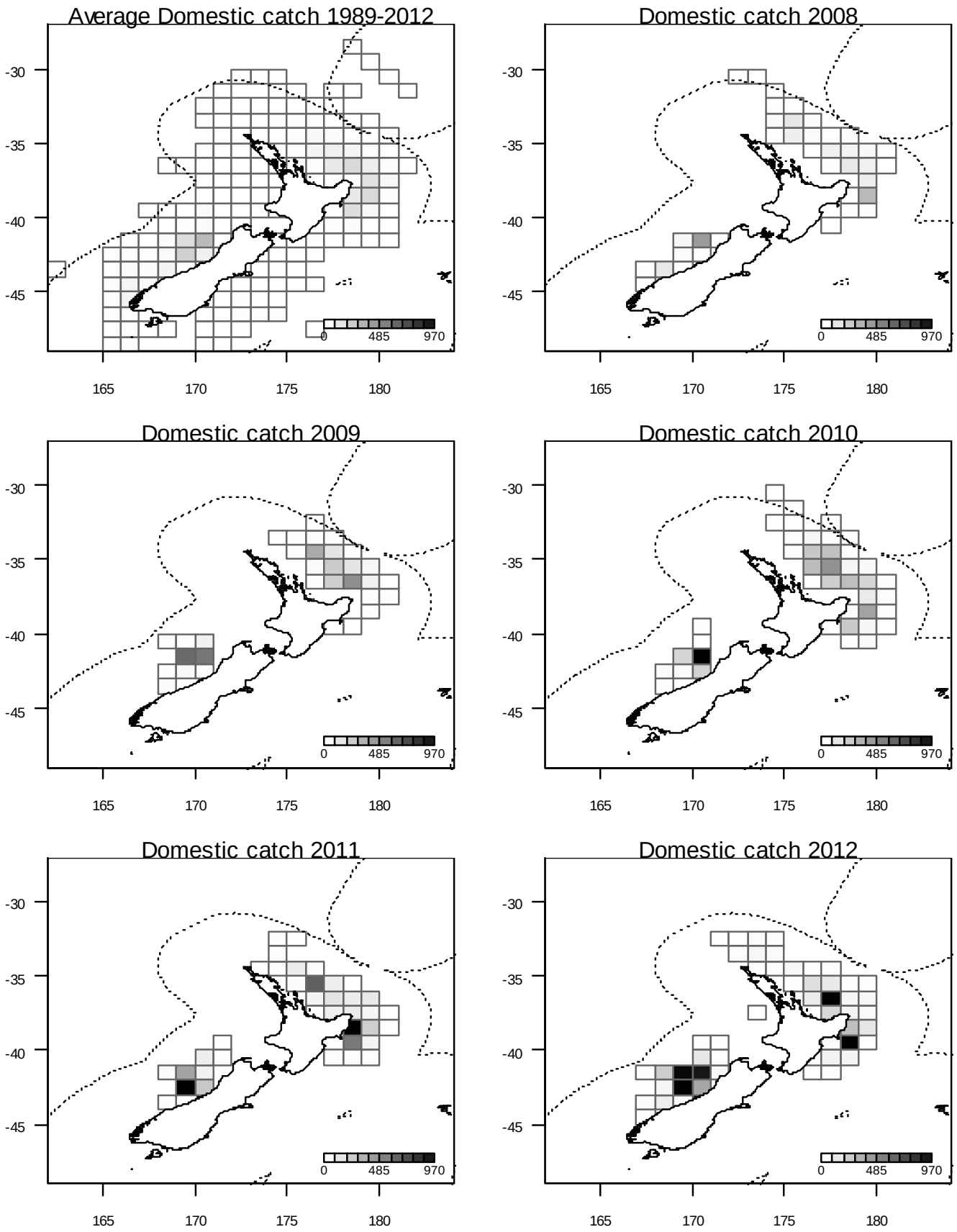


Figure 1: Distribution of longline catches (number of SBT per 1 degree square) for the domestic fleet: average for the time series (1989-2012), and annually for 2008 to 2012.

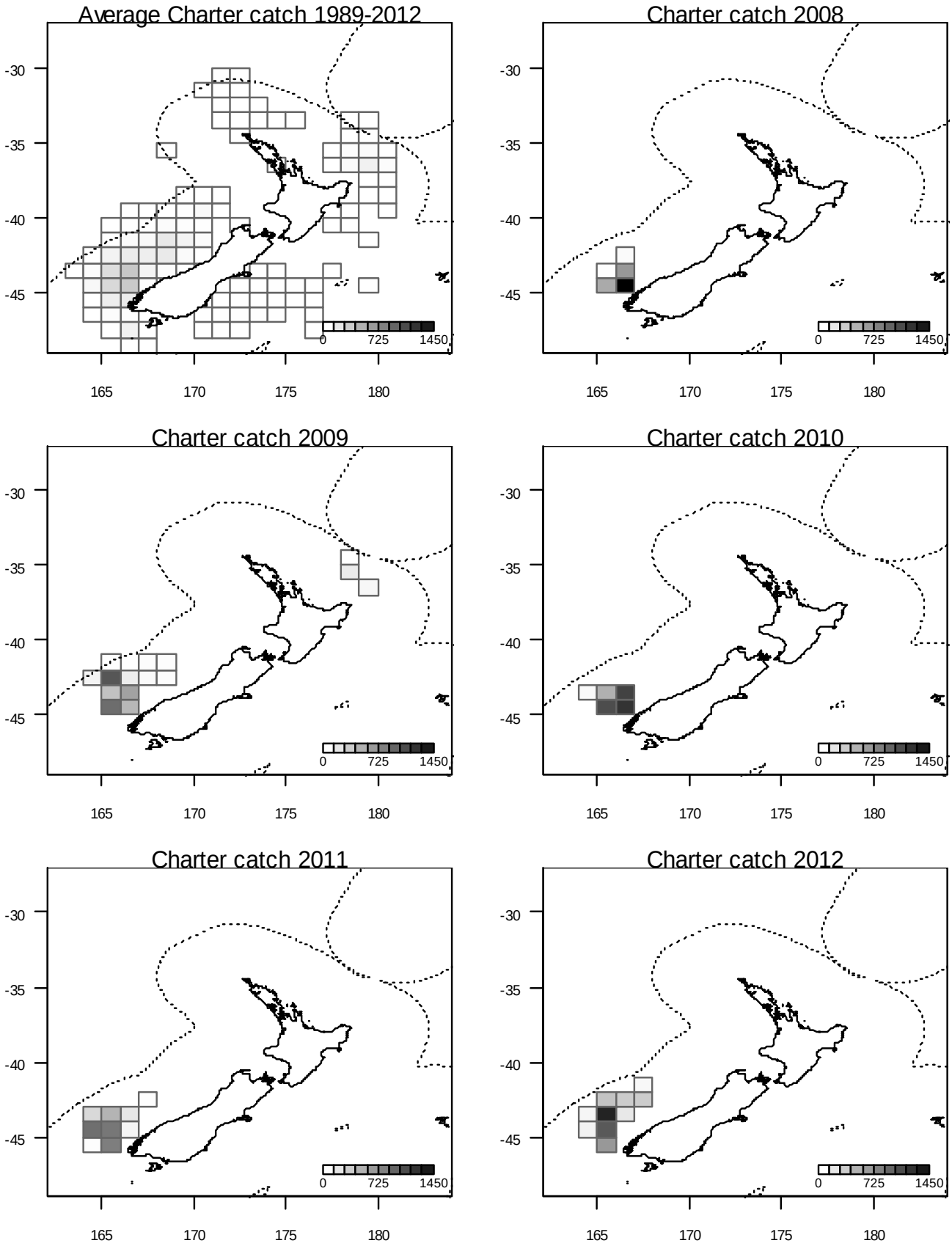


Figure 2: Distribution of longline catches (number of fish per 1 degree square) for the Charter fleet: average for the time series (1989-2012), and annually for 2008 to 2012.

