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National Plan of Action – Seabirds 2020

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1. Introduction

This document provides background to New Zealand's National Plan of Action-Seabirds 2020: Reducing the incidental mortality of seabirds in fisheries (NPOA Seabirds 2020). This document supports the NPOA Seabirds 2020 by providing more information about New Zealand's seabird populations; how seabirds interact with fisheries; what risks seabirds face from fisheries; and how these risks can be mitigated. This document also provides more details about the implementation approach and measurement of progress against the goals and objectives of the NPOA Seabirds 2020.

2. History

The responsibility to deal with threats to seabirds from fishing stems from the United Nations Convention on the Law of the Sea 1982 (UNCLOS). UNCLOS requires coastal states, like New Zealand, to ensure their Exclusive Economic Zone (EEZ) conservation and management measures take into consideration the effects on species, such as 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'*.¹

UNCLOS Article 119(1)(b) places a similar obligation on all states fishing on the high seas.² These obligations were repeated and developed in the United Nations Fish Stocks Agreement³ and the Food and Agriculture Organization of the United Nations (FAO)'s Code of Conduct for Responsible Fisheries⁴, both of which were produced in 1995. Therefore, the obligation to consider effects on species, such as seabirds, could now be considered binding on all countries as part of customary international law.

As a result of increased awareness about the incidental capture of seabirds, especially in longline fisheries, in 1998, the FAO organised an expert consultation on the subject. This resulted in publishing the International Plan of Action for reducing incidental catch of seabirds in longline fisheries (IPOA-Seabirds) in 1999.⁵

The IPOA-Seabirds guides countries when preparing their own national plans of action to reduce the incidental catch of seabirds in longline fisheries, and deciding what technical measures to include. These plans are known as, 'NPOA Seabirds'.

New Zealand's first NPOA Seabirds was published in 2004.⁶ The NPOA Seabirds 2004 included all New Zealand fisheries, and:

- described what was known about seabird interactions with New Zealand fisheries;
- explained the voluntary and mandatory measures that New Zealand would use to reduce the incidental catch of seabirds in those fisheries;
- listed the research that was underway to understand the nature and extent of incidental catch, and how to mitigate it; and

¹ [United Nations Convention on the Law of the Sea 1982 \(UNCLOS\)](#):Article 61(4).

² UNCLOS 1982: Article 119(1)(b)

³ [Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks 1995 \(UN Fish Stocks Agreement\) 2001](#)

⁴ [FAO Code of Conduct for Responsible Fisheries 1995](#)

⁵ [International Plan of Action for reducing incidental catch of seabirds in longline fisheries \(IPOA Seabirds\) 1999](#)

⁶ <https://fs.fish.govt.nz/Doc/21870/NPOAseabirds%5B1%5D.pdf.ashx>

- outlined how New Zealand would oversee, monitor and review the effectiveness of the voluntary and mandatory measures and the overall implementation of the NPOA Seabirds 2004.

In 2007, the FAO acknowledged the need to broaden the range of fishing gear covered by the IPOA-Seabirds, and the need to strengthen the IPOA-Seabirds' implementation by developing best-practice technical guidelines. These guidelines were developed at an expert consultation in 2008.⁷

The best practice technical guidelines highlighted that, despite international efforts to reduce the incidental mortality of seabirds in longline fisheries, the populations of many seabird species were declining. The declining populations were partly attributed to: the low number of countries that had developed an NPOA Seabirds; the limited implementation of NPOA Seabirds; the varying quality of the NPOA Seabirds; and the limited action being taken by some Regional Fisheries Management Organisations (RFMOs). Developing and implementing a more robust and widespread suite of NPOA Seabirds, which covered all relevant types of fishing gear, was necessary and urgent.

New Zealand responded by revising its NPOA Seabirds 2004 in 2012, to produce the NPOA Seabirds 2013.⁸ This revision acknowledged that, although the incidental capture of seabirds had been reduced in some New Zealand fisheries, much more work was needed in other fisheries, and improvements were needed in all fisheries. The NPOA Seabirds 2013 also acknowledged the need to assess, and help reduce the incidence of, incidental mortality of New Zealand seabirds in waters outside New Zealand's jurisdiction.

The NPOA Seabirds 2020 replaces the NPOA Seabirds 2013. It uses lessons learnt from implementing the NPOA Seabirds 2013, which are described in the *Review of the National Plan of Action Seabirds 2013*.⁹

3. State of New Zealand Seabird Populations

New Zealand seabirds have diverse taxonomy, biology, ecology and behaviour. Approximately 145 seabird taxa use New Zealand waters. This includes about 95 taxa that breed in New Zealand—over one third of these are endemic, meaning they only breed in New Zealand.

More albatross, petrel, shag and penguin species breed in New Zealand than anywhere else in the world. Other seabirds visit New Zealand waters to feed, however do not breed here.

The diversity of seabirds in New Zealand partly stems from the country's unique natural history, and its geographic spread from the sub-tropical Kermadec archipelago in the north to the sub-Antarctic islands in the south. Before humans arrived in New Zealand, the absence of mammalian predators on land made it a particularly safe place for seabirds to breed. New Zealand continues to be an important foraging and breeding ground for seabirds because of its extensive coastline; numerous inshore and offshore islands (many of which are predator free); and surrounding seas and oceans.

Despite New Zealand being such an important area for seabirds, they face many threats. These include predators (introduced land-based mammals and other birds), disease, fire, weeds, loss of

⁷ Food and Agriculture Organization of the United Nations. [Report of the expert consultation on best practice technical guidelines for IPOA/NPOA Seabirds](#). FAO Fisheries and Aquaculture Report No. 880, FIIT/R880 (En). Bergen, Norway. 2–5 September 2008.

⁸ <https://www.mpi.govt.nz/dmsdocument/3962-national-plan-of-action-2013-to-reduce-the-incidental-catch-of-seabirds-in-new-zealand-fisheries>

⁹ <https://www.fisheries.govt.nz/protection-and-response/sustainable-fisheries/managing-our-impact-on-marine-life/seabirds/>

nesting habitat, competition for nest sites, coastal development, human disturbance, commercial and cultural harvesting, volcanic eruptions, pollution, plastic and marine debris, oil spills and exploration, heavy metals or chemical contaminants, global sea and air temperature changes, marine biotoxins and interactions with fisheries.¹⁰

The International Union for the Conservation of Nature (IUCN) maintains a global list of threat status for a range of species, including seabirds. The seabird species at highest risk of capture by New Zealand's fisheries have IUCN threat statuses ranging from endangered (such as Gibson's albatross) to near-threatened (such as Southern Buller's albatross).

New Zealand also defines threat status for its seabird species under the New Zealand Threat Classification Scheme. New Zealand classifies a number of taxa at a finer resolution than the IUCN (for example, separating Gibson's and Antipodean albatross), and ranks the threat status of New Zealand-breeding populations only (for example, flesh-footed shearwater, which also breeds in Australia).

Table 1 lists the species of New Zealand's seabirds most at risk from fishing (from the 2020 seabird risk assessment, refer to section 4.3), together with their IUCN and New Zealand threat status.

¹⁰ Taylor, G. A. (2000). *Action plan for seabird conservation in New Zealand. Part A, threatened seabirds*. Threatened Species Occasional Publication No. 16. Department of Conservation, Wellington. Retrieved from at <https://www.doc.govt.nz/globalassets/documents/science-and-technical/tsop16.pdf>

Table 1: Seabird taxa at risk from commercial fishing in New Zealand, and IUCN and New Zealand threat status

Common name ¹¹	Scientific name	Risk	IUCN threat status ¹²	NZ threat status ¹³
Black petrel	<i>Procellaria parkinsoni</i>	Very High	Vulnerable	Threatened, Vulnerable
Salvin's albatross	<i>Thalassarche salvini</i>	High	Vulnerable	Threatened, Critical
Westland petrel	<i>Procellaria westlandica</i>	High	Endangered	At risk, Uncommon
Flesh-footed shearwater	<i>Puffinus carneipes</i>	High	Near threatened	Threatened, Vulnerable
Southern Buller's albatross	<i>Thalassarche bulleri bulleri</i>	High	Near threatened*	At risk, Uncommon
Gibson's albatross	<i>Diomedea antipodensis gibsoni</i>	High	Endangered*	Threatened, Critical
New Zealand white-capped albatross	<i>Thalassarche steadi</i>	Medium	Near threatened	At risk, Declining
Chatham Island albatross	<i>Thalassarche eremite</i>	Medium	Vulnerable	At risk, Uncommon
Northern Buller's albatross	<i>Thalassarche bulleri platei</i>	Medium	Near threatened*	At risk, Uncommon
Yellow-eyed penguin (mainland)	<i>Megadyptes antipodes</i>	Medium	Endangered	Threatened, Endangered*
Antipodean albatross	<i>Diomedea antipodensis antipodensis</i>	Medium	Endangered*	Threatened, Critical
Northern giant petrel	<i>Macronectes halli</i>	Medium	Least concern	At risk, Recovering
Otago shag	<i>Leucocarbo chalconotus</i>	Medium	Vulnerable*	At risk, Recovering
Spotted shag	<i>Stictocarbo punctatus</i>	Low	Least concern	Not threatened
Yellow-eyed penguin	<i>Megadyptes antipodes</i>	Low	Endangered	Threatened, Endangered
White-chinned petrel	<i>Procellaria aequinoctialis</i>	Low	Vulnerable	Not threatened
Campbell black-browed albatross	<i>Thalassarche impavida</i>	Low	Vulnerable*	Threatened, Vulnerable
Northern royal albatross	<i>Diomedea sanfordi</i>	Low	Endangered	At risk, Uncommon

* Threat status assessed at a different population level

¹¹ From Richard, Y.; Abraham, E.; Berkenbusch, K. (2020) Assessment of the risk of commercial fisheries to New Zealand seabirds, 2006-07 to 2016-17. *New Zealand Aquatic Environment and Biodiversity Report* 237. Retrieved from <https://www.mpi.govt.nz/dmsdocument/39407-aebr-237-assessment-of-the-risk-of-commercial-fisheries-to-new-zealand-seabirds-200607-to-201617>

¹² IUCN. (2019). *The IUCN red list of threatened species*. Version 2019-1. Retrieved from www.iucnredlist.org

¹³ Retrieved from <https://www.doc.govt.nz/globalassets/documents/science-and-technical/nztcs19entire.pdf>

4. Interactions between Seabirds and New Zealand Fisheries

Understanding how seabirds interact with New Zealand fisheries helps explain New Zealand's rationale for the NPOA Seabirds 2020.

4.1 Types of Seabirds at Risk of Incidental Capture

Different species of seabirds have different biological characteristics (such as diving ability, agility, size, sense of smell, eyesight and diet) and foraging traits (such as foraging range; and aggression, boldness or shyness they display towards fishing activity). These differences affect the threats they face from fishing operations, and how susceptible they are to interactions with, and capture by, fishing.

The nature and extent of seabird interactions with fishing operations differs spatially and temporally. There are further variations between sectors and fisheries, and between fleets and vessels within fisheries. Some fishing methods are particularly threatening to some types or species of seabirds. For example, penguins are particularly vulnerable to set net operations.

During the 2018/19 fishing year, the seabird species most frequently observed captured in New Zealand commercial fisheries were, in descending order, white-chinned petrel, white-capped albatross, sooty shearwater, Buller's albatross, and Salvin's albatross.¹⁴ The observed seabird capture rates in trawl, longline and set net fisheries are provided in Appendix 5 of the *Review of the National Plan of Action Seabirds 2013*.¹⁵

4.2 Current Information Sources

Four main sources of information are used to identify and assess the nature, extent and potential consequences of seabird mortality in fisheries within New Zealand's jurisdiction, or fishing by New Zealand vessels on the high seas:

1. Fisheries New Zealand's observer-reported data. This provides data on seabird captures, species identification, use of mitigation measures and general fishing practices, photographs of seabirds caught on fishing vessels, and specimens (seabirds killed by fishing operations) for onshore analysis.
2. Commercial fisher-reported data. This provides data on the spatial and temporal distribution of fishing effort, and on seabird captures, but less resolution on seabird species.
3. Research outputs on seabird biology, demography, ecology, and at-sea distribution.
4. Data collected by, or reported to, RFMOs.

Information from these sources is used to report on, and monitor, seabird captures in New Zealand fisheries, seabird population statuses, and to assess the risk fisheries pose to seabirds.^{16 17} These reports, along with domestic and international assessments of seabird population status (Table 1), are the basis for assessing the nature and extent of seabird captures in New Zealand fisheries. Such

¹⁴ Observer coverage is not representative of total fishing effort. Therefore, the seabird species that are most frequently observed being captured may not be a true reflection of the seabird species most frequently caught across all New Zealand fisheries.

¹⁵ <https://www.fisheries.govt.nz/protection-and-response/sustainable-fisheries/managing-our-impact-on-marine-life/seabirds/>

¹⁶ The *Aquatic Environment and Biodiversity Annual Review 2018* is available at <https://www.fisheries.govt.nz/dmsdocument/34854-aquatic-environment-and-biodiversity-annual-review-aear-2018-a-summary-of-environmental-interactions-between-the-seafood-sector-and-the-aquatic-environment>

¹⁷ Fisheries New Zealand's database of protected species capture information is maintained at <https://psc.dragonfly.co.nz>

information provides comprehensive, annual data by fishery and species, and will be used to assess implementation and performance during the term of the NPOA Seabirds 2020.

Other sources of information include: anecdotal information about interactions between seabirds and New Zealand's recreational and customary non-commercial sectors; and information from various sources about seabird interactions in waters under the jurisdiction of other coastal states.

Digital monitoring is expected to substantively change how fisheries are monitored in New Zealand. Digital monitoring involves geospatial position reporting and electronic reporting by commercial fishers. Cameras on fishing vessels may also supplement on-board observer activities. Digital monitoring is expected to improve the information on seabird capture events across a broad range of fisheries.

4.3 Risk Assessment Method

The New Zealand seabird risk assessment is the main way that Fisheries New Zealand evaluates the impact of commercial fisheries on New Zealand seabirds. The risk assessment uses the spatially explicit fisheries risk assessment (SEFRA) method.¹⁸ For each seabird population, the seabird risk assessment combines an impact assessment of deaths from all commercial fisheries with a biological assessment of the associated effect on the population, as a function of population size and demographic parameters influencing population productivity. Using Bayesian models, uncertainty arising from imprecise model inputs and imperfect model fits is estimated empirically and reflected explicitly in model outputs.

For each species–fishery combination, the SEFRA method combines maps of seabird distributions with maps of spatially-resolved fishing effort data and observed seabird captures recorded by fisheries observers. The rate at which seabirds encounter fishing effort is a product of the spatial overlap of the seabird and fishing effort distribution layers. The probability of death per encounter is estimated from observed captures, and modified to include deaths that may be un-observable (known as ‘cryptic mortality’).

The New Zealand seabird risk assessment is a multi-species model that assesses risk from fisheries to all seabird populations and from all commercial fishing methods simultaneously, to estimate cumulative effects at the population level. Subsequently, model estimates can be queried or disaggregated at any spatial and temporal scale, so that decision makers can focus on particular species, fisheries or locations of interest, and can track changes over time. Outputs of the risk assessment can be used to: prioritise the deployment of fisheries observers (where catchability is uncertain); identify what additional research is needed (where risk is uncertain because the inputs into the model are imprecise); and inform the design of risk reduction measures (where risk is judged to be too high).