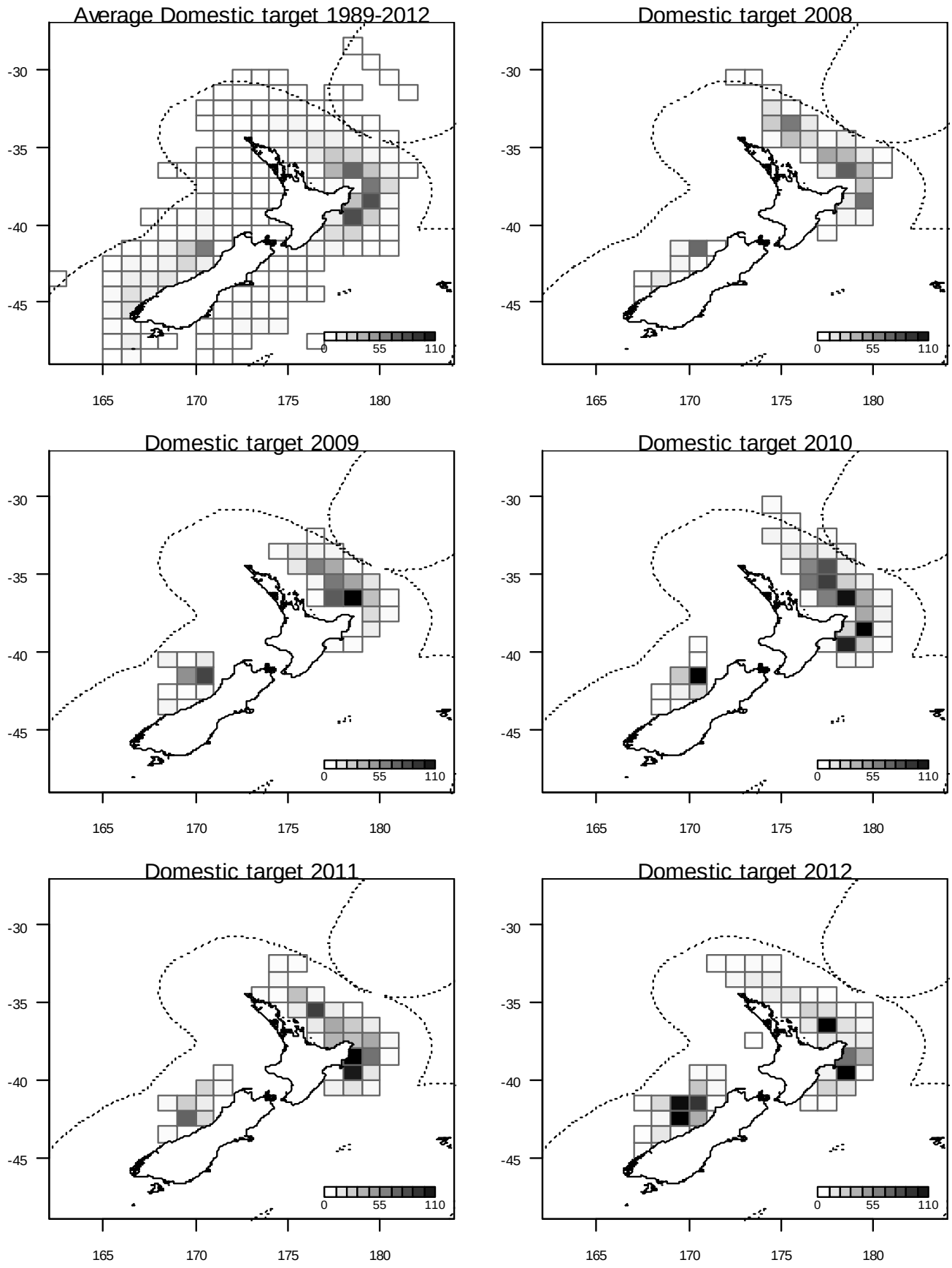


Figure 3: Distribution of longline effort (thousands of hooks per 1 degree square) for the domestic fleet that was targeted at southern bluefin tuna: average for the time series (1989-2012), and annually for 2008 to 2012.

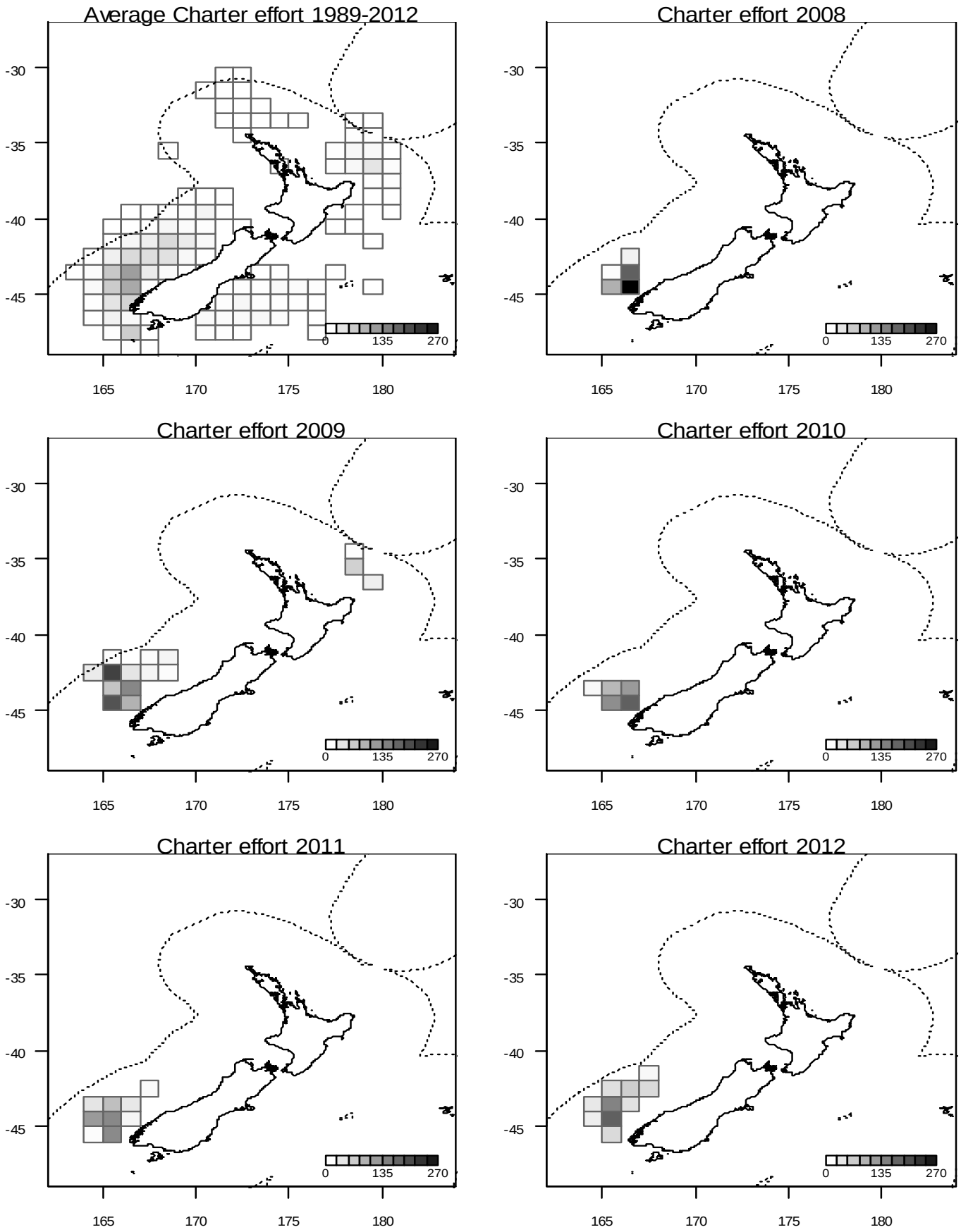


Figure 4: Distribution of longline effort (thousands of hooks per 1 degree square) for the charter fleet: average for the time series (1989-2012), and annually for 2008 to 2012.

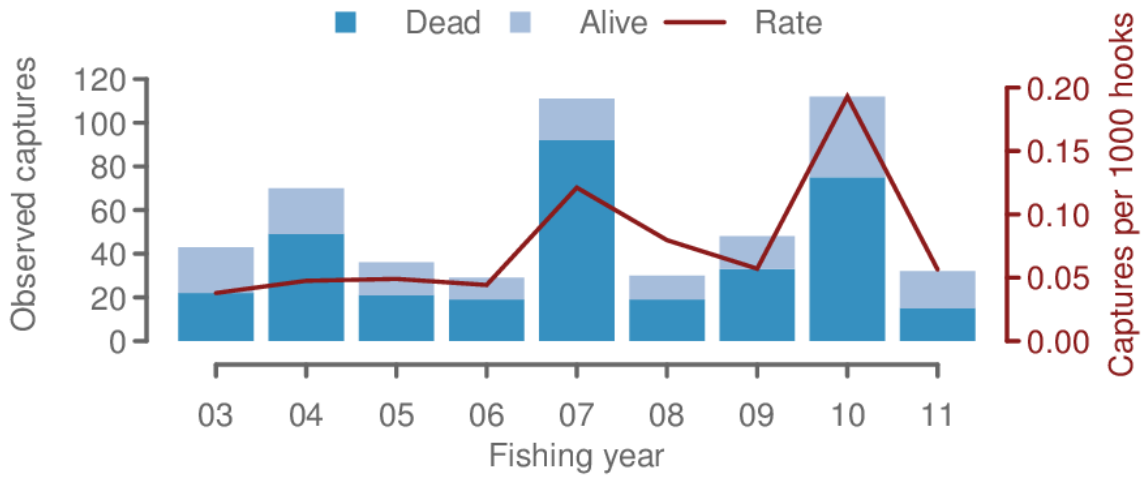


Figure 5: Captures of seabirds, proportion caught dead/alive and captures per 1000 hooks in the southern bluefin longline fisheries 2002-03 through 2010-11.

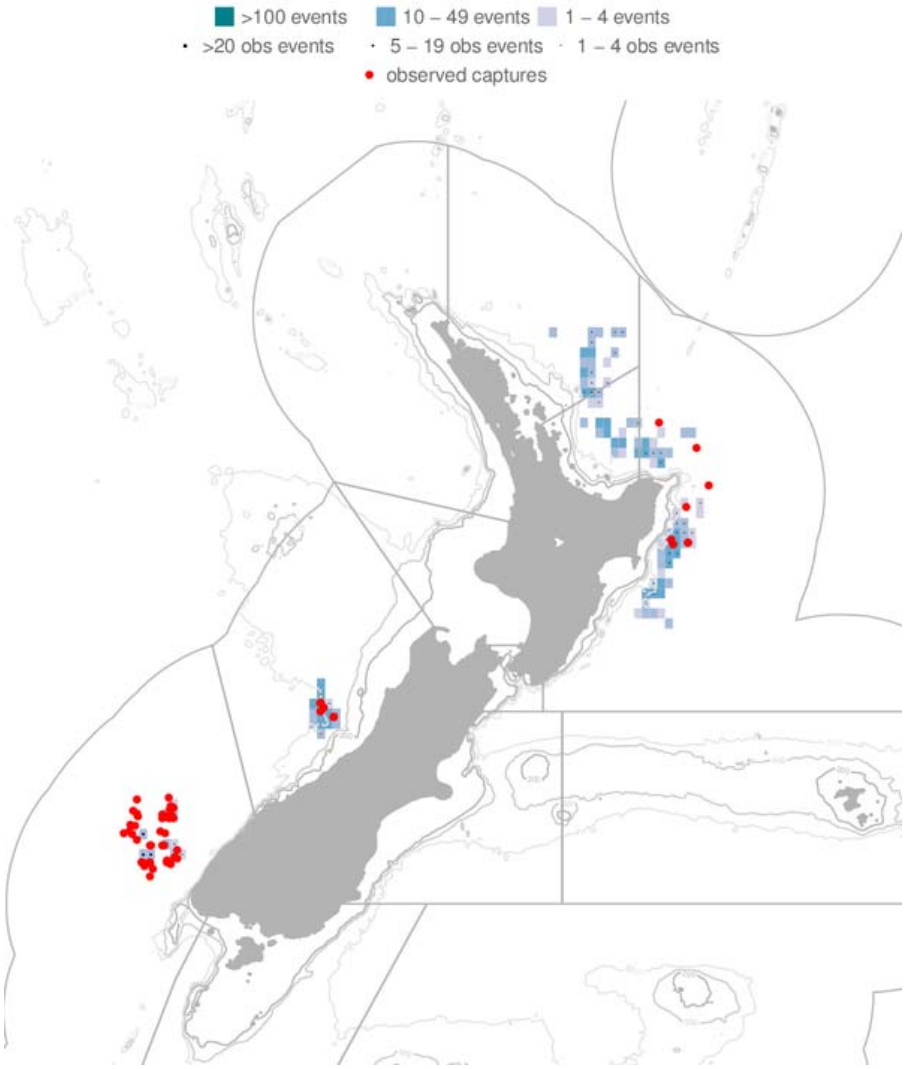


Figure 6: Map of fishing effort and observed seabird captures, 2009–10. Fishing effort is mapped into 0.2-degree cells, with the colour of each cell being related to the amount of effort. Observed fishing events are indicated by black dots, and observed captures are indicated by red dots. Fishing is only shown if the effort could be assigned a latitude and longitude, and if there were three or more vessels fishing within a cell. In this case, 69.3% of the effort is shown.