The SEFRA method evaluates performance against policy objectives by expressing estimated fisheries-related deaths as a proportion of a predefined ‘Population Sustainability Threshold’ (PST). PST is the maximum number of annual deaths under which the impacted population size can be expected to recover to and/or stabilise at a particular fraction of the un-impacted population. In other words, risk is calculated by comparing estimated deaths with the PST. The risk score is expressed as a Bayesian distribution including uncertainty. Therefore, PSTs can also be defined with reference to the level of confidence with which the population outcome will be achieved, e.g. “With

¹⁸ The SEFRA method is described in chapter 3 of the *Aquatic environment and biodiversity annual review 2018*, available at <https://www.mpi.govt.nz/dmsdocument/34854-aquatic-environment-and-biodiversity-annual-review-aebar-2018-a-summary-of-environmental-interactions-between-the-seafood-sector-and-the-aquatic-environment>

X% certainty, a population for which Risk = 1 will recover to and/or stabilise at or above Y% of the un-impacted level”.

The choice of population outcome implicit in the PST is a policy decision, which may vary between species. To date, the multi-species seabird risk assessment has used a simple logistic population-growth model with a default setting for all species.¹⁹ The policy decision may be reviewed to reflect different conservation priorities for different seabird species.

Regardless of the choice of population outcome in the PST (the denominator in the risk equation), risk scores are additive as a function of the number of deaths (the numerator). This means that species-level risk scores can be disaggregated by fishery or geographic area, at any spatial scale. The following sections summarise the contributions each fishery group makes to species-level risk for the most at-risk seabird species.

This document uses the 2020 Seabird Risk Assessment²⁰, and bases the risk categories on those used in the NPOA Seabirds 2013 as per Table 1, where a species is in a category if the risk ratio meets either the median or credible interval threshold.

Risk Category	Median	Credible Interval
Very High	1	>2
High	0.3	>1
Medium	0.1	>0.3
Low	-	>0.1

4.4 Commercial Longline Fisheries

Seabirds are captured in longline fisheries when they get hooked through their beaks or throats (or other parts of their bodies) when they try to eat hooked bait. They can also get tangled in fishing line when they forage on hooked bait, fish or discharged fish waste.

Seabirds are captured primarily during the setting or hauling of longlines, when the hooks are at a depth at which baits are accessible to seabirds. When seabirds are caught during setting, they typically die as they are dragged underwater and drown. Seabirds that are caught during hauling are often released alive, although the post-release survival rates are not well known.

Therefore, slow longline sink rates during setting, and the discharge of fish waste during setting and hauling, are operational factors that may increase the risk of seabird captures.

The risk of seabirds being captured during setting can be reduced by using tori (streamer) lines, which deter seabirds from foraging on baited hooks. Another risk-reduction method is using line or hook weighting regimes that rapidly sink baited hooks to below the reach of diving seabirds.

The risk of seabirds being captured during hauling can be reduced by managing the discharge of fish waste, deploying deterrent devices (such as a brickle curtain), and operational practices that minimise the time hauled hooks stay at, or near, the surface of the water.

¹⁹ The default is that Risk = 1 corresponds to a median population-stabilisation outcome of 75% of the un-impacted population level.

²⁰ Richard, Y.; Abraham, E.; Berkenbusch, K. (2020) Assessment of the risk of commercial fisheries to New Zealand seabirds, 2006-07 to 2016-17. *New Zealand Aquatic Environment and Biodiversity Report 237*. Retrieved from <https://www.mpi.govt.nz/dmsdocument/39407-aebr-237-assessment-of-the-risk-of-commercial-fisheries-to-new-zealand-seabirds-200607-to-201617>

There are two categories of longline fishing. Surface (pelagic) longlining uses gear suspended from the sea surface using floats; bottom (demersal) longlining uses gear sunk to the seabed using weights.

4.4.1 Surface longline fisheries

Surface longline gear is used to target tuna species and swordfish in the upper 100–200 metres of the water column. During the 2018/19 fishing year, around 30 vessels used surface longline fishing methods in New Zealand.²¹ Such vessels are between 14 and 22 metres long. Fish waste from at-sea processing is discharged at sea.

Between 800 and 1,200 hooks, typically baited with squid, are usually deployed per fishing event (or 'set'). During the 2018/19 fishing year, 2 million hooks were reported set.²²

Surface longline gear consists of long (up to 20 metres) transparent nylon snoods (branch lines) suspended from a monofilament backbone. However, the way gear is configured (such as the snood length and spacing) depends on the target species and fisher's preference.

Until 2015/16, the surface longline fishery operating in New Zealand included Japanese charter vessels. These vessels were more than 43 metres long, deployed up to 4,000 hooks per set, and configured their gear differently to the domestic vessels (for example, they used longer snoods). The Japanese charter fleet was comprehensively observed and had relatively low seabird capture rates. The Japanese charter fleet has not fished in New Zealand since vessel registration requirements changed in 2016, and is therefore not discussed further in this document. Any reference to seabird capture rates or observer coverage before 2015/16 refers to the domestic fleet only.

The spatial distribution of surface longline fishing effort varies during the year. However, there are four primary fisheries:

1. a swordfish and bigeye tuna target fishery in northern waters, which operates throughout the year, however mainly in the austral summer (and accounts for around 30% of total surface longline effort);²³
2. a southern bluefin tuna target fishery off the west coast of the South Island, which mainly operates between April and July (and accounts for around 20% of total surface longline effort)
3. a second bluefin tuna target fishery off the east coast of the North Island, which operates between May and September (and accounts for around 40% of total surface longline effort)
4. a third southern bluefin tuna fishery off the east coast of the South Island, which operates between February and May (and accounts for around 10% of total surface longline effort)

Gear configuration and operations vary between target species. When swordfish are being targeted, hooks are typically set closer to the sea surface, and there is a larger distance between snoods than when southern bluefin tuna are targeted. Vessel operators may also choose to set at a faster speed when they target swordfish—so that hooks stay closer to the surface—or set during the day to maximise the catch.

Surface longline fishing gear may also present a risk to seabirds when the gear is fishing (termed the 'soak'). Environmental factors (such as upwelling), or large fish (like tuna or sharks) can bring the gear towards the surface so that it becomes accessible to seabirds.

²¹ Most vessels that fish using the method of surface longlining also fish using other methods for part of the year.

²² Note that fishing effort and observer data used throughout this report is ungroomed and may be subject to change.

²³ The percentage of total effort is based on the number of hooks set in the 2018/19 fishing year.

The southern bluefin tuna surface longline fishery has the highest observer coverage, with the swordfish and bigeye tuna fisheries having lower coverage. During the 2018/19 fishing year approximately 10% of effort (hooks) targeting southern bluefin tuna was observed, while 9% of effort targeting swordfish and bigeye tuna was observed.

Various albatross and petrel species, many of which are classified as being at ‘Very High’ or ‘High’ risk from fishing (by the latest iteration of the seabird risk assessment), have been observed interacting with surface longline gear. The capture of large albatross species (*Diomedea spp*) in surface longline fisheries is a particular concern. The 2020 seabird risk assessment estimated that surface longline fisheries contributed 93% of the risk score (the percentage of annual potential fatalities²⁴) for Gibson’s albatross and 86% of the risk score for Antipodean albatross.

Black petrel, southern Buller’s albatross, Westland petrel and white-capped albatross are other ‘Very High’ or ‘High’ risk species that have been observed caught in surface longline fisheries. The 2020 seabird risk assessment estimated that surface longline fisheries contributed 18% of the risk score for black petrel, 19% of the risk score for southern Buller’s albatross, 31% of the risk score for Westland petrel and 7% of the risk score for white-capped albatross. Black petrels are mostly caught in the summer swordfish or bigeye tuna target fisheries,²⁵ while white-capped albatross, southern Buller’s albatross and Westland petrel are mostly caught in the west coast of the South Island southern bluefin tuna fishery. Few seabirds are caught in the southern bluefin tuna fishery on the east coast of the North Island.

4.4.2 Bottom longline fisheries

During the 2018/19 fishing year, approximately 90 vessels fished using the method of bottom longlining in New Zealand. The species of seabirds that are most frequently observed interacting with bottom longline vessels vary by fishery.

The 2020 seabird risk assessment estimated that bottom longline fisheries contributed 13% of the risk to Salvin’s albatross, 63% of risk to Chatham Island albatross, 51% of the risk to northern giant petrel, 32% of the risk to black petrel, 53% of the risk to flesh-footed shearwater, and 18% of the risk to Westland petrel.

The set up and operations of the bottom longline fleet are diverse, but the fleet can broadly be split into two types based on the method used to bait hooks.

4.4.2.1 Hand-baiting Vessels

Most bottom longline vessels bait hooks by hand. Hand-baiting vessels are typically between 6 and 25 metres long and deploy up to 6,000 hooks per set. During the 2018/19 fishing year, hand-baiting bottom longline vessels recorded setting approximately 21 million hooks.

Hand-baiting vessels target a wide variety of species and are active around New Zealand’s entire coastline—from shallow inshore waters to some offshore areas over 600 metres deep. These vessels most frequently target snapper (snapper targeting makes up 51% of the total effort primarily from Northland to the Bay of Plenty),²⁶ ling (ling targeting makes up 27% of the total effort and is targeted

²⁴ An estimate of the number of birds killed in fisheries each year.

²⁵ Black petrels are not present in New Zealand waters during the winter, so they don’t face the risk of capture in the southern bluefin tuna fishery on the east coast of the North Island.

²⁶ The percentage of total effort is based on number of hooks set between the 2016/17 and 2018/19 fishing years.

around the South Island and eastern North Island), and bluenose or hapuka (bluenose or hapuka targeting makes up 12% of the total effort and is predominantly conducted in northern waters).

These vessels discharge fish waste (e.g. offal and used bait) at sea. However, the quantity of fish waste discarded varies considerably depending on target species; snapper is landed whole, which results in very little fish waste whereas ling is generally processed at sea, which results in an increased quantity of fish waste.

All hook-bearing lines deployed from hand-baiting vessels are externally weighted. However, the way gear is set up varies between target species and vessel operators. For example, when targeting bluenose, operators typically add more floats to the line.

Hand-baiting vessels targeting snapper, bluenose or hapuka off northern New Zealand are known to capture black petrels and flesh-footed shearwaters. The 2020 seabird risk assessment estimated that small vessel bottom longline fisheries contributed 32% of the risk score for black petrels and 53% of the risk score for flesh-footed shearwaters.²⁷

Specific analysis of observer data indicates that black petrel and flesh-footed shearwater captures on hand-baiting bottom longline vessels are more likely to occur during the haul than other seabirds in other bottom longline fisheries.²⁸

Observer coverage of the hand-baiting bottom longline fleet is typically lower than that for autoline, with between 2% and 5% of hooks set observed annually. Coverage is directed towards the South Island ling and North Island snapper, bluenose or hapuka fisheries.

4.4.2.2 Autoline Vessels

Vessels that use automatic baiting machines (autoline vessels) are typically larger than hand-baiting vessels, and deploy more hooks (up to 30,000) per set. During the 2018/19 fishing year, autoline vessels recorded setting approximately 20 million hooks within New Zealand's EEZ.

Large (more than 34 m long) autoline vessels predominantly target ling in offshore waters (chiefly the Chatham Rise and sub-Antarctic), or toothfish species in very deep water outside the EEZ. Smaller (less than 34 m long) autoline vessels target a wider range of species (ling, school shark, hapuka and bluenose) in coastal and offshore waters.

As of May 2020, eight autoline vessels (four large and four small) were active in New Zealand or registered to New Zealand companies. The four large vessels use an integrated weight line with a lead core of 50 grams per metre. Small autoliners weight lines externally. Three of the large autoliners operate fish-meal processing plants, turning most of their fish waste into meal. The other vessels discharge fish waste at sea.

Observer coverage of the autoline bottom longline fleet varies between fisheries and vessels. The large autoline fleet that targets toothfish species outside the EEZ has 100% observer coverage, with very low observed seabird capture rates. The large autoline fleet that targets ling within the EEZ has been moderately well observed (approximately 15% of hooks set were observed between the

²⁷ The risk assessment does not differentiate between hand-baiting and autoline vessels. It does, however, distinguish between the small vessel (less than 34 m) and large vessel (greater than 34 m) bottom longline fleets. The delineation is intended as a proxy for hand-baiting and autoline vessels but the smaller autoline vessels are included within the small vessel bottom longline fleet. Numbers provided are based on small ling BLL, snapper, hapuka, minor species, and bluenose target BLL.

²⁸ Between the 2008/09 and 2017/18 fishing years 44% of the black petrel and 34% of the flesh-footed shearwaters that were observed captured on hand-baiting bottom longline vessels were released alive. As they were released alive, it is assumed they were caught during the haul, not during the set. By comparison, 8% of white-chinned petrels observed caught on large autoline vessels during this time were released alive, indicating that most captures occurred during the set.

2006/07 and 2018/19 fishing years). However, the small autoline fleet has not been as well observed (fewer than 5% of hooks set are observed each year).

Seabird capture rates by large (more than 34 m long) autoline vessels are typically low (between 0.01 and 0.02 seabirds per 1,000 hooks). White-chinned petrel is the most frequently caught species, although the 2020 seabird risk assessment estimates a 'Low' risk to the population from fishing.

The large vessel ling bottom longline fishery is estimated to pose a negligible risk to all New Zealand seabird species.

4.5 Commercial Trawl Fisheries

Trawling involves using cables called warps to tow a net (or nets) at depth behind a vessel.

When seabirds collide with trawl warps, they can be injured or die, especially larger species like albatross. If seabird wings are injured, the seabird may be unable to forage, which can lead to death. Some seabirds drown when the trawl warps force them underwater. Grease, or similar substances, applied to warps can get transferred onto seabirds, damage their feathers and exacerbate the risk of capture. Seabirds that are injured or killed in interactions with warps are not always retained and counted as an observed capture. This mortality is known as 'cryptic mortality' and remains a key area of uncertainty in relation to understanding mortality from seabirds resulting from trawl fishing.

There is an increased risk of collisions between seabirds and trawl warps if the discharge of fish waste attracts seabirds towards risk areas where the trawl warps enter the water. Managing fish waste²⁹ and deploying warp mitigation devices that scare or deter birds from risk areas (such as bird bafflers or tori lines) can reduce the risk of seabirds colliding with trawl warps.

Seabirds can also be caught by trawling if they get tangled in trawl nets. This can happen when the net is on, or close to, the sea surface typically during deployment of the gear (shooting) or hauling. Smaller seabirds (such as petrels or shearwaters) can get trapped inside the net when they dive into its mouth, while other species (such as albatrosses) may get tangled in the net mesh when they try to seize fish from the net. The risk of seabirds getting caught in the net is reduced if fish are removed from the net before shooting (the term for fish stuck in nets is 'stickers') and the time the net spends at, or near, the surface is minimised.