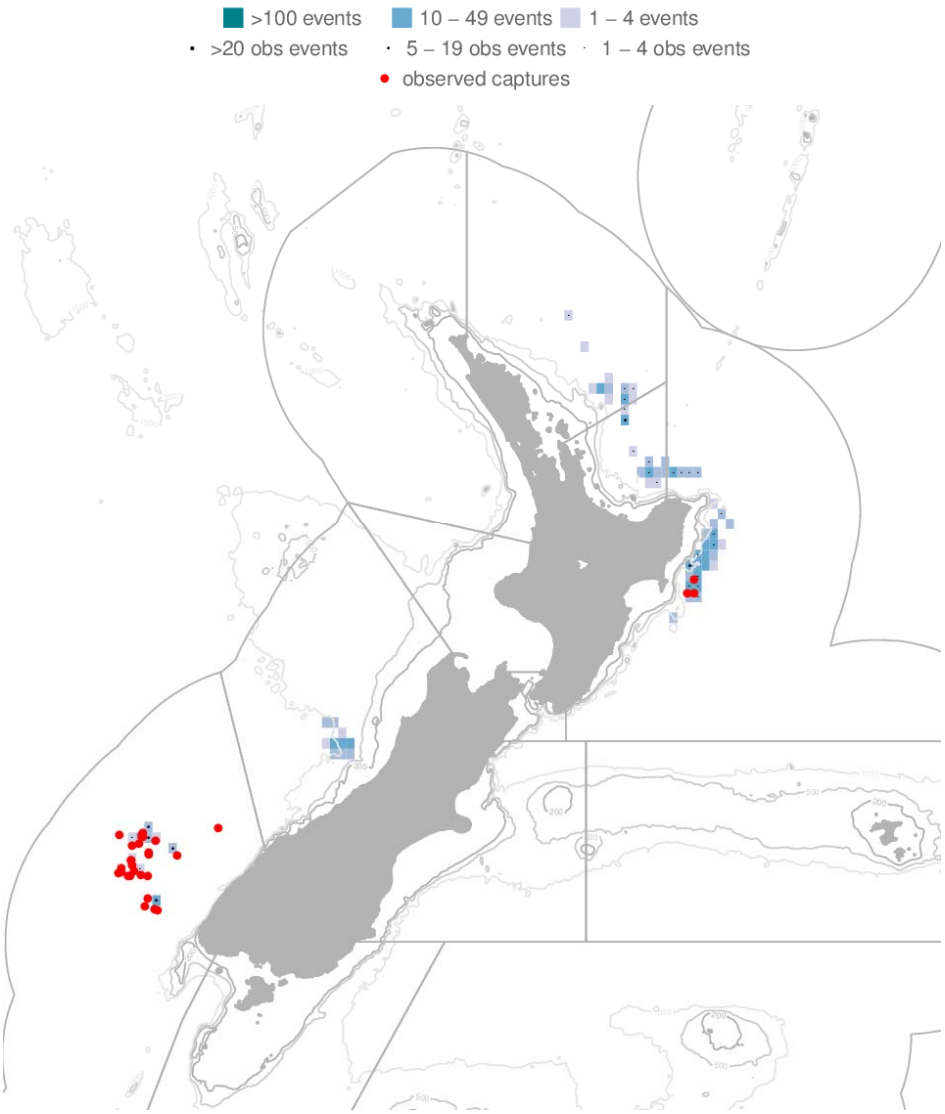


Figure 7: Map of fishing effort and observed seabird captures, 2010–11. Fishing effort is mapped into 0.2-degree cells, with the colour of each cell being related to the amount of effort. Observed fishing events are indicated by black dots, and observed captures are indicated by red dots. Fishing is only shown if the effort could be assigned a latitude and longitude, and if there were three or more vessels fishing within a cell. In this case, 69.3% of the effort is shown.

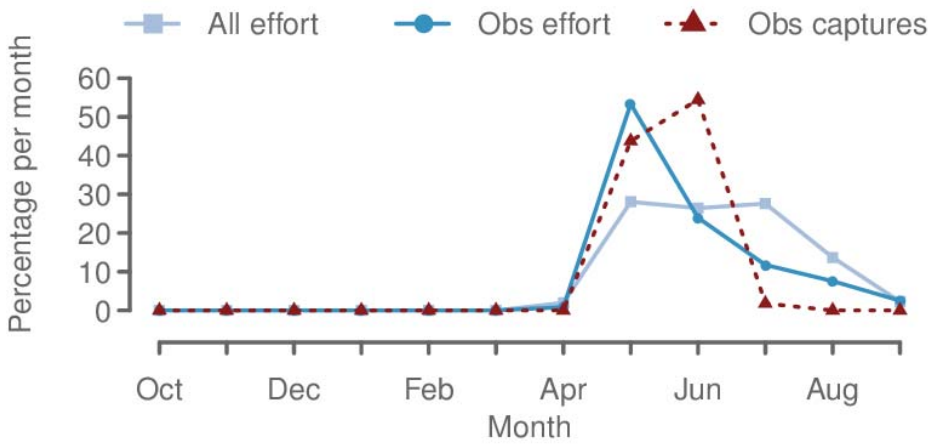


Figure 8: Fishing effort and observed captures of seabirds by month, during the 2010–11 fishing year.

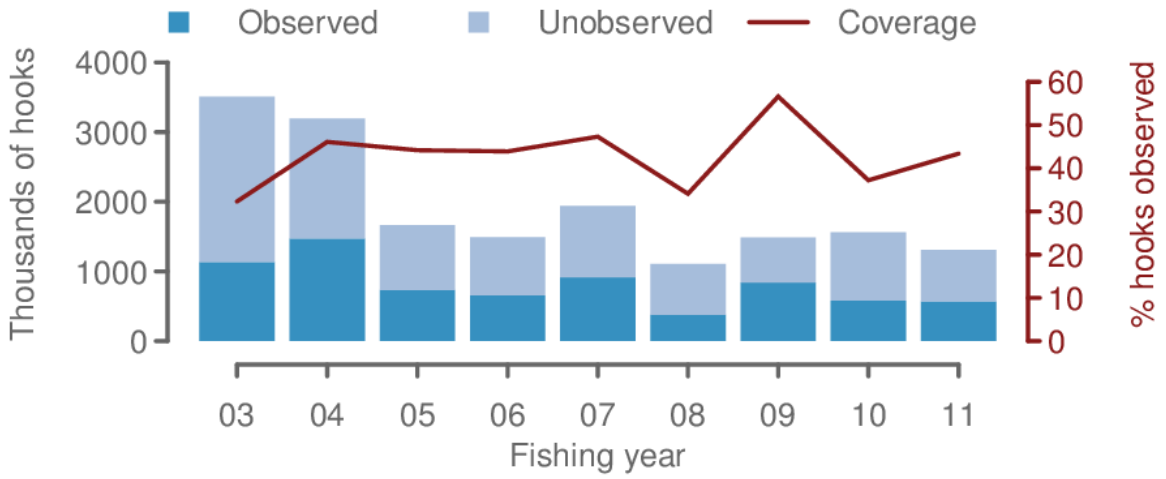


Figure 9: Fishing effort and observations in southern bluefin longline fisheries 2002-03 through 2010-11.

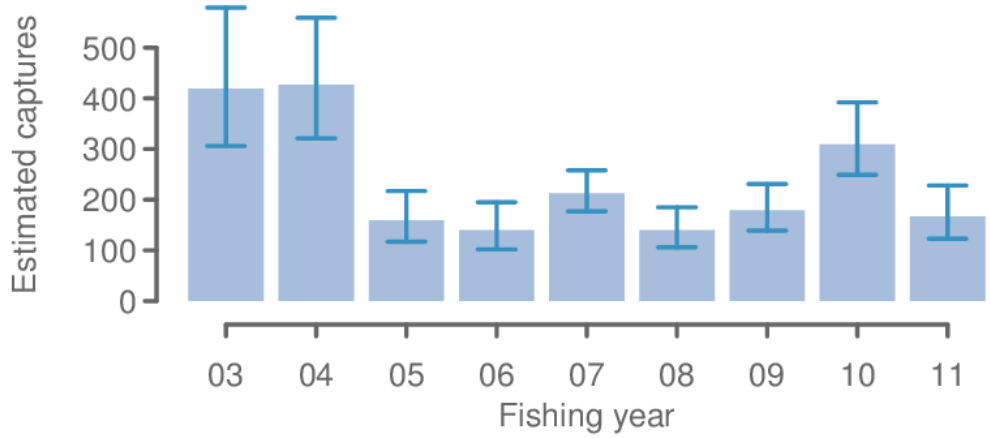


Figure 10: Estimated captures of seabirds (with 95%c.i.) in southern bluefin longline fisheries 2002-03 through 2010-11.

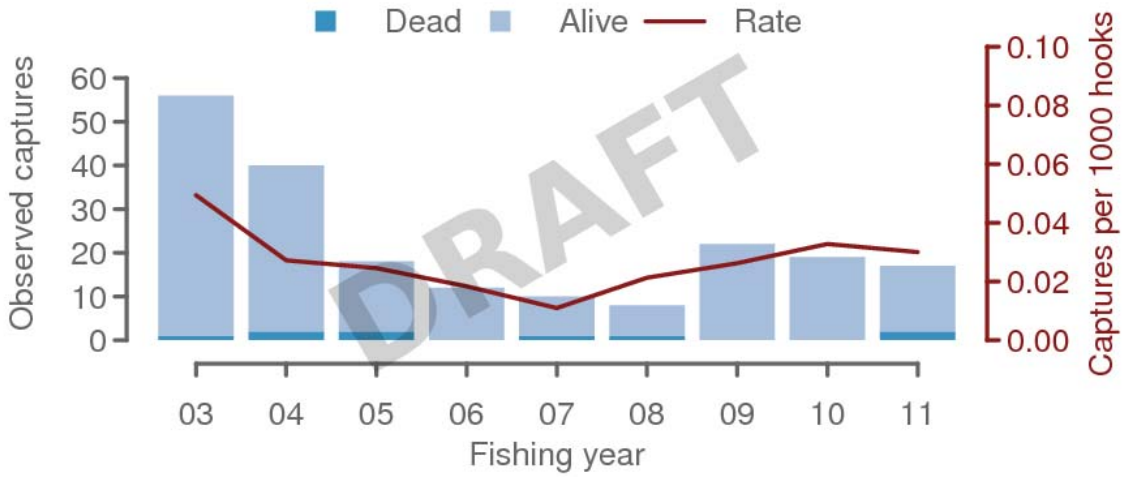


Figure 11: Observed captures of fur seals in southern bluefin longline fisheries 2002-03 through 2010-11.

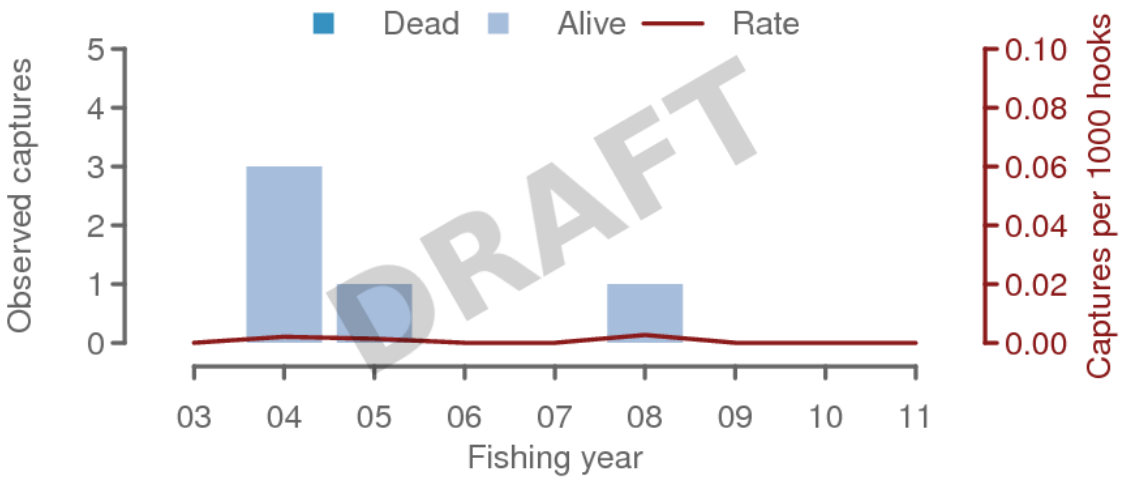


Figure 12: Observed captures of whales and dolphins in southern bluefin longline fisheries 2002-03 through 2010-11.

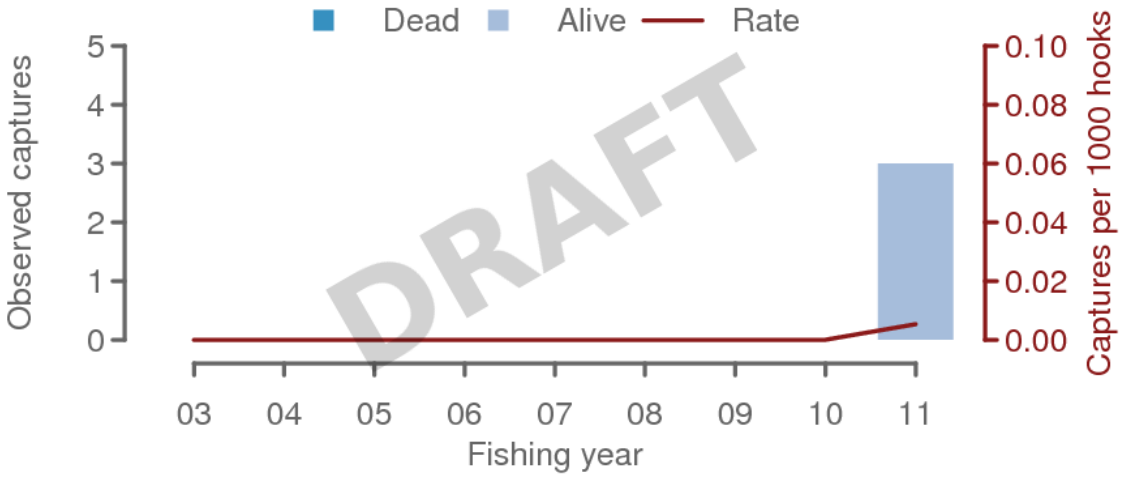


Figure 13: Observed captures of turtles in southern bluefin longline fisheries 2002-03 through 2010-11.

APPENDIX I – ABSTRACTS OF NEW ZEALAND MEETING PAPERS FOR ERSWG10

#	CCSBT-ERS/1308/18
Title	Ecological Risk Assessment for seabird interactions in surface longline fisheries managed under the Convention for the Conservation of Southern Bluefin Tuna
Authors	S. M. Waugh, D. P. Filippi, B. R. Sharp, H. Weimerskirch and M. Diase
Abstract	An analysis of risk of seabird interactions with surface longline fisheries was undertaken in 2012 using fishing data from the Commission for the Conservation of Southern Bluefin Tuna (Commission), and biological and spatial data indicative of the distributions of a suite of albatross and petrel species known or likely to be captured or killed in the Convention for the Conservation of Southern Bluefin Tuna (CCSBT) fisheries; in this paper we update that analysis using improved spatial seabird distribution data layers utilising all available satellite tracking data for the same group of species. The analysis adapted methods developed in other regions and applied to assess risk of incidental mortality of highly migratory top predator species in other Regional Fisheries Management Organisations. Seabird species included in the analysis include rare species, such as Amsterdam Albatross, listed as Critically Endangered by the IUCN, and globally distributed species, such as white-chinned petrels (listed as Vulnerable by the IUCN) and sooty shearwater (Near Threatened). Simple representations of species spatial distributions were used in the first instance, with hotspots of activity defined around breeding localities for each species. These distributions were combined with spatial fishing effort data to define risk as a function of spatial overlap between these distributions on a seasonal quarterly basis. Risk is then a function of spatial overlap, species vulnerability to capture in longline fisheries, and species biological productivity. Results indicate that species at highest risk are primarily large albatrosses at temperate latitudes, followed by smaller albatrosses. Geographical areas of highest risk include the Tasman Sea and the area around New Zealand, primarily in the austral autumn and winter. The analysis has improved on previous work by utilising species spatial distribution information derived from satellite telemetry. Further improvements in the long term can be achieved by collecting fishery-specific information indicative of species capture rates to inform estimates of species vulnerability to CCSBT longline fisheries.

#	CCSBT-ERS/1308/19
Title	A brief note on future porbeagle shark research
Authors	Ministry for Primary Industries, New Zealand
Abstract	An approach to joint assessment of porbeagle shark stock status is proposed. Specific comment on approaches to assessment, sharing of data, joint work and timing of research is sought from Extended Commission for the Conservation of Southern Bluefin Tuna (CCSBT) members. It would be useful if CCSBT members were able to bring to the 2013 Ecologically Related Species Working Group (ERSWG) meeting a summary of data available to contribute to a joint assessment of porbeagle stock status.