Between the 2014/15 and 2018/19 fishing years, approximately 88% of observed captures on deepwater trawl vessels were classed as 'net captures'. Of those, 37% of the seabirds were released alive, although post-release survival rates are unknown. The number of seabirds observed to be caught in the net greatly exceeds those observed to be caught by warps.³⁰ However, before drawing firm conclusions about which capture type poses a greater risk to seabirds, cryptic mortality and the comparative risks of trawl and net captures on less well-observed trawl fleets must be considered.

4.5.1 Types of Trawl Vessels

Three trawl fleets are active within New Zealand: large trawl vessels (more than 28 m long), small trawl vessels (less than 28 m long) and scampi trawl vessels.

As of May 2020, there were 35 vessels in the large trawl fleet. These vessels mostly target middle-depth species (such as hoki or squid) or deepwater species (mainly orange roughy or oreo) in

²⁹ Fish waste can be managed by processing it into fish meal, mincing it, discharging it in batches or restricting its discharge.

³⁰ Between the 2014/15 and 2018/19 fishing years 88% of observed captures on deepwater trawl vessels were classed as 'net captures'; 8% were classed as 'warp captures'; and 4% were classed as 'other' (this includes birds that were caught on the paravane or were tangled in a mitigation device).

offshore waters. Some vessels may also target inshore species (such as snapper or trevally, particularly around the North Island). The large trawl fleet conducts approximately 25,000 fishing events (tows) each year. Many large trawlers undertake some on board processing; therefore, they generate more fish waste than other vessels. This fish waste is either turned into fishmeal, minced and discharged, or discharged in batches. Eighteen vessels in the large vessel trawl fleet have on-board meal plants, which reduces the quantity of fish waste to be discharged.

As of May 2020 there were approximately 140 vessels in the small vessel trawl fleet. These vessels operate in coastal waters around the entire coastline, typically targeting inshore species. The small trawl fleet conducts between 50,000 and 60,000 tows each year. They may also seasonally target middle-depth species such as hoki. Small trawlers keep fish whole (green), although they may process non-target species (such as ling or school shark) at sea.

As of May 2020, the scampi trawl fleet comprises 10 vessels that almost exclusively target scampi.³¹ These vessels are between 20 and 32 m long and use specific scampi gear (lightweight, multi-rig nets). The scampi fleet typically conducts 4,500 to 5,000 tows per year.

Although most scampi are retained whole, scampi fishing incurs high rates of non-target fish and invertebrate catch, which results in relatively high rates of fish waste being discharged. The discharge of fish waste attracts seabirds to the vessel, increasing the risk of seabird captures. Multi-rig nets also stay on the water's surface longer during hauling, which can increase the risk of seabirds getting caught in the net.

4.5.2 Observer Coverage

The rates of observer coverage vary between the three trawl fleets. The large trawl fleet has been consistently well observed: more than 40% of all tows by large trawlers were observed between the 2014/15 and 2018/19 fishing years. Specific target fisheries (such as southern squid, jack mackerel and southern blue whiting) have noticeably higher levels of observer coverage (up to 100% of tows).

The rate of observer coverage of the small trawl fleet is much lower (approximately 5% of tows between 2014/15 and 2018/19). It has increased in recent years, but remains highly skewed towards northern waters and seasonal hoki fisheries.

The rates of observer coverage of the scampi trawl fleet are also relatively low: coverage rates varied between 3% of tows in 2015/16 and 16% in 2018/19.

4.5.3 Risk to Seabirds

The trawl fleet is active throughout New Zealand's EEZ, and a wide variety of seabird species are known to interact with, and be captured by, commercial trawl vessels. Seabird interactions with the trawl fleet are best characterised for large vessel fisheries, as they are the ones most commonly observed. Seabird capture rates by the large trawl fleet are highest in the southern squid and Chatham Rise or sub-Antarctic middle-depth fisheries. Seabird capture rates are lowest in the deepwater and jack mackerel fisheries.

Of the species classed as being at a 'Very High' or 'High' risk from fishing, large trawlers (excluding those targeting scampi) are estimated to contribute 34% of the risk score for Salvin's albatross; 62%

³¹ Some vessels may also target other deepwater species or inshore species, or switch to different fishing methods.

of the risk score for southern Buller's albatross; 18% of the risk score for Westland petrel; and 35% of the risk score for white-capped albatross.³²

Less is known about seabird interactions with the small trawl fleet, because the fleet is not well observed and observer coverage is biased towards areas or fisheries where lower rates of seabird captures would be expected.³³ Observed capture rates are unlikely to be representative of the total number of seabirds captured, as seabird captures are thought to be more frequent in certain areas or seasons when there is often less observer coverage. The estimated number of seabirds caught by small trawlers is highly uncertain.

For species classed as being at a 'Very High' or 'High' risk from fishing, the estimated contribution from small trawlers to the overall risk is shown in the table below.

Species	Proportion of risk estimated from inshore trawl
Black petrel	46%
Salvin's albatross	39%
Flesh-footed shearwater	31%
Westland petrel	29%
Southern Buller's albatross Gibson's albatross	<10%

Although observer coverage of the scampi trawl fishery is relatively low, the current estimates of seabird interactions in this fishery are thought to be reasonably accurate. This is because the scampi fishery is limited to five small areas (more than 99% of scampi target tows are conducted in these areas) and the observer coverage is relatively representative of the whole fishery.

Seabird species known to interact with the scampi trawl fleet include Salvin's albatross and white-capped albatross (primarily on the Chatham Rise and in the sub-Antarctic); flesh-footed shearwaters (in the Bay of Plenty); and white-chinned petrel (in the sub-Antarctic). The 2020 seabird risk assessment estimated that the scampi trawl fleet contributes 12% of the risk score for Salvin's albatross, 6% of the risk score for flesh-footed shearwater and 3% of the risk score for white-capped albatross.

4.6 Commercial Set Net Fisheries

Set nets (also known as gill nets) are a threat to diving seabirds (such as penguins, shags and petrels) due to the risk of them getting tangled, and drowning, in the nets while they forage for food. Depending on the seabird species, and how the nets are fished, seabirds can get captured when the net is deployed (set or hauled) or when soaking (while the gear is being used for fishing). Nets set close to breeding colonies and within key foraging areas are considered to pose the greatest risk to seabirds, particularly penguins.

A broad range of fish species are targeted using set nets. The areas fished, net configuration, and operational practices used vary according to the fish species being targeted. Flatfish and mullet are

³² Contributions to risk based on hoki, middle depth, squid, scampi, deepwater, ling, hake, southern blue whiting, and jack mackerel trawl APF estimates. This includes some effort by small trawl vessels.

³³ Small (less than 28 m long) trawlers in areas and fisheries with relatively high levels of observer coverage include the inshore trawl fishery off the west coast of the North Island and seasonal (winter) hoki fisheries in the Cook Strait or on the west coast of the South Island.

targeted by relatively small (less than 13 m long) vessels within enclosed waters, such as estuaries. This activity is thought to present a low risk to seabirds.

A second set net fleet operates in coastal waters. It primarily targets sharks, although warehou, ling or tarakihi are also targeted. These vessels are larger (up to 22 m long) and use longer nets,³⁴ with some vessels using multiple nets per fishing event. The coastal set net fleet operates around most of the coast of New Zealand (noting that a number of exclusions zones are in place for marine mammals).

A third set net fleet targets butterfish using multiple, short (20 m) nets. These nets are typically set very close to the shore and can present a very high risk to seabirds if they are used near seabird colonies. During the 2018/19 fishing year, approximately 30 vessels targeted butterfish this way, mainly in Cook Strait and around the south coast of the South Island.

The rates of observer coverage of set net fisheries are mixed. The coverage in some areas (such as around New Plymouth) has been high (100%) for some years, moderate (up to 30% of nets set) in some areas (such as the south and east coasts of the South Island), and low to nil in other areas or sectors (such as in Cook Strait or enclosed waters like estuaries). Overall, observer coverage in set net fisheries has averaged around 3.5% of nets set over the 2014/15 to 2018/19 fishing years.

In recent years, yellow-eyed penguins, Fiordland crested penguins, little blue penguins, Stewart Island shags, flesh-footed shearwaters and cape petrels have been observed caught in set nets. However, it is difficult to infer the number and rate of seabird captures in set net fisheries around New Zealand, because observer data is limited and not representative.

4.7 Other Commercial Fisheries

Observer data, fisher reports and research indicate that seabirds occasionally die in other commercial fisheries, including trolling, potting, and purse seining. Diving seabirds, like shags, can get trapped in fish or lobster pots while they forage for food,³⁵ while others, like gannets, can get hooked or tangled up in the line after diving on trolling lures. Internationally, seabirds are known to get caught in purse seine fisheries.³⁶ However, between 2004/05 and 2018/19 only eight seabirds were observed caught during purse seine operations in New Zealand, and six of these were released alive. During this time, approximately 10% of purse seine fishing events were observed.

³⁴ Regulations provide for most fishers to use up to 3,000 metres of nets.

³⁵ Shags captured in pot fisheries have historically been reported from the Chatham Islands; however, changes to pot designs are thought to have reduced the risk of capture. Wildlife Management International Limited. (2012). *Shag interactions with commercial rock lobster pot and trap fishing methods in the Chatham Islands*. WMIL: Marlborough, New Zealand. Retrieved from <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/int-2011-02-shag-pot-interaction-final-report.pdf>

³⁶ Suazo, C. G., Oliveira, N., Debski, I., Mangel, J. C., Alfaro Shigueto, J., Azocar, J., García-Alberto, G., & Velarde, E. (2017). *Seabird bycatch in purse seine fisheries: Status of knowledge and mitigation measures*. Agreement on the Conservation of Albatrosses and Petrels. Eighth Meeting of the Seabird Bycatch Working Group. Wellington, New Zealand. 4–6 September 2017. Retrieved from <https://www.acap.ag/en/working-groups/seabird-bycatch-working-group/seabird-bycatch-wg-meeting-8/sbwg8-information-papers/2917-sbwg8-inf-26-seabird-bycatch-in-purse-seine-fisheries-status-of-knowledge-and-mitigation-measures-summary-only/file>

4.8 Non-commercial Fisheries

Recreational fisheries are an important component of New Zealand's nearshore fisheries, with just under 20% of New Zealanders fishing recreationally every year.³⁷ The recreational take of some species in inshore finfish fisheries is estimated to be similar to the commercial harvest. However, the number of hooks and nets used in recreational fishing (the fishing 'effort') is unknown.

Set net and hook-and-line fisheries present the greatest recreational fishing risk to seabirds. In set net fisheries, diving seabirds can get tangled up and drown in the net while foraging for food. The greatest risk to seabirds from set net fisheries is when the nets are used in coastal waters near seabird colonies. Seabirds are captured in hook-and-line-fisheries by getting tangled up in, or hooked by, fishing gear. Seabirds are at the greatest risk of capture when light tackle or drifting fishing gear is used in coastal waters with high numbers of gulls or petrels present. Hook-and-line fishers operating on vessels encounter more seabird species than those fishing from land.

Research in southern New Zealand shows that various shag and penguin species are captured in non-commercial set nets.³⁸ However, it is difficult to infer the nature and extent of seabird deaths in these fisheries because of limited data on captures elsewhere in the country, or on the total recreational set net fishing effort.

A New Zealand study published in 2010 quantified the number of seabirds caught by non-commercial fishers by surveying fishers returning from fishing trips and observer coverage of charter vessels carrying recreational fishers.³⁹ The surveys were mainly done in the Hauraki Gulf, which has the most intense recreational fishing in New Zealand. The types of seabirds most commonly observed and reported caught were petrels (including shearwaters) and gulls. The study estimated that up to 40,000 seabirds may be caught by recreational fishers each year. However, 77% of seabirds reported caught by recreational fishers were released alive (although the post-release survival rates are unknown).

Two recent Fisheries New Zealand surveys of the New Zealand public on recreational fishing activity and catch asked questions about incidental seabird captures. The results of the 2017/18 Recreational Panel survey were recently released.⁴⁰ An exit survey conducted at the conclusion of the Recreational Panel survey asked fishers about seabirds disrupting their fishing activity, and what types of seabirds were involved in any disruption. Around 25% of respondents reported that seabirds had disrupted their fishing, primarily through chasing and grabbing baits. It should be noted that this was a separate category to seabirds being hooked or tangled. The most common types of seabirds reported were gulls and shags. The results of the other survey, which involved boat ramp surveys, were not available at time of this document's publication.

³⁷ Sport and Recreational New Zealand (SPARC). (2008). *Sport, recreation, and physical participation among New Zealand adults: key results of the 2007/08 Active NZ Survey*. SPARC: Wellington.

³⁸ Abraham, E. R., Berkenbusch, K. N., & Richard, Y. (2010). *The capture of seabirds and marine mammals in New Zealand non-commercial fisheries*. New Zealand Aquatic Environment and Biodiversity Report No. 64. Retrieved from https://fs.fish.govt.nz/Doc/22393/AEBR_64.pdf.ashx

³⁹ Ibid

⁴⁰ <https://www.mpi.govt.nz/travel-and-recreation/fishing/national-survey-of-recreational-fishers/>

4.9 Fisheries outside New Zealand's EEZ

The threats from fishing to seabirds that breed in New Zealand are not limited to the operations of New Zealand vessels in waters under New Zealand jurisdiction. Seabirds are also threatened by the operations of New Zealand and foreign-flagged vessels on the high seas, or by the operations of commercial, recreational or artisanal fishers in waters under the jurisdiction of other states.

New Zealand has extended its seabird risk assessment methodology to RFMO-reported surface longline fishing effort outside the New Zealand EEZ.⁴¹ This study found that black petrel and Antipodean albatross were the New Zealand species at greatest risk from surface longline fishing outside the New Zealand EEZ. This work will be updated regularly as new or improved data becomes available. The risks that other commercial fishing methods pose to seabirds that breed in New Zealand but venture outside the New Zealand EEZ haven't been quantified.

4.10 Impact of Incidental Capture on Seabird Species

Several population characteristics of albatrosses and petrels make them susceptible to long-term population decline as a result of anthropogenic mortalities. Albatrosses and petrels typically become sexually mature late (between 3 and 15 years old) and produce a maximum of one chick per year. If a breeding individual dies, the egg or chick almost always fails or dies, and the remaining partner may wait several years before nesting with a new partner. Some other species of seabirds, such as some shags and penguins, breed more prolifically and are therefore more resilient.

4.11 Other Threats to Seabirds

In addition to incidental death from fisheries, many species of seabirds face other threats to their survival. These threats include predators (mainly mammals), ocean plastic, degraded nesting habitats caused by introduced animals, reduced food supply, catastrophic events (such as storms or earthquakes), disease and climate change.

Other risks to seabirds—which partly arise from fishing but are shared across all vessel activities at sea and with offshore platforms—are colliding with vessels' or platforms' superstructures (this may cause death) or landing on vessels or platforms and being unable to leave without assistance (this is called 'deck landings' or 'deck strike'). The risks of collisions or deck landings are thought to be exacerbated by bright, artificial lights in low visibility (such as navigation lights in fog). Although collisions and deck landings are reported by vessel operators and observers, these causes of death are not included in the seabird risk assessment.