#	CCSBT-ERS/1308/20
Title	Risk of commercial fisheries to New Zealand seabird populations
Authors	Y. Richard and E. R. Abraham
Abstract	This report presents a risk assessment of the effect of fishing-related mortalities on 70 of the seabird species that breed in the New Zealand region. The assessment covers all fishing by commercial trawl, bottom-longline, surface-longline, and set-net fisheries within New Zealand's Exclusive Economic Zone. The risk was defined as the ratio of the estimated annual number of fatalities of birds due to bycatch in fisheries to the Potential Biological Removal (PBR), which is an estimate of the number of seabirds that may be killed without causing the population to decline below half the carrying capacity. The risk ratio for each seabird species is an estimate of the ratio between the number of fatalities due to fisheries bycatch, and the PBR. When estimating the PBR for each species, a recovery factor, f, should be specified. This recovery factor is typically between 0.1 and 0.5. It allows some protection against errors in estimating the PBR, and a lower value allows for a shorter recovery time for depleted populations. In this report, the risk ratio is calculated using PBR1: the value of the PBR calculated with f = 1. The values of the recovery factor for each species will be specified at a later stage. When interpreting the risk ratio, it should be borne in mind that species with risk ratios less than one may still be considered at risk, depending on the value of the recovery factor. Estimation of annual fatalities was based on seabird captures reported by observers between the 2006–07 and 2010–11 fishing years. From these captures, the total observable captures were estimated (the number of seabird captures that would have been reported had an observer been on every fishing vessel). Not all seabirds that are killed are brought on-board vessels, and the observable captures were multiplied by a factor to account for these cryptic mortalities. The cryptic multiplier varied between 1.30 and 8.66, depending on fishing method and seabird species. This study replaces a previous seabird risk assessment that used a similar methodology. Demographic parameters and distributions were updated for some species, the methods used for estimating observable captures were changed, and calculation of the PBR was modified to include an additional calibration factor. Because of the number of methodological changes that were made, changes in risk between the two assessments should not be taken as being due to changes in the fisheries. In total, there were 15 100 (95% c.i.: 13 600 – 16 600) estimated annual potential seabird fatalities across the four fishing methods. The highest number of annual potential fatalities were in trawl fisheries with 9870 (95% c.i.: 8560 – 11 300) estimated annual potential fatalities. There were a total of 3560 (95% c.i.: 3040 – 4150) annual potential fatalities in bottom-longline fisheries. Captures in surface longline fisheries were lower, with a total of 1340 (95% c.i.: 1170 – 1570) annual potential fatalities of all seabirds. The estimated fatalities in set-net fisheries were relatively low, with a total of 317 (95% c.i.: 228 – 460) annual potential fatalities of

	all species. The estimates of these annual potential fatalities depend strongly on the assumptions that were made about the extent of the cryptic mortalities. Six species had a median risk ratio above 1 or an upper 95% confidence limit above 2 and may be considered as at "Very high risk": black petrel, Salvin's albatross, flesh-footed shearwater, southern Buller's albatross, Chatham Island albatross, and New Zealand white-capped albatross. The risk ratio of black petrel was especially large, with a median of 19.9 (95% c.i.: 11.4 – 32.8), due to the combination of a high number of estimated annual potential fatalities (mean 1440; 95% c.i.: 1070 – 1900), and a low PBR1 (mean 74; 95% c.i.: 47 – 117). Fatalities of the species with high risk ratios were mainly in poorly observed small-vessel fisheries. Four species had a median risk ratio above 0.3 or an upper 95% confidence limit above 1, and may be considered as at "High risk": northern Buller's albatross, Gibson's albatross, Cape petrel, and Antipodean albatross. Nine species had a median risk ratio above 0.1 or an upper 95% confidence limit above 0.3 ("Medium risk"), and another seven had an upper 95% confidence limit above 0.1 ("Low risk"). Among the 70 considered species, 45 had the upper 95% confidence limit of their risk ratio below 0.1, suggesting that commercial fisheries in New Zealand waters are unlikely to significantly impact the demography of these species. The risk assessment methodology is not yet mature, and further improvements may be made in the future. Possible improvements include a better specification of the cryptic mortality. This improvement would require collection of data on cryptic mortality in New Zealand fisheries. While these kinds of data are difficult to collect, poor knowledge of cryptic mortality restricts understanding of the impacts of fisheries on seabird populations. For some species, the assessment could be extended to include fatalities in global fisheries, and to include broader impacts, such as bycatch in recreational fisheries. The risk assessment requires adequate observer data, and in small-vessel fisheries observer coverage remains low. Increasing observer coverage in these fisheries would greatly reduce the uncertainty associated with the current estimates of risk.

#	CCSBT-ERS/1308/21
Title	Risk of commercial fisheries to New Zealand seabird populations: Supplementary information
Authors	Y. Richard and E. R. Abraham
Abstract	This supplementary information presents a summary of population and distributional data for the 70 species included in the risk assessment of the impact of fishing-related mortalities on seabirds breeding in the New Zealand region. For each seabird species included in the risk assessment, the demographic parameters used were the New Zealand population size, the age at first reproduction, and the survival rate. For species for which no demographic estimates were available, values from proxy species were used, as indicated with a reference to the data source. Distributional data are presented as maps of the at-sea distribution of each species, with separate maps for the non-breeding and breeding distributions. The distribution of non-breeders was derived from existing maps published by NABIS (National Aquatic Biodiversity Information System) and Birdlife International. A

	single distribution map was generated when the breeding season extended throughout the year. Included in the distributional maps are data of any incidental captures in commercial trawl, longline and set-net fisheries between the 2006–2007 and 2010–2011 fishing years, recorded by fisheries observers. A detailed description of the methods used to derive the data presented here is provided in Section 2 of the risk assessment (CCSBT-ERS/1308/20).

#	CCSBT-ERS/1308/22
Title	A brief note on future seabird risk assessment research
Authors	Ministry for Primary Industries, New Zealand
Abstract	An approach to undertaking a global risk assessment for seabirds is proposed. Specific comment on the approach is sought from Commission members at the 10th meeting of the Ecologically Related Species Working Group (ERSWG10). New Zealand intends that the proposal will also be discussed at upcoming relevant WCPFC, SPRFMO and CCAMLR meetings.

#	CCSBT-ERS/1308/Info/06
Title	National Plan of Action to reduce the incidental catch of seabirds in New Zealand Fisheries 2013
Authors	Ministry for Primary Industries, New Zealand
Abstract	1. New Zealand is a special place for seabirds. More species of seabirds, particularly albatross, petrel, penguin and shag species, breed in New Zealand than anywhere else in the world. These seabirds are an important part of our natural and cultural heritage and provide locally important eco-tourism opportunities in some regions. Their intrinsic value as well as their range means they have significance for the wider international community. Accordingly New Zealand strives to be at the leading edge of international seabird conservation and management. 2. Seabirds are ranked by the International Union for the Conservation of Nature (IUCN) as the world's most threatened bird grouping. Globally they face a number of threats to their long term viability, both at their breeding sites and while foraging at sea. Work at the global level on reducing threats at breeding sites is a major focus of the Agreement on the Conservation of Albatrosses and Petrels (ACAP) and in New Zealand is the responsibility of the Department of Conservation (DOC). But the key threat to seabirds, especially albatrosses and petrels, is incidental capture and death through fishing operations. Seabirds that breed in New Zealand die as a result of interactions with commercial or recreational fishing operations in waters under New Zealand jurisdiction, through interactions with New Zealand vessels or other nations' vessels on the high seas and through interactions with commercial, recreational or artisanal fishing operations in waters under the jurisdiction of other states. 3. Under the United Nations Convention on the Law of the Sea (UNCLOS) coastal states like New Zealand are obliged to ensure their Exclusive Economic Zone (EEZ) conservation and management measures take into account the effects on species like seabirds that are associated with or dependent on harvested species so as to maintain or restore their populations above levels at which

their reproduction may be seriously threatened. A similar obligation is placed on all states fishing on the high seas. These obligations are repeated in the subsequent 1995 United Nations Fish Stocks Agreement (UNFSA) and now could be considered binding on all countries as part of customary international law.