The NPOA Seabirds 2020 focuses on threats to New Zealand seabirds from fishing activities and operations. However, to determine which actions to prioritise, the cumulative effects of non-fishing impacts on a species must also be considered. When a species is known to be significantly adversely affected by activities other than fishing, reducing the threat from fishing may be an important factor in reducing the species' overall risk of population decline.

⁴¹ Abraham, E., Roux, M.-J., Richard, Y., & Walker, N. (2017). *Assessment of the risk of southern hemisphere surface longline fisheries to ACAP species*. Western and Central Pacific Fisheries Commission, Scientific Committee, Thirteenth Regular Session. Rarotonga, Cook Islands. 9–17 August 2017. Retrieved from <https://www.wcpfc.int/node/29579>

5. Bycatch Mitigation in Commercial Fisheries

The New Zealand commercial fishing fleet has diverse operational practices. Likewise, when seabirds interact with fishing operations, different species display different behaviours. Therefore, applying rigid ‘one-size-fits-all’ seabird bycatch mitigation strategies may produce suboptimal results. Tailoring strategies to specific operational situations is critical to reducing the risk of seabird capture.

5.1 Legislative requirements

In the mid-2000s, the then Ministry of Fisheries considered imposing wide-ranging mandatory legislative options on some fleets to mitigate the risk they posed to seabirds. The legislative option subsequently approved by the Minister of Fisheries in 2009 involved amending regulations to empower the Chief Executive to issue circulars specifying general criteria for seabird mitigation measures that could be applied to classes of vessels or specific vessels.⁴²

The policy intent behind the regulations was that vessel-specific measures would only be applied if adherence to mitigation measures, whether required by legislation or non-regulatory, was unsatisfactory. The incentive was for fishers to voluntarily comply with all relevant measures to avoid having vessel-specific measures, with associated conditions, applied.

To date, three method-specific circulars have been issued. The option to issue vessel-specific circulars remains and would be considered in the event of a clear lack of adherence to mitigation measures.

5.1.1 Trawl

The Seabird Scaring Devices Circular 2010 applies to trawlers greater than or equal to 28 metres in overall length.⁴³ The circular requires this class of vessel to deploy one of three types of seabird scaring device: paired streamer lines (also referred to as tori lines); bird bafflers; or warp deflectors.

The circular contains specifications for each type of seabird scaring device.

5.1.2 Surface longline

The Fisheries (Seabird Mitigation Measures – Surface Longlines) Circular 2019 applies to any commercial fisher when setting surface longlines.⁴⁴ The circular requires fishers to use hook shielding devices, or to use a streamer line, and *either* set at night, *and/or* use a prescribed line weighting regime. The circular contains streamer line specifications that vary depending on the length of the vessel.

5.1.3 Bottom longline

The Fisheries (Seabird Mitigation Measures – Bottom Longlines) Circular 2018 applies to commercial fishers using the bottom longline method on vessels greater than or equal to 7 metres in overall length.⁴⁵ It requires the use of a streamer line while setting, and night setting unless a defined line weighting regime is followed. The circular contains streamer line specifications that vary depending on the length of the vessel.

⁴² Regulation 58A of the [Commercial Fishing regulations](#)

⁴³ The circular is available at <https://www.fisheries.govt.nz/dmsdocument/20321-seabird-scaring-devices-circular-2010-no-f517>

⁴⁴ The circular is available at <https://www.gazette.govt.nz/notice/id/2019-go5782>

⁴⁵ This circular is available at <https://www.fisheries.govt.nz/dmsdocument/20324-fisheries-seabird-sustainability-measuresbottom-longlines-circular-2010-no-f541>

5.2 Collaborative Approaches to Implementing Bycatch Mitigation

Liaison officers have been involved in helping to promote communication and awareness of best practice operations within fishing fleets since the early 2000s. The role of liaison officers is to assist fishers with protected species bycatch avoidance and mitigation measures. This includes providing advice, training and education materials, and advising on updated research. The programmes also create a conduit between government and fishers, which helps fishers and aids delivery on government management objectives for protected species.

Currently, two liaison programmes are in operation. One is run by the Deepwater Group Ltd with support from Fisheries New Zealand, the other by the Department of Conservation.

5.2.1 Deepwater Group liaison programme

Deepwater Group Ltd⁴⁶ has operated a protected species bycatch mitigation programme for the deepwater fisheries sector since the mid-2000s. The programme's initial focus was on seabirds but subsequently extended to all protected species.

The Deepwater Group's programme utilises two Nelson-based staff and covers the following fleets:

- >28m trawlers
- Scampi trawlers
- Ling bottom longliners that target ling in quota management areas LIN 2 – LIN 7⁴⁷
- Coastal hoki trawlers

Although the deepwater fleet is relatively small,⁴⁸ and its fishing activities are relatively homogeneous compared with the inshore sector, deepwater fishing takes place throughout the year and in areas of differing seabird activity. Over the life of the programme, the bycatch management and mitigation process has evolved to include: management plans that are specific to each vessel;⁴⁹ outreach services; and an auditing and review process supported by Fisheries New Zealand.⁵⁰

5.2.2 DOC liaison programme – Inshore and Highly Migratory Species focused

Compared with the deepwater sector, the inshore sector has more fishing methods (trawl, Danish and purse seine, longline and set net), more vessels (over 400, compared with less than 50 deepwater vessels), and poses more risks to protected species. However, the principles of engaging at the fleet level and the vessel level are similar to the deepwater fleet.

In 2014, the Department of Conservation (DOC) began a multi-year Protected Species Liaison Project with some small bottom longline vessels operating in northern New Zealand.⁵¹ The project uses similar processes to the Deepwater Group's programme, with contracted liaison officers helping operators develop a protected species risk management plan (PSRMP)⁵² for their vessels. PSRMPs

⁴⁶ Deepwater Group Ltd represents most deepwater species quota holders.

⁴⁷ Information on quota management system and quota management areas can be found [here](#).

⁴⁸ As of May 2020 there were 46 vessels in the core deepwater fleet (all bottom longline vessels more than 34 metres long; all trawl vessels more than 28 metres long that regularly target deepwater species; and all vessels that target scampi).

⁴⁹ Vessel-specific vessel management plans are not yet in place for all the ling bottom longline fleet.

⁵⁰ Deepwater Group Operational Procedures are available at <https://deepwatergroup.org/newsresources/op-manual/>

⁵¹ The report of a review of the Protected Species Liaison Coordination project is available at: <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/reports/mit2017-01-ps-liaison-coordination-draft-final.pdf.pdf>

⁵² PSRMPs can take a number of forms and can be referred to as simply Risk Management Plans (RMP) or in the deepwater, they are commonly known as Vessel Management Plans (VMPs).

are based on Operational Procedures and Mitigation Standards (refer to section 5.3.2), and they set out actions the skipper and crew will take to reduce the risk posed to seabirds, and other protected species, by the vessel operations.

As of 2018/19, the DOC programme has four part-time liaison officers and a coordinator. The liaison officers are based in the regions and each officer covers inshore vessels/methods in the following regions:

- Coromandel and Northland:
 - trawl, bottom longline, surface longline, and set net methods.
- Bay of Plenty and Auckland:
 - trawl, bottom longline, surface longline, and set net methods.
- West Coast region of the South Island (up to Mokau on the West Coast of the North Island), and the east coast from Timaru (north as far as Mahia):
 - trawl, bottom longline, surface longline, and set net methods.
- Canterbury, Otago and Southland:
 - trawl and set net methods.

The DOC programme is partly cost-recovered from quota holders as part of the Conservation Services Programme component of fisheries cost recovery levies, and partly Crown-funded.

As of 2019, 150 vessels now have an initial PSRMP, so a large proportion of the liaison work is concentrated on reviewing, auditing, and updating plans, responding to on-the-water issues, and working with skippers and vessel owners to avoid seabird bycatch. The number of PSRMPs (or analogous vessel-specific documents) in place across both the deepwater and inshore sectors, and information on the level of adherence to such plans, is provided in section 6.

Fisheries Inshore New Zealand (FINZ)⁵³ has recognised the success of these fishery-based programmes. FINZ has committed to supporting DOC in developing and implementing programmes for inshore fleets that pose a risk to seabirds and other protected species. Through the NPOA Seabirds 2020, seabird risk management processes for all fisheries will be aligned. This work will use lessons learnt to implement a consistent, transparent and effective seabird bycatch mitigation programme.

5.3 Implementing the NPOA Seabirds 2020 Bycatch Mitigation Process

To address the risks faced by seabirds, the process under the NPOA Seabirds 2020 will combine regulatory and other agreed (but non-mandatory) bycatch mitigation measures, and apply them on a vessel-specific basis. This approach focuses on education, partnering to find innovative solutions to reduce risk to seabirds, and ensuring that all fishers know how and are taking all practicable steps to avoid seabird bycatch. The intention is to increase the fishing industry's 'buy-in', maximise uptake of the measures, and allow individual and innovative approaches to be used.

Under the NPOA Seabirds 2020, bycatch mitigation will focus on trawl, longline and set net fisheries. PSRMPs may be developed for the Danish seine fleet but not for other fishing methods.

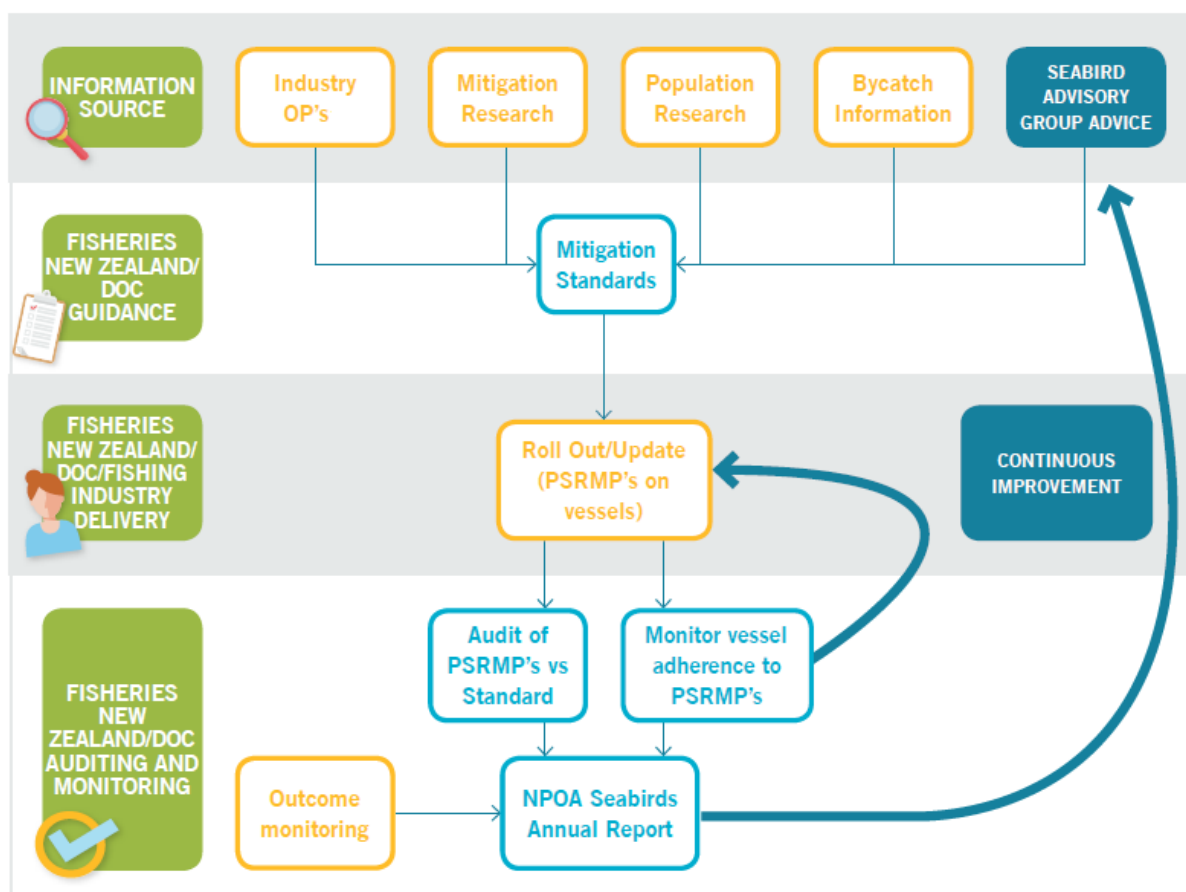
⁵³ Fisheries Inshore New Zealand (<https://www.inshore.co.nz/>) represents inshore and highly migratory species quota and annual catch entitlement holders.

Each PSRMP will set out the primary mitigation measures and contingency plans that will be used on a vessel. Each plan will be reviewed regularly to account for changes in a vessel's operations, or to incorporate advances in seabird risk mitigation measures.

PSRMPs will be developed with guidance from liaison officers, alongside fleet-wide Operational Procedures and government Mitigation Standards.

The NPOA Seabirds 2020's seabird bycatch mitigation process is displayed in Figure 1, and described in more detail in the following sections.

Figure 1: NPOA Seabirds 2020 bycatch mitigation process



5.3.1 Information Sources

5.3.1.1 Research and Bycatch Information

Research on possible mitigation options, biological information on population status and trends, outputs from updated risk assessments, and information on bycatch events and circumstances will contribute to updates of the Mitigation Standards as appropriate. This may include new mitigation practices, or a renewed focus on a particular area or species where information suggests that risk may be higher than previously estimated.

5.3.1.2 Industry Operational Procedures (Industry OPs)

The fishing industry develops Operational Procedures, which are documents that describe bycatch mitigation for specific fleets. These are developed in consultation with Fisheries New Zealand and DOC.⁵⁴

The Operational Procedures state mandatory mitigation measures and other strategies that the fleet has agreed to take (for example, sharing information about ‘hotspots’ and captures). The Operational Procedures also describe mandatory and non-mandatory (trigger point) reporting requirements; the process to audit vessel adherence to PSRMPs and Operational Procedures; and the process to review vessel PSRMPs.

5.3.1.3 10 Golden Rules

Forming part of industry Operational Procedures is the ‘10 Golden Rules’, which explains to crew members that they must ‘Look...Think...Act’ in terms of protected species mitigation. The rules are posted in a prominent position, such as the wheelhouse, as a constant reminder of what to consider during fishing operations.

5.3.2 Fisheries New Zealand/Department of Conservation guidance

5.3.2.1 Mitigation Standards

The diversity of vessel size, on-board equipment, and operational practices means that bycatch mitigation practices may differ across vessels. To ensure consistency in the bycatch mitigation practices used, and to help vessel crews develop their PSRMPs, Fisheries New Zealand and DOC have agreed Mitigation Standards, in consultation with the Seabird Advisory Group.

Mitigation Standards are written for a fishing method and vessel size combination, and are grouped by the desired outcomes of bycatch mitigation practices. For example, the desired outcomes for trawl vessels more than 28 m long are:

1. The discharge of fish waste from the vessel is managed so as not to attract seabirds to risk areas
2. The risk to seabirds from trawl warps is minimised
3. Seabird attraction towards, and access to, trawl nets is minimised. If seabirds do access nets, the risk of harmful interactions is minimised
4. The risk of deck landings or impacts against the vessel is minimised.

Each document details the Mitigation Standards necessary to achieve each desired outcome, and the equipment or operational practices that are needed to meet each Standard. For example, there are two Mitigation Standards needed to achieve desired outcome 1 for trawl vessels more than 28 m long:

Mitigation standard 1.1: Fish waste is not discharged from the vessel during shooting or hauling.

Mitigation standard 1.2: Any fish waste discharged whilst the net is being towed must be either minced or batch discharged.

The Mitigation Standards take into account global and domestic research on effective mitigation strategies. They will be regularly reviewed and updated to accommodate new research findings and

⁵⁴ Operational procedures and additional documents for the surface longline fleet are available on the Fisheries Inshore New Zealand website at <https://www.inshore.co.nz/operational-procedures/>. Operational procedures for deepwater fisheries are available on the DWG website at <https://deepwatergroup.org/newsresources/op-manual/>

feedback from at-sea monitoring. This will ensure continuous improvement of the mitigation of seabird captures.

Mitigation Standards have been developed for:

- >28m trawlers
- <28m trawlers
- Scampi trawlers
- Autoline bottom longliners
- Hand-baiting bottom longliners
- Surface longliners
- Set netters⁵⁵

5.3.3 Delivery

5.3.3.1 Roll Out, Update, and Implementation of Protected Species Risk Management Plans

Liaison officers will help vessel operators develop and review a PSRMP (or analogous risk management plan) for each vessel in the relevant fleet.⁵⁶ The PSRMP will use vessel operator knowledge and expertise of vessel operations, the best available information on seabird behaviour, risk mitigation research findings, and the Mitigation Standards.

PSRMPs will be prepared from a template, so they are consistent and can be audited against the Mitigation Standards.

For fisheries that already have PSRMPs, or equivalent documents, in place across the entire fleet (this applies to the more than 28 m long trawl, scampi trawl and surface longline fisheries), the focus will be on monitoring at-sea adherence with plans, and reviewing the content of the plans. The proposed plan to implement PSRMPs across the remaining fleets is set out in the NPOA Seabirds 2020 Implementation Plan.⁵⁷

5.3.4 Auditing of PSRMPs

Fisheries New Zealand and DOC will regularly compare PSRMPs to the Mitigation Standards to ensure that vessel operators are using practices that best mitigate the risk to seabirds. The results of these comparisons will be reported at least annually and be used to inform updates or revisions of the Mitigation Standards.

The results of reviews will be reported in the publicly available NPOA Seabirds Annual Report along with data on seabird captures and capture rates. The information, alongside any new research and/or risk assessment outputs, will be considered by Fisheries New Zealand and DOC in consultation with the Seabird Advisory Group and an assessment made on any updates required to the Mitigation Standards, or Operational Procedures, or whether to amend priorities for management and liaison activities.

⁵⁵ The set net Mitigation Standard will be reviewed during the first year of operation of the NPOA Seabirds 2020.

⁵⁶ Further information on DOC's activities is available in the *Conservation Services Programme Annual Plan 2018/19* available at: <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/plans/csp-annual-plan-2018-19.pdf> 2017/18

⁵⁷ The Seabird Implementation Plan is available at <https://www.fisheries.govt.nz/protection-and-response/sustainable-fisheries/managing-our-impact-on-marine-life/seabirds/>

5.3.5 Monitoring and feedback

At-sea monitoring is an essential component of the success of liaison programmes. At present, most deepwater fisheries have relatively high observer coverage, which creates the feedback loop that helps to drive change across the fleet. Achieving high levels of observer coverage in inshore and highly migratory species fisheries is inherently difficult due to a number of constraints. In these fisheries, alternative monitoring methods are currently being explored. This includes ongoing camera trials in the snapper bottom longline fishery, which aims to help us better understand the risks of black petrel interactions with this fleet.

Fisheries New Zealand expects that over the next few years, monitoring capabilities will be enhanced significantly. Already, electronic reporting has resulted in the more timely delivery of information to Fisheries New Zealand from vessels. The provision of more timely information allows Fisheries New Zealand to monitor seabird bycatch and mitigation use in real time, thereby improving the ability of Fisheries New Zealand to respond to seabird capture events. For example, Fisheries New Zealand can inform liaison officers of significant capture events on unobserved vessels and prioritise observer coverage in the short term onto those vessels reporting high seabird capture rates and/or operating in higher risk areas (so as to assess at-sea adherence to the PSRMP).

By the end of the five year term of this NPOA, the information available on fisher adherence to mitigation measures and seabird captures will enable Fisheries New Zealand to review and, if necessary, strengthen the legislative requirements. It will also allow for consideration of different ways of measuring seabird bycatch.

5.3.5.1 Trip-based feedback loop

Whenever a Fisheries New Zealand observer undertakes a trip on a vessel with a PSRMP or to which Operational Procedures apply, one of the observer's key tasks is to audit adherence to either the PSRMP or the relevant OP. Fleet-specific audit forms have been developed for this purpose.

Observers may also be debriefed by Fisheries New Zealand staff after a trip. Debriefs can include discussing the audit form and any points of interest during the observers' time on board the vessel.

The aim of the audit process is to monitor adherence to the vessel's PSRMP and fleet Operational Procedures, and also to provide feedback to liaison officers and vessel operators and crew. Vessels may only be in port for a few days a year and crews may change during the port call. Therefore, feedback that may result in an action, such as buying new materials or making physical changes to parts of a vessel or operations, needs to be provided in a timely manner.

In order to close the feedback loop, liaison officers are provided details of the audit and debrief so that they can follow up with the manager or crew of the vessel. Annual summaries of audits will be published in the NPOA Seabirds Annual Report.

If a vessel is repeatedly observed to be not adhering to its PSRMP, Fisheries New Zealand would consider specifying vessel-specific mitigation measures under Regulation 58A of the Commercial Fishing Regulations.

The generic examples below illustrate how the trip-based feedback loop operates.

Example 1

An observer audit indicates that components of a tori line need replacing. The liaison officer will inform the vessel operator and offer assistance in sourcing materials prior to the next trip.

Example 2

An observer audit notes that crew were not clearing stickers from the trawl net as diligently as they could have been. This feedback will be provided to the vessel operator so they remind crew on the next trip to address this issue, or develop new processes and procedures to ensure the crew are fully implementing the PSRMP.

5.3.5.2 Triggers (real-time management of events)

Each PSRMP or OP sets out “trigger points”. Trigger points are a real-time capture reporting threshold system. If a trigger is reached, the skipper is expected to notify the relevant liaison officer within 24 hours.⁵⁸ If a Fisheries New Zealand observer is on a vessel, the same process applies; reaching a trigger means the observer must also notify the Fisheries New Zealand Observer Programme shore staff as soon as possible.

Additional details about the event can then be requested and Fisheries New Zealand and DOC will work together to determine what response, if any, is required. Liaison officers will also follow up and work with vessel operators to identify what they can do to mitigate the risk of further captures.

Seabird triggers are broadly similar across all PSRMPs or OPs:

Deepwater fleet	Inshore fleet
<i>For any 24 hour period:</i> <ul style="list-style-type: none">• <i>Three or more large dead seabirds (e.g. albatrosses or mollymawks)</i>• <i>Five or more dead seabirds (any size)</i>	<i>For any 24 hour period:</i> <ul style="list-style-type: none">• <i>One black petrel, flesh footed shearwater, yellow eyed penguin or greater albatross (royal, Gibson, wandering)</i>• <i>Three or more large dead seabirds (e.g. mollymawks, giant petrels or gannets)</i>• <i>Five or more small seabirds (e.g. petrels or shearwaters)</i>
<i>For any 7-day period:</i> <ul style="list-style-type: none">• <i>10 or more captures of any seabird (dead or alive)</i>	<i>For any 7-day period:</i> <ul style="list-style-type: none">• <i>10 or more captures of any seabird (dead or alive)</i>
<i>For any 7-day period:</i> <ul style="list-style-type: none">• <i>10 or more captures of any seabird (dead or alive)</i>	<i>For any 7-day period:</i> <ul style="list-style-type: none">• <i>10 or more captures of any seabird (dead or alive)</i>

Reporting triggers enables liaison officers to advise whether additional mitigation measures should be taken, and to consider whether other vessel operators need to be advised if it is a fleet-wide issue. Advising other vessel operators does not happen routinely but may take the form of a reminder if a capture event occurs as a result of a fisher not adhering to a PSRMP or OP.

Trigger reporting also enables Fisheries New Zealand and DOC to investigate the causes of triggers in order to advise on future mitigation actions. If the cause of a trigger being reached was likely due to a potential breach of legislative requirements, Ministry for Primary Industries compliance staff would also be informed.

The generic examples below illustrate potential scenarios and outcomes of triggers being reached.

⁵⁸ Deepwater vessel crews are also expected to notify their vessel manager.

Example 1

A 24 hour seabird trigger was reached on a factory trawler. This was communicated to the vessel's shore staff and the relevant liaison officer. The liaison officer spoke to the vessel manager who, in turn, contacted the vessel skipper. The discussion with the skipper indicated that the seabird captures were likely due to silver warehou heads being continuously discarded by the crew rather than going to the meal plant or being batch discarded. The discarding attracted more birds and resulted in some being captured on the warps. The outcome was that all parties agreed that fish heads would be stored and only discarded between tows.

Example 2

A trawler reported a large, one-off capture event. The liaison officer spoke to the vessel manager who, in turn, contacted the vessel skipper. The discussion with the skipper indicated that the captures were the result of a gear failure; in this instance winch failure during hauling when the trawl net was at the surface led to seabirds being captured in the net. The liaison officer reminded the vessel manager to try and minimise the length of time the net spent at the surface and to try and undertake repairs with the gear on board.

The nature of fishing means that gear failures do occasionally occur, which can lead to seabirds being captured and triggers being reached. Some large one-off capture events have resulted from instances of gear failure.

Example 3

A seabird trigger was reached on a surface longline vessel. Discussions between the skipper and the liaison officer indicated that the seabirds had been taking during setting. The liaison officer advised the skipper to add additional weight to the line to achieve a faster sink rate. The crew subsequently routinely increased the line weighting regime.

Annual summaries of triggers and follow up actions taken will be published in the NPOA Seabirds Annual Report.

6. Performance Measurement

The NPOA Seabirds 2020 has four goals and eleven objectives for the next five years, and there are 36 performance measures to track performance against the objectives. Progress towards the objectives will be reported annually in the NPOA Seabirds Annual Report.

This section lists the performance measures for each objective. Where relevant, additional contextual information is provided for objectives and performance measure. The current status related to each performance measure is described, with baseline information provided wherever possible. Where gaps in reporting on performance measures are identified, relevant actions to address those will be added to the Seabird Implementation Plan.

Goal 1: Avoiding Bycatch

Table 2: Performance Measures, additional information, and current status for Objective 1

Objective 1	Ensure all New Zealand commercial fishers are using practices that best avoid the risk of seabird bycatch, enabled by appropriate regulations
Additional information	<p><i>This objective relates solely to commercial fishers; Objective 2 relates to non-commercial fishers.</i></p> <p><i>‘Enabled by appropriate regulations’ means that any seabird-related legislative requirements that apply to commercial fishers should support the relevant Mitigation Standard.</i></p> <p><i>Generally, ‘appropriate regulations’ should be outcome-based rather than prescriptive, allowing for flexibility in how the outcome is achieved. Given the diversity within and across the different fishing fleets, there is risk that overly prescriptive measures may not be practical to implement for all vessels in a fleet.</i></p>
Performance Measure 1 (input)	Proportion of each relevant fishing fleet with vessel-specific protected species risk management plans for seabird capture mitigation (target: 100%)
Additional information	<p><i>This performance measure relates to the implementation of Mitigation Standards. In this context ‘relevant fishing fleet’ refers to a fleet to which a Mitigation Standard applies.</i></p> <p><i>The intent of this performance measure is that all vessels in a fleet to which a Mitigation Standard applies should have a PSRMP.</i></p> <p><i>PSRMPs can also be developed for vessels in fleets that do not have an agreed Mitigation Standard and this information will be included in the Seabird Annual Report. However, until a Mitigation Standard is agreed, there is no specific target for vessels or fleets to which this scenario applies.</i></p>
Current status: inshore fisheries	As of September 2019, approximately 65% of inshore trawl vessels less than 28 m long, 62% of bottom longline vessels, and less than 1% of set net vessels had PSRMPs.
Current status: deepwater fisheries	<p>In September 2019, all deepwater trawl vessels⁵⁹ had PSRMPs.</p> <p>No ling bottom longline vessels have PSRMPs, but Operational Procedures have been developed and are in place for the 32 vessels that regularly target ling in LIN 2– LIN 7.</p>
Current status: highly migratory species	All vessels operating in the surface longline fishery have PSRMPs.

⁵⁹ This number includes all trawl vessels longer than 28 metres and all trawl vessels used to target scampi (47 vessels).

Performance measure 2 (input)	Proportion of vessel-specific protected species risk management plans that meet the Mitigation Standards and regulations for the relevant fishery (target: 100%)
Additional information	<i>This performance measure requires that all PSRMPs must meet the relevant Mitigation Standard, (Mitigation Standards incorporate general legislative requirements). If vessel-specific legislative requirements exist, these must also be incorporated into a PSRMP.</i>
Current status: all fisheries	Will be reported on annually
Performance measure 3 (input)	Rate of adherence to vessel-specific protected species risk management plans (based on available monitoring data) (target: 100%)
Additional information	<i>To date, fisheries observers have been the primary source of monitoring data. This performance measure envisages, however, that data from compliance inspections or electronic monitoring (on-board cameras) will be included wherever possible.</i> <i>The NPOA Seabirds 2020 envisages that electronic monitoring is likely to become an additional source of monitoring data during the five-year term of the NPOA.</i>
Current status: inshore fisheries	In the 2017/18 fishing year Fisheries New Zealand observers audited 13 trips on 10 bottom longline vessels in FMA 1. The audits highlighted that changes are needed to the PSRMPs and the audits themselves, to enable consistent results and ensure fishery operations and reporting are represented.
Current status: deepwater fisheries	In the 2017/18 fishing year Fisheries New Zealand observers audited at-sea practices on 35 large trawl vessels, and 7 scampi trawl vessels on a total of 150 trips. 89% of the audits showed no follow-up action was necessary because the vessels were adhering to their plans. In the second half of the 2017/18 fishing year observers audited five bottom longline vessels that target ling against the bottom longline Operational Procedures. These vessels collectively deployed 75% of all hooks that targeted ling that year. Two audits showed follow-up actions were needed.
Current status: highly migratory species	Since the 2017/18 fishing year, observers have used audit forms to monitor the rate of adherence against PSRMPs. ⁶⁰
Performance measure 4 (input)	Regulations and Mitigation Standards are reviewed, updated, and developed to reflect the best available information (target: annual review)
Additional information	<i>The annual review of Mitigation Standards (as outlined in Figure 1) is a key component of implementing the NPOA Seabirds 2020. Mitigation Standards will be updated where information to support improved mitigation measures becomes available. Annual review of the implementation and effectiveness of</i>

⁶⁰ The audit outcomes and vessel risk-reduction measures have been summarised in DOC's Conservation Services Programme reports, which are available on the DOC website: www.doc.govt.nz/our-work/conservation-services-programme/csp-reports

	<i>Mitigation Standards will also be used to inform the development of regulatory measures, where required, to ensure the objectives of the NPOA Seabirds 2020 are met.</i>
Current status	<p>At the commencement of the NPOA Seabirds 2020, regulations applied to:</p> <ul style="list-style-type: none"> • Trawl vessels >28m in length • Bottom longline vessels >7m in length • All surface longline vessels <p>Mitigation Standards have been agreed for:</p> <ul style="list-style-type: none"> • Trawl vessels >28m in length • Trawl vessels <28m in length • Scampi trawl vessels • Bottom longline vessels (autoline) • Bottom longline vessels (hand baiting) • Surface longline vessels <p>A draft Mitigation Standard has been developed for set net vessels.</p>
Performance measure 5 (output)	Number of fisheries that have enough information to set reduction targets (target: increasing)
Additional information	<p><i>This performance measure is linked to Performance Measure 20 (increased monitoring coverage). It envisages that over the term of the NPOA Seabirds 2020, additional monitoring data is likely to become available to enable reduction targets to be developed for an increasing number of fisheries.</i></p> <p><i>The Seabird Implementation Plan includes work to review and update the approach to setting bycatch rate reduction targets.</i></p> <p><i>For a description of the approach to setting capture rate reduction targets that was agreed by the Seabird Advisory Group in 2015, refer to Appendix 2.</i></p>
Current status	Using the approach to setting capture rate reduction targets agreed by the Seabird Advisory Group in 2015, two fisheries (squid trawl and middle-depth trawl) have enough information to set numerical capture rate reduction targets.
Performance measure 6 (output)	Rates of seabird capture relative to agreed reduction targets (where enough information is available) (target: decreasing in line with reduction targets)
Additional information	<i>This performance measure will report on capture rates in those fisheries for which targets have been set under Performance Measure 5.</i>
Current status: squid trawl	The reduction target agreed in the NPOA Seabirds 2013 was 12.0 birds per 100 tows. Between 2014/15 and 2016/17 the capture rate was 15.5 birds per 100 tows.
Current status: middle-depth trawl	The reduction target agreed in the NPOA Seabirds 2013 was 2.3 birds per 100 tows. Between 2014/15 and 2016/17 the capture rate was 2.8 birds per 100 tows.