4. As a result of increased awareness about the incidental catch of seabirds, initially in longline fisheries, the United Nations Food and Agriculture Organisation (UNFAO) organised an expert consultation on the issue in 1998 that resulted in the voluntary *International Plan of Action for reducing incidental catch of seabirds in longline fisheries* (IPOA-Seabirds) of 1999. The IPOA-Seabirds provided guidance to states in preparing their own specific national plans of action (NPOA-Seabirds) for reducing the incidental catch of seabirds in longline fisheries, including the technical measures that might usefully be included. In 2007 the UNFAO acknowledged the need to broaden the range of fishing gears and methods covered by the IPOA-Seabirds and to strengthen its implementation by developing best practice guidelines to support the elaboration of NPOA-Seabirds. An expert consultation was convened in 2008 and developed the IPOA/NPOA-Seabirds Best Practice Technical Guidelines (hereafter BPTG).

5. The BPTG highlight the fact that despite international efforts in recent years to reduce the incidental mortality of seabirds in longline fisheries, populations of many species continue to decline. This was attributed in part to the small number of NPOA-Seabirds developed, their limited implementation, the varying quality of the plans, and the limited nature and extent of actions by some Regional Fisheries Management Organisations (RFMOs). The development and implementation of a more robust and widespread suite of NPOA-Seabirds covering all relevant gear types was seen as necessary and urgent.

6. The BPTG note that fisheries vary widely according to geographic area, target species, fishing gear, vessels and fishing practices and that therefore the use of the BPTG needs to be fishery specific. They also emphasise the importance of ongoing mitigation research, education, training and outreach, observer programmes, catch reduction objectives, monitoring and reporting and also periodic reviews – all with a view to continued risk reduction.

7. Seabird populations that breed in New Zealand face different levels of risk from fishing operations. This depends upon their demographic and biological characteristics, their foraging behaviours, and their extent of overlap with commercial and recreational fisheries in New Zealand and in other parts of their range outside the EEZ. The commercial fisheries in New Zealand with which they can have interactions resulting in death or injury include longline fisheries, trawl fisheries, set net fisheries and other fisheries including trolling, hook and line, potting and purse seining. In recreational fisheries, seabirds have been recorded caught in hook and line and set net fisheries. For some fisheries and some species effective mitigation techniques are well known. In other fisheries effective techniques have not yet been devised or are less

	effective or effective only with respect to some species. 8. As well, the actions we can take to reduce the incidental catch of seabirds that breed in New Zealand inevitably vary depending on jurisdictional issues such as whether the relevant fishery is carried on in waters under New Zealand jurisdiction (or by New Zealand flagged vessels), on areas of the high seas for which an RFMO has responsibility, or in waters under the jurisdiction of other states. But useful options exist for all these circumstances. 9. This New Zealand NPOA-Seabirds 2013, taking account of the BPTG, establishes New Zealand's approach to reducing the incidental mortality of seabirds from fishing. It sets out a long term objective, some supporting high level subsidiary objectives and objectives to be met within the first five years. It outlines the management mechanisms for ensuring that the objectives are achieved including through the establishment of clear accountabilities for overall progress and a process of annual reporting and review of fisheries specific objectives contained in the national annual and five year fisheries planning documents. In broad terms the Plan seeks to ensure that: i) awareness of the problem and the known methods of reducing it is heightened both domestically and internationally; ii) relevant effective mitigation methods are applied in all New Zealand fisheries and by New Zealand vessels on the high seas; iii) capture rates are reducing towards negligible levels in all New Zealand fisheries; iv) the development of new mitigation measures, new observation and monitoring methods, and relevant research are encouraged and resourced; v) priority for the application of existing mitigation measures, the development of new mitigation measures and the introduction of other relevant actions are determined in accordance with the level of risk faced by particular seabird species; and vi) active co-operation is established with other countries whose vessels have interactions with seabirds, particularly those that breed in New Zealand, including through relevant RFMOs and through bilateral information sharing and assistance where relevant.

#	CCSBT-ERS/1308/Info/07
Title	Application of Potential Biological Removal methods to seabird populations
Authors	Y. Richard and E. R. Abraham
Abstract	The Potential Biological Removal (PBR) approach was developed in response to the United States Marine Mammal Protection Act, to identify populations experiencing human-caused mortality at levels that could result in population depletion. The PBR is calculated from the maximum population growth rate (rmax) and a lower estimate of the population size (Nmin), as PBR = 1/2 rmaxNminf, where f (typically between 0.1 and 0.5) is a "recovery factor" that may be set lower to allow a population to recover faster, or to provide additional protection to the population. If the human-caused mortalities are less than the PBR, then a depleted population will be able to recover so that, given sufficient time, it has a 95% probability of being over half the carrying capacity.

When assessing the potential impact of human-caused mortalities on seabird populations, the PBR has been used as a guide to the productivity of the seabird populations. Applying the PBR to seabirds is difficult as neither the maximum growth rate nor the total population size can be directly measured. Instead, approximations must be used that allow estimation of these parameters from readily available data.

In this report, we used simulations of seabird demography to assess the accuracy of these approximations. This approach involved three main steps. First, we simulated the population dynamics for 12 types of seabirds, representing a range of species breeding in New Zealand. For each species type, we estimated the maximum human-caused mortality rate that the populations could incur, while still being able to recover to above half the carrying capacity, with 95% probability, in the presence of both environmental and demographic stochasticity. Second, we generated a PBR estimate using an approximate maximum growth rate and population size. The PBR estimate included a parameter r, calibrated so that the base PBR (PBRb; evaluated with f = 1 and with the total population, N, rather than the conservative estimate, Nmin) had only a 5%-probability of exceeding the maximum human-caused mortality. Finally, we explored the effect of errors or bias in the demographic parameters used for the calculation of the PBR, to provide guidance in setting the value of the recovery factor, f.

The analysis showed that the approximate base PBR derived from demographic parameter estimates tended to overestimate the maximum human-caused mortality. Inclusion of a calibration factor, r, was required to adjust the PBR approximations to meet the management criterion; r varied between 0.17 and 0.61, depending on the species types. In general, the calibration factor was smaller for species with slower growth rates, such as albatrosses, and higher for species with higher growth rates, such as shags and penguins. Previous estimates of the PBR for seabird populations that did not include this calibration factor are likely to have overestimated the human-caused mortalities that the populations could incur.

The choice of f values will depend on what errors in the underlying parameters are considered plausible, and on requirements for the recovery time of depleted populations. In this report, some exploration of the consequences of incorrect estimates of the parameters is given, but an explicit recommendation for the choice of f values is not made.

With the inclusion of the additional calibration factor, r, the method for calculating the PBR described here provides a simple way for determining whether fishing-related mortalities are sufficiently low that seabird populations are able to recover to and/or remain at above half the carrying capacity in the long term.

APPENDIX II – FISHERIES SEABIRD MITIGATION MEASURES FOR SURFACE LONGLINES

Extract from *New Zealand Gazette:*

Fisheries (Seabird Mitigation Measures-Surface Longlines) Circular 2011 (No. F629)

Pursuant to Regulation 58 and 58A of the Fisheries (Commercial Fishing) Regulations 2001, the Fisheries Manager Highly Migratory and Pelagic, Ministry of Agriculture and Forestry (acting pursuant to a delegated authority in accordance with section 41 of the State Sector Act 1988) gives the following notice.