Performance measure 7 (output)	Number, and proportion, of compliance inspections that assess compliance against the relevant regulations.
Additional information	<i>This performance measure reflects the role of Fisheries Compliance in ensuring compliance with regulations. Reporting will include vessel type, area, type of inspection (at sea, in port or aerial), and presence/absence of seabird scaring devices or other regulated mitigation devices.</i>
Current status:	When Fisheries Compliance do inspections, they record whether seabird mitigation devices required by regulations are checked. Inspections also record whether a breach is detected or whether a potential breach is under further investigation.

Table 3: Performance Measures, additional information, and current status for Objective 2

Objective 2	Practices that effectively avoid risk of seabird bycatch are supported and promoted to non-commercial fishers
Additional information	<p><i>This objective relates solely to non-commercial fishers. There is a separate objective relating to commercial fishers (Objective 1).</i></p> <p><i>The objective acknowledges that non-commercial fishers also interact with seabirds. Understanding more about interactions and developing mitigation for non-commercial fisheries are focus areas.</i></p>
Performance measure 8	<p>Outreach is directed to non-commercial fishers and measured by:</p> <ol style="list-style-type: none"> 1. the number of social media hits for seabird-related outreach campaigns (target: increasing) 2. the amount of seabird-awareness material and mitigation guidance that is distributed (target: increasing) 3. the proportion of registered amateur charter vessel operators who have been provided with material and mitigation guidance (target: 100%) 4. new seabird-awareness material and mitigation guidance available in Te Reo Māori and other languages
Additional information	<p><i>This performance measure focuses on the best ways of making seabird-related information available to the different components of the non-commercial sector.</i></p> <p><i>Measures 1 and 2 are largely aimed at recreational fishers and envisage use of on-line media (Measure 1) and channels such as fishing magazines (Measure 2).</i></p> <p><i>Amateur charter vessel operators are required to be registered under the Fisheries (Amateur Fishing) Regulations 2013. This means outreach can be targeted to these operators (Measure 3).</i></p> <p><i>Measure 4 recognises the need to develop material for customary non-commercial fishers in Te Reo Maori and for recreational fishers for whom English is not their first language.</i></p>
Current status:	<ol style="list-style-type: none"> 1. Information about the number of social media hits in 2018 was unavailable. 2. In January 2018, an article on seabirds was published in fishing magazines and advertising space was used for seabird awareness communication.

	<p>3. To date, registered amateur charter vessel operators have not been provided with material and mitigation guidance.</p> <p>4. Will be reported annually</p>
Performance measure 9	The number of organisations involved in messaging and geographical areas covered (target: increasing)
Additional information	<i>This performance measure acknowledges that organisations outside government (Fisheries New Zealand and the Department of Conservation) are also involved in provision of information regarding seabird mitigation practices to non-commercial fishers. The target of 'increasing' relates to the geographical areas covered; work to date has had a regional focus e.g. the Hauraki Gulf. The number of organisations involved is likely to remain relatively static.</i>
Current status:	This information is not available for 2018
Performance measure 10	Information that is available to understand seabird captures and the use of bycatch mitigation measures in non-commercial fisheries (target: increasing)
Additional information	<i>This performance measure recognises that we need more information on how seabirds are captured by non-commercial fishers as well as how these fishers can avoid catching seabirds. Information relating to the number of captures by non-commercial fishers falls under Goal 3: research and information.</i>
Current status:	Surveys of recreational groups and non-commercial fishers and feedback from fishery officers will be primary sources of information to report on this performance measure.
Performance measure 11	Increased use of mitigation practices and safe handling techniques amongst non-commercial fishers (based on available data) (target: increasing)
Additional information	<i>This performance measure recognises the need to consider how information could be collected to enable monitoring and reporting on mitigation and safe handling technique use.</i>
Current status:	This information is not available for 2018

Goal 2: Healthy Seabird Populations

*The NPOA focuses on the **direct** effects of fishing. As noted in the scope section of the NPOA, it is acknowledged that indirect effects may significantly impact on seabird populations. They will remain a focus for Fisheries New Zealand and the Department of Conservation's seabird and research activities.*

Table 4: Performance Measures, additional information, and current status for Objective 3

Objective 3	Research, monitoring, and management actions are prioritised for seabird populations of particular concern, and their risk ratios reduce ⁶¹
Additional information	<p><i>There are two components to this objective. The first identifies that the limited resources that are available should be directed towards where the need is greatest.</i></p> <p><i>The second component, about risk ratios, reflects the desire to see risk ratios reduce over time for the populations of particular concern. Reduction in risk ratios reflects a reduction in estimated impacts of fishing on a given seabird population. For a full description of the risk ratios, refer to the Risk Assessment Method section of this document.</i></p> <p><i>A key aspect of this objective is the 'populations of particular concern' qualifier and its associated definition. There are two processes to identifying such populations. First, all those species categorised at High or Very High risk through risk assessment will be included. Second, there will be annual expert review of other data (e.g. population monitoring), and taking into account threat status, to identify other populations for prioritisation. This will include consideration of species categorised as at medium or lower risk in the risk assessment and will ensure resources are targeted at those species in greatest need of further action.</i></p> <p><i>As an example, the mainland and Stewart Island hoiho population was not considered a Very High or High risk species in the risk assessment, but has been prioritised for monitoring and management action on the basis of population monitoring information and understanding of the range of threats to the populations.</i></p>
Performance measure 12	Research and/or management actions are undertaken specifically for species or populations of particular concern (target: 100% of identified populations of particular concern)
Additional information	<i>This performance measure requires reporting on research and management actions for populations of particular concern, aiming for there to be targeted action for all such populations.</i>
Current status:	<p>There are currently species-specific management approaches in place for black petrel, mainland and Stewart Island hoiho (yellow-eyed penguin), and Antipodean albatross.</p> <p>Fisheries New Zealand and/or DOC commissioned research is in progress on all other remaining species currently identified as being of particular concern:</p>

⁶¹ 'Particular concern' means all those species identified through both risk assessment (species categorised at High or Very High risk) and review of other data (e.g. population monitoring indicating a significant population decline), and taking into account threat status.

	Salvin's albatross, Westland petrel, flesh-footed shearwater, southern Buller's albatross, Gibson's albatross and white-capped albatross.
Performance measure 13	Level of uncertainty in risk assessment outputs (target: decreasing)
Additional information	<p><i>This performance measure relates to the '95% c.i.' (credible interval) in the seabird risk assessment. Currently, the 95% c.i. (the 'width') is quite broad for some outputs due to uncertainty in the data inputs.</i></p> <p><i>As an example, the 2020 seabird risk assessment output for black petrel estimates a mean risk ratio of 1.23, but the 95% c.i. ranges from 0.55 to 2.11. This means that fishing may be having little impact (risk ratio of 0.55), or be having more than 2 times the level of impact that will maintain the population at the defined population outcome (risk ratio of 2.11). This uncertainty is the result of a number of factors including limited information on the population and distribution of black petrels, captures in fisheries, and estimates of cryptic mortalities.</i></p> <p><i>This performance measure will demonstrate the extent to which the width of 95% c.i.s are getting narrower over time as we improve data inputs. Additional information on uncertainty in the risk assessment is available in the 2020 seabird risk assessment.</i></p>
Current status:	Figure 2 shows the outputs, and associated credible intervals, from the 2020 seabird risk assessment.
Performance measure 14	Risk ratios for seabird populations of particular concern (target: decreasing)
Additional information	<p><i>This performance measure also relates to outputs of the seabird risk assessment. A decreasing risk ratio means that the estimated risk to a population from fishing is reducing.</i></p> <p><i>During the course of the NPOA it is envisaged that it will be possible to update the seabird risk assessment annually. Until that time, it will likely be updated every second or third year.</i></p>
Current status:	<p>The risk ratios for current species of particular concern are:</p> <ul style="list-style-type: none"> • Black petrel: 1.23 (95% credible interval 0.55–2.11) • Salvin's albatross: 0.65 (95% credible interval 0.42 – 0.94) • Westland petrel: 0.54 (95% credible interval 0.26 – 1.12) • Flesh-footed shearwater: 0.49 (95% credible interval 0.30 – 0.80) • Southern Buller's albatross: 0.37 (95% credible interval 0.21 – 0.60) • Gibson's albatross: 0.31 (95% credible interval 0.17 – 0.54) • Antipodean albatross: 0.17 (95% credible interval is 0.09–0.30) • Yellow-eyed penguin (mainland and Stewart Island population only) (hoiho): 0.17 (95% credible interval 0.0–0.3)

Figure 2: Population Sustainability Threshold (PST), total fishery-related deaths (D) in trawl, longline, and set net fisheries, risk ratio with $f = 1$ ($RR = D/PST$), and the probability that $D > PST$ for seabird taxa in the current risk assessment. Taxa are ordered in decreasing order of the median risk ratio.⁶²

	PST		D		Risk ratio		P(D > PST)
	Mean	95% c.i.	Mean	95% c.i.	Median	95% c.i.	
Black petrel	447	225–831	513	325–803	1.23	0.55–2.11	0.70
Salvin's albatross	3 460	2 630–4 730	2 250	1 640–3 060	0.65	0.42–0.94	0.01
Westland petrel	351	233–532	194	103–361	0.54	0.26–1.12	0.05
Flesh-footed shearwater	1 450	1 010–2 050	710	496–1 020	0.49	0.30–0.80	0.00
Southern Buller's albatross	1 360	896–2 160	486	358–664	0.37	0.21–0.60	0.00
Gibson's albatross	497	327–743	151	95–221	0.31	0.17–0.54	0.00
NZ white-capped albatross	10 800	7 680–15 700	3 160	2 290–4 330	0.29	0.18–0.46	0.00
Chatham Island albatross	428	292–632	123	69–196	0.28	0.14–0.53	0.00
Northern Buller's albatross	1 640	1 070–2 630	414	321–524	0.26	0.15–0.41	0.00
Yellow-eyed penguin (mainland)	120	79–180	21	8–41	0.17	0.06–0.38	0.00
Antipodean albatross	369	258–517	63	37–97	0.17	0.09–0.30	0.00
Northern giant petrel	337	159–792	51	16–113	0.15	0.04–0.47	0.00
Otago shag	283	184–418	37	20–58	0.13	0.06–0.25	0.00
Spotted shag	3 730	1 790–7 080	304	198–439	0.09	0.04–0.19	0.00
Yellow-eyed penguin	285	189–424	21	8–41	0.07	0.03–0.16	0.00
White-chinned petrel	25 800	16 100–41 300	1 680	1 390–2 010	0.07	0.04–0.11	0.00
Campbell black-browed albatross	2 000	993–3 570	117	65–223	0.06	0.03–0.15	0.00
Northern royal albatross	723	345–1 360	36	14–81	0.05	0.02–0.15	0.00
Foveaux shag	208	132–317	7	2–14	0.03	0.01–0.08	0.00
Grey petrel	5 460	3 190–9 130	139	86–217	0.03	0.01–0.05	0.00
Southern royal albatross	854	600–1 190	22	9–42	0.02	0.01–0.05	0.00
Snares Cape petrel	1 570	605–3 670	24	5–68	0.01	0.00–0.06	0.00
Fluttering shearwater	35 900	15 300–73 700	393	197–665	0.01	0.00–0.03	0.00
Northern little penguin	1 500	905–2 310	13	4–26	0.01	0.00–0.02	0.00
White-flipped little penguin	467	270–742	4	0–9	0.01	0.00–0.02	0.00
Little black shag	338	155–644	3	0–9	0.01	0.00–0.03	0.00
Pied shag	1 120	707–1 680	8	0–25	0.01	0.00–0.02	0.00
Grey-headed albatross	695	335–1 270	5	0–21	0.01	0.00–0.04	0.00
Fiordland crested penguin	626	283–1 180	4	0–15	0.00	0.00–0.03	0.00
Southern little penguin	1 500	910–2 380	7	1–15	0.00	0.00–0.01	0.00
Common diving petrel	137 000	46 900–309 000	383	63–1 430	0.00	0.00–0.01	0.00
Grey-faced petrel	30 000	19 200–50 200	62	27–117	0.00	0.00–0.00	0.00
Sooty shearwater	622 000	296 000–1 180 000	1 210	681–2 220	0.00	0.00–0.01	0.00
Light-mantled sooty albatross	873	668–1 140	2	0–13	0.00	0.00–0.01	0.00
Hutton's shearwater	14 900	9 160–23 300	17	3–68	0.00	0.00–0.00	0.00
Chatham Island little penguin	1 500	926–2 390	1	0–8	0.00	0.00–0.01	0.00
Buller's shearwater	56 200	34 300–102 000	17	6–35	0.00	0.00–0.00	0.00
Little shearwater	21 600	13 800–32 900	6	1–12	0.00	0.00–0.00	0.00
White-headed petrel	34 400	16 300–67 600	9	2–19	0.00	0.00–0.00	0.00
NZ white-faced storm petrel	331 000	139 000–683 000	85	17–239	0.00	0.00–0.00	0.00
Australasian gannet	9 400	4 120–18 500	3	0–12	0.00	0.00–0.00	0.00
Southern black-backed gull	333 000	138 000–689 000	54	18–117	0.00	0.00–0.00	0.00
Fairy prion	326 000	209 000–493 000	89	10–462	0.00	0.00–0.00	0.00
Snares crested penguin	6 860	4 800–9 660	1	0–5	0.00	0.00–0.00	0.00
Broad-billed prion	68 400	45 400–104 000	9	1–29	0.00	0.00–0.00	0.00
Black-bellied storm petrel	15 400	8 650–25 900	2	0–9	0.00	0.00–0.00	0.00
Cook's petrel	48 900	27 400–87 100	7	0–36	0.00	0.00–0.00	0.00
Antarctic prion	154 000	77 000–284 000	10	2–26	0.00	0.00–0.00	0.00
Mottled petrel	47 200	30 400–77 100	4	0–21	0.00	0.00–0.00	0.00
Auckland Island shag	485	198–988	0	0–1	0.00	0.00–0.00	0.00
Bounty Island shag	26	15–43	0	0–0	0.00	0.00–0.00	0.00
Subantarctic skua	67	44–103	0	0–0	0.00	0.00–0.00	0.00
Caspian tern	172	95–294	0	0–0	0.00	0.00–0.00	0.00
Chatham Island shag	76	47–116	0	0–3	0.00	0.00–0.05	0.00
Campbell Island shag	476	222–906	0	0–0	0.00	0.00–0.00	0.00
Eastern rockhopper penguin	11 100	6 800–17 300	1	0–3	0.00	0.00–0.00	0.00
Erect-crested penguin	17 800	12 600–24 700	1	0–4	0.00	0.00–0.00	0.00
White-bellied storm petrel	228	106–441	0	0–0	0.00	0.00–0.00	0.00
White tern	26	15–43	0	0–0	0.00	0.00–0.00	0.00
South Georgian diving petrel	10	5–18	0	0–1	0.00	0.00–0.07	0.00
NZ king shag	39	24–60	0	0–2	0.00	0.00–0.06	0.00
Kerm. storm petrel	12	4–26	0	0–0	0.00	0.00–0.00	0.00
Masked booby	53	28–94	0	0–0	0.00	0.00–0.00	0.00
NZ storm petrel	53	6–207	0	0–1	0.00	0.00–0.02	0.00
Pitt Island shag	103	63–161	0	0–2	0.00	0.00–0.02	0.00
Chatham petrel	42	23–76	0	0–0	0.00	0.00–0.00	0.00
Chatham Island taiko	2	1–4	0	0–0	0.00	0.00–0.00	0.00
Pycroft's petrel	412	247–718	0	0–1	0.00	0.00–0.00	0.00
Soft-plumaged petrel	497	136–1 290	0	0–0	0.00	0.00–0.00	0.00
Wedge-tailed shearwater	6 020	3 040–10 600	0	0–0	0.00	0.00–0.00	0.00
Kerm. petrel	779	500–1 300	0	0–1	0.00	0.00–0.00	0.00
White-naped petrel	7 080	3 340–14 200	0	0–0	0.00	0.00–0.00	0.00

Table 5: Performance Measures, additional information, and current status for Objective 4

Objective 4	The number of fishing-related mortalities is decreasing towards zero
Additional information	<i>Fishing-related mortalities is the estimated number of seabird deaths caused by fishing, including cryptic mortality. This is estimated in the seabird risk assessment, which uses the term 'fishery-related deaths' (refer Figure 2).</i>
Performance measure 15	Estimated fishing-related deaths, from the seabird risk assessment, relative to the average number of fishing-related deaths between 2014/15 and 2016/17 (target: decreasing for all species)
Additional information	<p><i>The reduction in estimated fishing-related mortalities will be monitored from a baseline of the average number of estimated fishing-related mortalities between 2014/15-2016/17, which is the output from the 2020 seabird risk assessment.</i></p> <p><i>The seabird risk assessment incorporates a wider range of information than other capture estimation methods e.g. seabird population and distribution information, and estimates of cryptic mortality. For this reason it will be used as the basis for this performance measure.</i></p>
Current status:	Figure 2 shows the current estimate of fishing-related mortalities for seabird populations using data up to 2016/17.

Goal 3: Research and Information

Table 6: Performance Measures, additional information, and current status for Objective 5

Objective 5	Research is undertaken to improve bycatch mitigation across sectors, especially where there are high bycatch rates and no known effective mitigation (note: mitigation may include spatial and temporal closures)
Additional information	<i>This objective relates to both the commercial and non-commercial sectors. It acknowledges the importance of continuously improving mitigation practices.</i>
Performance measure 16	Number of mitigation practices assessed
Additional information	<i>In support of moving towards zero fishing-related seabird mortalities, continuous improvement of mitigation is a key aspect of this NPOA.</i> <i>This performance measure will report on, for example, research or trials undertaken by Fisheries New Zealand, the Department of Conservation, the fishing industry, or other organisations, that relate to efficacy of mitigation practices.</i>
Current status:	This will be reported on annually, using outputs from DOC and Fisheries New Zealand research, and other organisations' projects. Previously published reports are summarised in Appendices 6, 7, and 8 of the Review of the National Plan of Action – Seabirds (2013). ⁶³
Performance measure 17	Number of mitigation practices improved, where applicable
Additional information	<i>This performance measure is complementary to Performance Measure 16.</i> <i>In support of moving towards zero fishing-related seabird mortalities, continuous improvement of mitigation is a key focus. Where mitigation practices that apply to the commercial sector are improved, Mitigation Standards, PSRMPs or other components of the bycatch mitigation process will be updated to reflect the best available information.</i>
Current status:	This will be reported on annually, using outputs from DOC and Fisheries New Zealand research, and other organisations' projects. Previously published reports are summarised in Appendices 6, 7, and 8 of the Review of the National Plan of Action – Seabirds (2013). ⁶⁴
Performance measure 18	Number of fisheries without available or known effective mitigation (target: decreasing)
Additional information	<i>This performance measure recognises the need to identify or develop mitigation options for those fisheries with a risk of seabird capture, but that do not currently have recognised or effective mitigation.</i>
Current status:	A Mitigation Standard is yet to be finalised for set net fisheries and will be reviewed during the first year of operation of the NPOA Seabirds 2020. The effectiveness of some mitigation options in other commercial fisheries, such as

⁶³ Available at: <https://www.fisheries.govt.nz/dmsdocument/38057-national-plan-of-action-seabirds-2013-review-document>

⁶⁴ Ibid

	seabird scaring devices for small trawlers, requires further testing and development. Additionally, effective mitigation for non-commercial fisheries is not well known.
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Table 7: Performance Measures, additional information, and current status for Objective 6

Objective 6	Monitoring programmes for New Zealand commercial fisheries are designed and implemented to provide statistically robust information to assess progress towards the NPOA Seabirds 2020's objectives
Additional information	<i>This objective, and its associated performance measures, is focused solely on the commercial sector and ensuring that monitoring programmes are appropriately designed to support the NPOA. To date, Fisheries New Zealand's observer programme has been the primary means of monitoring commercial fisheries. It is anticipated that during the term of the NPOA, electronic monitoring (cameras on vessels) will provide an additional means of monitoring commercial fisheries.</i>
Performance measure 19	Monitoring objectives and needs are documented and updated annually, informed by the risk assessment and species conservation concern
Additional information	<i>This performance measure will demonstrate transparent and robust planning and documenting of monitoring priorities for seabirds.</i>
Current status:	This will be reported annually.
Performance measure 20	Monitoring coverage across all fisheries (target: increasing)
Additional information	<i>At-sea monitoring is vital to measuring mitigation use, the efficacy of mitigation, and estimating captures and is therefore key to implementing the NPOA Seabirds 2020.</i>
Current status:	Table 8 shows the percentage of fishing events observed in the main fisheries during 2018/19.
Performance measure 21	Uncertainty in risk assessment arising from limited monitoring data (target: decreasing)
Additional information	<p><i>One of the most important sources of uncertainty in the seabird risk assessment arises from limited monitoring data e.g. low observer coverage. This uncertainty can be addressed, in part, by identifying opportunities to tailor monitoring coverage to reduce that uncertainty, and building that into a monitoring plan.</i></p> <p><i>This uncertainty is reflected in the estimates of fishing-related deaths in the risk assessment, as observed (or e-monitored) captures are a key input to estimating fishing-related deaths.</i></p> <p><i>Note that there will be an inherent time lag between changes in observer coverage and the results flowing through to the risk assessment outputs. Similarly, additional monitoring will not reduce uncertainty associated with cryptic mortality.</i></p>

Current status:	<p>Refer to the 2020 seabird risk assessment for more detail on estimates of uncertainty relating to monitoring data.</p> <p>Uncertainty arising from limited monitoring data is reflected primarily in estimates of catchability, but can also be seen to some extent, in the total estimates of fishing-related deaths.</p>
Performance measure 22	The Fisheries New Zealand monitoring plan, and the plan's rationale, is published annually
Additional information	<i>Monitoring plans, such as observer coverage plans, will be discussed with the Seabird Advisory Group annually. Monitoring plans and the Seabird Implementation Plan will be uploaded on the Fisheries New Zealand website at the start of each financial year.</i>
Current status:	<p>Currently, Fisheries New Zealand publishes an annual observer coverage plan. Rationale is currently set out in the operational plans of the relevant management team.</p> <p>The current observer coverage plan, together with previous plans, is available via the Fisheries New Zealand website: https://www.fisheries.govt.nz/growing-and-harvesting/fisheries/operating-as-a-fisher/observer-services/</p>

Table 8: Percentage of fishing events observed in the main fisheries during 2018/19 fishing year.
Note that the data used in this table is ungroomed and may be subject to change.

	Fishing events	Percentage of events observed
Trawl fishery (tows)		
Hoki trawl	12,007	29%
Hake trawl (>28 m)	77	91%
Ling (>28 m)	774	38%
Squid (>28 m)	4,278	87%
Southern blue whiting	747	100%
Jack mackerel	1,568	79%
Scampi	4,372	16%
Middle-depth ⁶⁵ (>28 m)	1,960	57%
Deepwater ⁶⁶	3,620	39%
Flatfish	9,903	<1%
Other inshore ⁶⁷	30,804	5%
All trawl	70,110	21%
Bottom longline (BLL) fishery (hooks)		
Ling BLL vessels >28 m long	17,363,009	12%
Ling BLL vessels <28m long	6,056,996	5%
Snapper BLL	10,716,900	3%
Bluenose BLL	1,257,141	3%
Hapuka/bass BLL	3,018,057	3%
Other BLL	2,903,869	3%
All bottom longline	41,315,972	7%
Surface longline (SLL) fishery (hooks)		
Southern bluefin SLL	1,336,916	10%
Other SLL	632,946	9%
All surface longline	1,969,142	10%
Other fisheries		
Set net (metres of net)	13,231,557	7%
Purse seine (sets)	541	7%

⁶⁵ Includes effort targeting alfonsino, barracouta and warehou species.

⁶⁶ Includes orange roughy and oreo target tows.

⁶⁷ Includes all tows by vessels <28 m except those targeting hoki, scampi, orange roughy or flatfish species and tows by vessels >28 m targeting inshore species such as (gurnard, snapper, tarakihi or, trevally).

Table 9: Performance Measures, additional information, and current status for Objective 7

Objective 7	Observation and monitoring methods are researched, developed and implemented across all sectors
Additional information	<i>This objective covers all sectors and acknowledges that there are gaps in our observation and monitoring framework in terms of collecting information on seabird interactions, particularly for non-commercial fisheries.</i>
Performance measure 23	New observation and monitoring methods (including e-monitoring) are incorporated into monitoring programmes, analyses, and reporting
Additional information	<p><i>As noted, the anticipated rollout of cameras on vessels during the term of this NPOA is expected to provide additional monitoring of commercial fisheries.</i></p> <p><i>The ER/GPR ⁶⁸ information provided by all commercial fishers is a new source of information that can be analysed to provide additional data on implementation of the NPOA.</i></p> <p><i>Providing a means for non-commercial fishers to report seabird captures is also something that could be contemplated.</i></p>
Current status:	This will be reported annually.
Performance measure 24	Update and improve observer and fisher reporting requirements to enable effective analysis of bycatch and mitigation use as necessary
Additional information	<p><i>Observer tasking with respect of seabird interactions, mitigation use, and PSRMP auditing will continue to be reviewed and refined to ensure appropriate and useful data are collected in a standardised way.</i></p> <p><i>When electronic reporting was introduced, commercial fishers were asked to record specific information relating to mitigation use and seabird interactions. The fields to be reported will be reviewed and updated as necessary.</i></p>
Current status:	This will be reported annually.
Performance measure 25	Proportion of commercial fishers reporting mitigation use (target: 100% by 2022)
Additional information	<i>This performance measure is complementary to Performance Measure 24. All fishers using a method that has an agreed Mitigation Standard should be reporting mitigation use within two years of the NPOA Seabirds 2020 commencing.</i>
Current status:	Fishers are able to report a subset of mitigation use but reporting is not mandatory. Summary information will be reported annually.