Circular

1. Title
This circular is the Fisheries (Seabird Mitigation Measures-Surface Longlines) Circular 2011.

2. Commencement
This circular comes into force the day after its notification in the *New Zealand Gazette*.

3. Interpretation
In this circular:

"Act" means the Fisheries Act 1996;
"nautical dawn" means the time at sunrise when the centre of the sun is at a depression angle of 12 degrees below the ideal horizon for the place;
"nautical dusk" means the time at sunset when the centre of the sun is at a depression angle of 12 degrees below the ideal horizon for the place;
"set", in relation to a surface longline, means releasing the surface longline into the water;
"surface longline" means a line to which a hook or hooks (whether baited or not) are attached, and that is:

(a) suspended by floats; and
(b) not attached to the sea floor;

"streamer line" means the type of bird scaring device, also known as a tori line, as described in clause 6 of this circular.

4. Restrictions on use of surface longlines
No commercial fisher may set surface longlines to take fish, aquatic life or seaweed within New Zealand fisheries waters between the hours of 0.5 hours before nautical dawn and 0.5 hours after nautical dusk, unless line weighting is employed in accordance with clause 5 of this circular.

5. Line weighting
(1) For the purposes of clause 4, a metal weight of 45 g or more must be attached for every hook deployed.
(2) The position of the weight must correspond to one of the following:

(a) Weights less than 60 g must be within 1 m of the hook; or
(b) weights of 60g-98 g must be within 3.5 m of the hook; or
(c) weights greater than 98 g must be within 4 m of the hook.

6. Streamer line required if surface longlines used
If a commercial fisher uses a surface longline to take fish, aquatic life or seaweed within New Zealand fisheries waters, the commercial fisher must:

(a) carry a streamer line on board the vessel used by the commercial fisher; and
(b) use the streamer line in accordance with clause 7; and
(c) permit inspection of the seabird scaring device on board the vessel used by the commercial fisher at any reasonable time by a fisheries officer or an observer appointed under section 223(2) of the Act.

7. Streamer line specifications

(1) The streamer line must meet the following specifications:

(a) The streamer line must be attached to the vessel so that when deployed the baits are protected by the streamer line, even in cross winds;
(b) The streamer line must be a minimum of 100 m in length;
(c) If a streamer line is less than 150 m in length, a towed object must be attached to the end of the tori line so that the aerial extent of the line is maintained over the sinking baited hooks.
(d) The streamer line must achieve a minimum aerial extent of 50 m;
(e) Streamers must be brightly coloured, and must be spaced at a maximum of 5 m, commencing not more than 5 m from the stern of the vessel and extending thereafter along the aerial extent of the line. When a streamer line is deployed, each of the streamers must reach the sea surface in the absence of wind and swell. Streamer length will therefore vary depending on the height of their attachment point above the water;
(f) The streamer line must be suspended from a point on the vessel at least 5 m above the water in the absence of swell;
(g) If the streamer line that is in use breaks or is damaged, it must be repaired or replaced so that it meets these specifications before any further hooks enter the water.

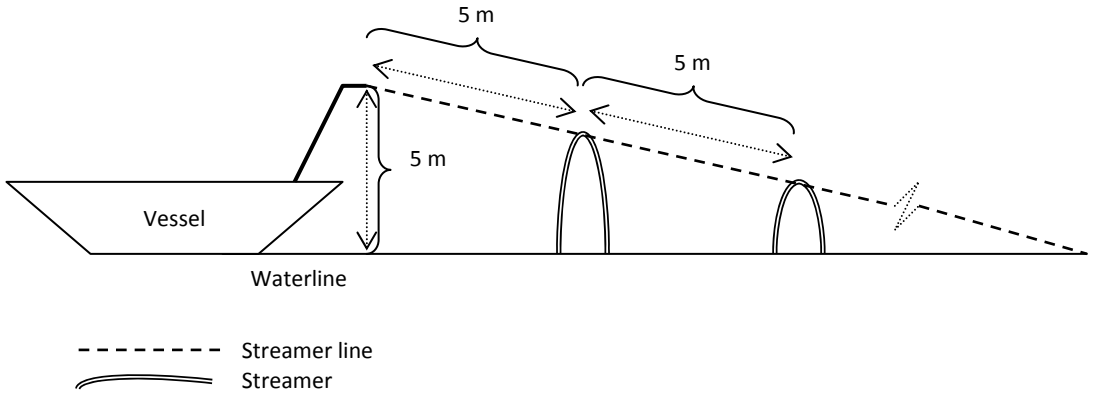
(2) The specifications do not apply to additional or secondary seabird scaring devices fishers may choose to use (such as a second tori or streamer line).

8 The Schedule

(I) The Schedule provides further guidelines on the design and deployment of streamer lines as seabird scaring devices.
(2) The Schedule is not part of the specifications.
(3) If there is any inconsistency between the guidelines in the Schedule and the specifications, the specifications prevail.

Schedule

Seabird Scaring Device (Streamer line)
Diagram not to scale
Not all specifications illustrated



(4) The streamer line needs to protect baited hooks from seabirds. This means that the streamer line should be positioned in such a way that streamers are flapping in an unpredictable fashion, above the area in which the baited hooks enter the sea, so that seabirds are deterred from attempting to take bait from the hooks. In order to achieve this even during cross-winds, it is expected fishers will have to make adjustments to the configuration of the streamer line depending on the conditions.

(5) It is generally recognised as best practice to maximise the aerial extent of the streamer line, because this maximises the area in which the baited hooks are protected from seabirds. Best practice would be to achieve an aerial extent of 100 m. In order to maximise aerial extent, it is necessary to create tension in the streamer line. This can be achieved by:

(a) towing an object on the terminal end of the streamer line; or
(b) towing extra length of streamer line; or
(c) increasing the diameter of the in-water section of the streamer line.

(6) The towed object could be a cone or buoy, a section of heavy rope, or any other object that creates sufficient drag to maintain the streamer line's aerial extent.

(7) In order to be effective at scaring seabirds away from the line of baited hooks, the streamer lines should not become tangled, either with each other or with the branch-line. Each streamer shall be attached to the streamer line in a manner to prevent fouling of individual streamers with the streamer line, and to ensure individual streamers reach the waterline in the absence of wind or swell. Swivels or a similar device can be placed in the streamer line in such a way as to prevent streamers being twisted around the streamer line. Each streamer may also have a swivel or other device at its attachment point to the streamer line to prevent fouling of individual streamers.

(8) Streamers are to be spaced at 5 m intervals along the aerial extent of the line. The total number of streamers in use will vary depending on how the line is configured. Streamers that are hanging in the water can be prone to tangling. Because the far end of the streamer line will frequently be in the water, fishers may not wish to have streamers the whole way down the line. However, it is important that streamers are present to deter birds from taking baited hooks all along the part of the line that remains above water, as outlined in the specifications.

(9) To ensure streamers are visible to birds, they should stand out against the surroundings. Streamers should be made of brightly coloured fluorescent plastic tubing or other material. Bright colours such as red, yellow, orange or pink are most effective during day setting. For night setting, the streamers should be of a colour that contrasts with the surroundings. Colours such as blue and green are less likely to be effective, because they are less likely to be highly visible to birds.

(10) In order to comply with the regulations, a streamer line must be used when setting surface longlines. If the streamer line that is in use breaks or is damaged, it must be repaired or replaced so that it meets these specifications before any further hooks enter the water. For this reason, a complete additional streamer line should be carried as a spare.

9. Revocation—The following notice is revoked:
Fisheries (Seabird Scaring Devices Minimum Standard and Procedures) Notice 2007 (No. F414)