⁶⁸ Electronic reporting and geospatial position reporting

Table 10: Performance Measures, additional information, and current status for Objective 8

Objective 8	A research programme provides information to reduce uncertainty in estimates of risk to seabirds from fishing
Additional information	<i>This objective, and associated performance measures, relates to the seabird risk assessment. It complements the work undertaken in relation to Objectives 6 and 7 that relate to reducing uncertainty in specific inputs to the risk assessment.</i>
Performance measure 26	Uncertainty in risk assessment due to limited biological data (target: decreasing)
Additional information	<i>Assessing the risk to a population (or the impacts of fishing on the population) relies on having good information on population size and any trends, as well as distribution and behavioural information.</i>
Current status:	<p>This will be reported whenever the risk assessment is updated or when research is published.</p> <p>Appendix B in the 2020 seabird risk assessment lists the demographic parameters used in the risk assessment and the associated credibility intervals.</p>
Performance measure 27	Uncertainty in risk assessment due to limited information about the nature of fishing interactions with seabirds (such as vulnerability and cryptic mortality) (target: decreasing)
Additional information	<i>This performance measure is focused on reducing uncertainty associated with understanding the nature of fishing interactions with seabirds. This uncertainty is primarily associated with estimates of cryptic mortality, which is mortality that would not be recorded by an observer such as a bird that strikes a trawl warp but is not recovered on the vessel. Cryptic mortality estimates are a key component of overall estimates of vulnerability (the likelihood that a seabird is captured or killed in a fishing event).</i>
Current status:	<p>This will be reported whenever the risk assessment is updated or when research is published.</p> <p>Appendix A in the 2020 seabird risk assessment details the cryptic multipliers and the associated credibility intervals. The overall estimation of vulnerability and relevant credibility interval information is in Appendix E of the risk assessment.</p>

Goal 4: International Engagement

Table 11: Performance Measures, additional information, and current status for Objective 9

Objective 9	The risk to New Zealand seabird species from fisheries outside the New Zealand EEZ is assessed and communicated to international organisations, governments and other stakeholders
Additional information	<i>The migratory nature of many New Zealand seabirds means they are also threatened by the operations of New Zealand and foreign-flagged vessels on the high seas, or by fishers operating in waters under the jurisdiction of other states.</i>
Performance measure 28	A fisheries risk assessment for seabirds is completed and updated to incorporate data for New Zealand seabirds caught outside the New Zealand EEZ
Additional information	<i>Extending the risk assessment framework to New Zealand seabirds caught outside the EEZ will assist with prioritising management action at a global scale.</i>
Current status:	A draft Southern Hemisphere Risk Assessment incorporating surface longline effort, was presented to the CCSBT Ecologically Related Species Working Group in May 2019. ⁶⁹
Performance measure 29	New Zealand's information on compliance with seabird measures is shared with relevant flag states, CCAMLR⁷⁰, and Regional Fisheries Management Organisations
Additional information	<i>Regional Fisheries Management Organisations (RFMOs) and CCAMLR have management measures relating to seabird mitigation. Any information New Zealand obtains on compliance with these measures, for example through compliance activities on the High Seas, will be shared with vessel flag states and the relevant RFMO.</i> <i>This performance measure acknowledges the need for a feedback loop between vessels, flag states, and RFMOs relating to adherence to seabird measures.</i>
Current status:	Information on compliance with seabird measures by New Zealand-flagged vessels operating outside New Zealand waters is made publicly available in New Zealand's country reports to relevant RFMOs which are published on RFMO websites. New Zealand undertakes High Seas patrols in the Pacific and has shared the results of High Seas inspections with relevant flag states and relevant RFMOs.
Performance measure 30	New Zealand actively engages with governments and fishing industries whose vessels create the greatest risk to New Zealand seabirds
Additional information	<i>The southern hemisphere risk assessment for New Zealand seabirds identifies where the greatest risk lies and where engagement should be prioritised.</i> <i>For clarification, in the context of this performance measure, 'New Zealand' includes all stakeholders. This performance measure is intended to reflect broader engagement rather than that of just the New Zealand government.</i>

⁶⁹ Commission for the Conservation of Southern Bluefin Tuna

⁷⁰ Commission for the Conservation of Antarctic Marine Living Resources

Current status:	<i>In November 2018, New Zealand signed a cooperative arrangement with Chile focused on enabling collaboration between New Zealand and Chile on seabird issues.</i>
Performance measure 31	New Zealand actively facilitates data sharing (relevant to New Zealand seabirds and fishing) between relevant international organisations, governments and stakeholders
Additional information	<i>This performance measure is complementary to the others under this objective. It acknowledges that as part of the process of reducing the risk to New Zealand seabirds from fishing outside the EEZ, the appropriate feedback loops need to be created.</i>
Current status:	Data sharing activities will be reported on annually.

Table 12: Performance Measures, additional information, and current status for Objective 10

Objective 10	New Zealand advocates for the development, adoption, improvement, and uptake of seabird conservation measures⁷¹
Additional information	<i>This objective relates to the role New Zealand plays in RFMOs and CCAMLR in implementing measures to mitigate the risk to New Zealand seabirds from fisheries outside the EEZ.</i>
Performance measure 32	Where possible, meeting reports from CCAMLR and Regional Fisheries Management Organisations show that seabird matters, including new conservation measures, have been considered
Additional information	<i>This performance measure provides transparency about what New Zealand advocates for at CCAMLR and RFMO meetings related to reducing the risk to New Zealand seabirds from fisheries outside the EEZ.</i>
Current status:	<p>The 2019 meeting reports from CCSBT and WCPFC showed New Zealand's leadership in seabird-related items, such as leading work to update the southern hemisphere risk assessment at CCSBT, and leading a proposal to adopt seabird handling guidelines at WCPFC.⁷²</p> <p>The report from the 2020 meeting of the South Pacific Regional Fisheries Management Organisation reflects New Zealand's efforts to support observer coverage requirements in South Pacific squid fisheries to understand seabird interactions.</p> <p>The report from the 2019 CCAMLR meeting showed referenced a presentation from New Zealand on offal dumping, which is prohibited in the convention area as part of measures to minimise incidental mortality of seabirds.</p> <p>Outcomes of future RFMO discussions will be reported annually.</p>
Performance measure 33	Where possible, conservation measures from relevant fora consider the risk to seabirds from fishing
Additional information	<i>This performance measure is complementary to the southern hemisphere fisheries risk assessment for seabirds and outcomes from New Zealand</i>

⁷¹ In the NPOA Seabirds 2020, the term 'conservation measures' is intentionally broad, so that a wide range of options to avoid, remedy or mitigation adverse effects of fishing on seabird populations can be considered.

⁷² Western and Central Pacific Fisheries Commission

	<i>advocacy as covered by performance measure 32. Conservation measures should be informed by the risk assessment.</i>
Current status:	Successfully reached agreement on changes to seabird conservation measures at CCSBT in 2019 and WCPFC in 2018. Outcomes of future RFMO discussions will be reported annually.
Performance measure 34	New Zealand carries out compliance checks for all high seas vessels visiting New Zealand ports, where appropriate, consistent with port state measures, and in keeping with the relevant Regional Fisheries Management Organisation rules and conservation and management measures
Additional information	<i>This performance measure recognises that by undertaking in-port inspections New Zealand can contribute to the feedback loop between RFMOs, vessels, and flag states on adherence with seabird-related conservation and management measures.</i>
Current status:	This will be reported annually.

Table 13: Performance Measures, additional information, and current status for Objective 11

Objective 11	New Zealand actively works bilaterally, multi-laterally, and with international organisations to build capacity to reduce the risk to New Zealand seabirds
Additional information	<i>This objective recognises work to reduce bycatch in New Zealand fisheries alone may not be sufficient to protect wide-ranging seabirds and acknowledges the need to work with other jurisdictions to achieve our objectives for New Zealand seabirds.</i>
Performance measure 35	Active and effective programmes, including mitigation research and outreach, are in place, or completed, that build the capacity of governments and other stakeholders in fisheries that create risks to New Zealand seabirds
Additional information	<i>This performance measure acknowledges the importance of capacity-building in other jurisdictions. It also recognises that to be effective mitigation, may need to be designed specifically for the fisheries operating in that jurisdiction.</i>
Current status:	Amongst other initiatives, MFAT funds work delivered by MPI aimed at enhancing fisheries management capacity in the Pacific, which includes the management of bycatch. Seabird related activities undertaken by this programme will be reported annually.
Performance measure 36	New Zealand supports small-island developing states in developing and implementing NPOA Seabirds, as necessary
Additional information	<i>Under Te Pātuitanga Ahumoana a Kiwa work programme, small-island developing states can request support from New Zealand in developing and implementing NPOA Seabirds.⁷³</i>
Current status:	This will be reported on annually.

⁷³ More information about the Te Pātui programme is available [here](#) and [here](#)

7. Appendix One: Seabird Advisory Group Terms of Reference

PURPOSE

The purpose of the group is to monitor and assist the implementation of the NPOA Seabirds 2020 and to contribute to the review that, in accordance with its provisions, is scheduled to commence after its fourth year of operation.

MEMBERSHIP

The membership of the group will be open to all interested organisations. It is expected that members will be persons who have knowledge and experience in relation to the fishery-seabird interactions issues that need to be addressed to ensure the NPOA Seabirds 2020 is implemented. It should include members from environmental groups, the fishing industry, the recreational and customary non-commercial sectors, the Department of Conservation, Fisheries New Zealand, and Ministry of Foreign Affairs and Trade.

No formal upper limit for the membership of the group should be prescribed, but, in order to ensure it is able to function effectively and efficiently, the numbers attending meetings should not exceed twelve. If necessary, consultations should be held before the first meeting, and subsequently at the request of any interested stakeholder, to arrange appropriate shared membership or rotational membership. Organisations wishing to participate in the work of the group should ensure their nominated participant will be able to contribute to the work of the group on a continuous basis. Consideration should be given as appropriate to the co-option, for particular meetings, of experts who are not normally members of the group.

Members are expected to contribute in a professional capacity and are not expected necessarily to represent the views of their sector.

ROLE

The group is an advisory body, not a decision-making body. It will monitor progress against the objectives of the NPOA Seabirds 2020 and provide advice and assistance to Fisheries New Zealand, the Department of Conservation, and the Ministry of Foreign Affairs and Trade in relation to the implementation of the NPOA Seabirds 2020.

To fulfil its role the group will, as appropriate:

- review at sea monitoring data, scientific reports, industry self-reporting data and other sources of information to assess progress in achieving seabird related objectives annual and five-year plans;
- review updates to and revisions of the risk assessment to assess progress in reducing the level of risk to seabirds from fisheries or other sources as appropriate;
- appraise Regional Fisheries Management Organisation reports and other international or domestic reports to assess progress in addressing threats to New Zealand seabirds in other fisheries outside New Zealand;
- consider reports, factsheets or other information on the development of new mitigation practices or technology and their suitability for New Zealand fisheries; and,
- evaluate the effectiveness of training, education, and outreach in New Zealand fisheries in achieving behaviour change in commercial and non-commercial fisheries.

MODUS OPERANDI

In consultation with Fisheries New Zealand and the Department of Conservation, the group will elect a Chair who may be an independent person from outside the group.

The group will meet at least annually and sufficiently frequently to carry out its role effectively. In particular the timing and frequency of its meetings must ensure it is able to contribute effectively to the annual review and revision of the seabird interaction components of fisheries plans.

The group will be provided in a timely manner with all information relevant for its role. In particular, Fisheries New Zealand will provide it with the fisheries planning documents and associated implementation guidelines, review documents reporting on the achievements against annual and five-year plans, science documents describing the most recent risk assessments, developments in mitigation and reports on the capture of seabirds in fishery. The Department of Conservation will provide the group with any relevant information or recommendations developed by the Agreement on the Conservation of Albatrosses and Petrels.

Where possible advice from the group, including recommendations, will be arrived at by consensus. Where the group is unable to provide its advice by consensus, it will set out in any report the different views of its members.

Meetings of the group will be co-ordinated and serviced by Fisheries New Zealand and Department of Conservation.

8. Appendix Two. Capture rate reduction targets

During the term of the NPOA Seabirds 2013, a working group of the Seabird Advisory Group (SAG) was tasked with developing a set of principles that could be used when determining capture rate reduction targets. The group recommended that fisheries be defined using the same groupings as those of the seabird risk assessment model, and that capture rate reduction targets should be quantitative wherever possible. These targets would then be compared to a baseline capture rate, defined at that time as the average estimated capture rate across the three year block leading up to the implementation of the NPOA Seabirds derived from trips with at least 10% observer coverage and high confidence (a coefficient of variation⁷⁴ of less than 0.30). It was also agreed that these targets should be robust, therefore a test was devised based on the level of actual observed captures, the estimated captures, and the corresponding capture rate.

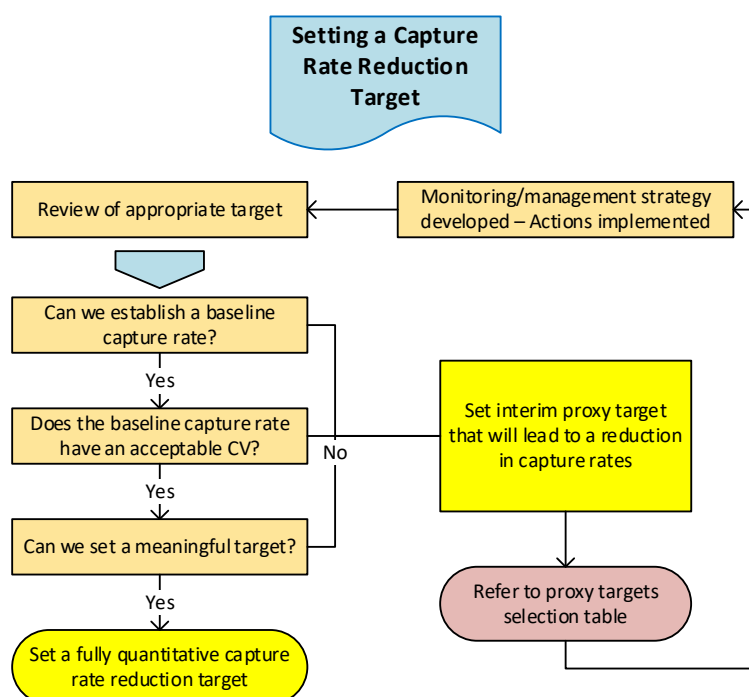


Figure 3: Steps to setting a capture rate reduction target

The calculation steps to determine the baseline capture rate, the capture rate reduction targets, and proxy targets for deepwater fisheries are outlined in Table 14. The cells shaded red indicate the step at which the above criteria have not been met and fisheries highlighted in yellow indicate that it was possible to capture quantitative capture rates. The service provider responsible for the enumeration of seabird captures calculated how a 'statistically significant' decrease in capture rate would compare to the baseline capture rate. The targets were set for the end of the 5 year period of the NPOA Seabirds and are measured based on a 3 year rolling average. For fisheries where the above criteria are not met, proxy targets have been developed.

⁷⁴ Coefficient of variation (CV) is a metric of the variation of the data around the mean. It allows for comparison of the variation within and across data sets.

Table 14. Capture rate reduction targets developed for deepwater fisheries

Baseline capture rate								
Fishery	Baseline observer coverage	Annual CV of captures	Observed captures	Estimated captures	Capture rate/100 tows/sets	Meaningful target?	'Target' rate/100 tows (reduction)	Suggested target/proxy
SBW trawl	>10%	0.0004-0.27	4-20	6-20	1.1	No		Continue to monitor and report, target is no significant increase (based on 3-yr rolling averages)
SQU trawl	>10%	0.039-0.134	>100	>300	14.0	Yes	12.0 (14%)	Statistically significant decrease in rate (based on 3-yr rolling average)
JMA trawl	>10%	0.037-0.421	7-33	10-34	1.0	No		Continue to monitor and report, target is no significant increase (based on 3-yr rolling averages)
SCI trawl	<10%					No		Observer coverage has been >10% twice in the most recent 4 years. A calculation of the overall observer coverage indicates that 8.4% of tows have been observed in the last five years, this is not considered sufficient to provide a robust baseline. Proxy target is to have VMPs in place on all vessels, ELO visit all scampi vessels, and a target of 15% observer coverage be set.
Deepwater trawl ⁷⁵	>10%	0.392-0.407	2	16-24	0.6	No		Continue to monitor and report, target is no significant increase (based on 3-yr rolling averages)
Middle depths trawl (>28 m) ⁷⁶	>10%	0.065-0.187	>100	>200	2.7	Yes	2.3 (15%)	Statistically significant decrease in rate (based on 3-yr rolling averages)
Large vessel BLL	>10% 09/10-11/12	0.32-0.451	4-27	>100	1.0	No		Continue to monitor and report, target is no significant increase (based on 3-yr rolling averages)
Small vessel LIN BLL	<10%					No		Work with industry to implement vessel-specific seabird management plans including the use of best practice mitigation across this fleet. Liaison officers will also provide seabird training sessions to crew. And a target of 15% of effort observed will be set.

⁷⁵ Deepwater trawl includes orange roughy, alfonso and oreo species.

⁷⁶ Middle depth trawl includes trawl effort for all species other than those with specific categories. This includes hoki, hake and ling and a number of tier 2 species.