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Ministry for Primary Industries
Manatū Ahu Matua

National Plan of Action – 2013

to reduce the incidental catch of seabirds in New Zealand Fisheries

Growing and Protecting New Zealand

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Foreword

Protecting New Zealand's seabirds

New Zealand's fishing industry is an important part of our economy. We must ensure the ongoing sustainability of our fisheries for future generations, and at the same time, that the seabirds living within our Exclusive Economic Zone are adequately protected from any risks associated with fishing. Seabirds are ranked by the International Union for the Conservation of Nature as the world's most threatened bird grouping, and the key threat to seabirds is incidental capture and mortality through fishing operations.

This has a special relevance for us in New Zealand because more species of seabirds breed here than in any other country in the world. We strive to be at the leading edge of international seabird conservation and management.

Although progress has already been made in reducing the incidental capture of seabirds in some New Zealand fisheries, there is still more to do.

This National Plan of Action-Seabirds 2013 (NPOA-Seabirds) aims to reduce the number of seabird deaths from fishing. It builds on and considerably expands the good work begun in the NPOA-Seabirds 2004. It reflects excellent collaboration and consultation between the Ministry for Primary Industries, the Department of Conservation, the fishing industry, tangata whenua and environmental groups. It is a great example of co-operation between a wide range of stakeholders with a common interest.

The NPOA-Seabirds 2013 clearly sets out New Zealand's approach for the next five years on this issue. It defines over-arching objectives for the prevention, monitoring and management of incidental seabird capture. It sets out how these objectives are to be addressed and implemented by the Ministry for Primary Industries, and provides clear expectations for regular review and reporting on progress towards meeting the objectives. It outlines ways to reduce fishing-related seabird deaths by raising awareness of the problem and encouraging the research and resourcing of new measures and methods. New Zealand will also actively co-operate on seabird protection measures with other countries whose vessels have interactions with seabirds – particularly those that breed here.

I am very encouraged by the development of the NPOA-Seabirds 2013, which represents a, which represents a significant step forward in protecting our seabirds. I would like to personally thank everyone involved and look forward to the rich abundance of seabird species found in our waters thriving.

Hon. Nathan Guy
Minister for Primary Industries
24 April 2013

Executive Summary

1. New Zealand is a special place for seabirds. More species of seabirds, particularly albatross, petrel, penguin and shag species, breed in New Zealand than anywhere else in the world. These seabirds are an important part of our natural and cultural heritage and provide locally important eco-tourism opportunities in some regions. Their intrinsic value as well as their range means they have significance for the wider international community. Accordingly New Zealand strives to be at the leading edge of international seabird conservation and management.

2. Seabirds are ranked by the International Union for the Conservation of Nature (IUCN) as the world's most threatened bird grouping. Globally they face a number of threats to their long term viability, both at their breeding sites and while foraging at sea. Work at the global level on reducing threats at breeding sites is a major focus of the Agreement on the Conservation of Albatrosses and Petrels (ACAP) and in New Zealand is the responsibility of the Department of Conservation (DOC). But the key threat to seabirds, especially albatrosses and petrels, is incidental capture and death through fishing operations. Seabirds that breed in New Zealand die as a result of interactions with commercial or recreational fishing operations in waters under New Zealand jurisdiction, through interactions with New Zealand vessels or other nations' vessels on the high seas and through interactions with commercial, recreational or artisanal fishing operations in waters under the jurisdiction of other states.

3. Under the United Nations Convention on the Law of the Sea (UNCLOS) coastal states like New Zealand are obliged to ensure their Exclusive Economic Zone (EEZ) conservation and management measures take into account the effects on species like seabirds that are associated with or dependent on harvested species so as to maintain or restore their populations above levels at which their reproduction may be seriously threatened. A similar obligation is placed on all states fishing on the high seas. These obligations are repeated in the subsequent 1995 United Nations Fish Stocks Agreement (UNFSA) and now could be considered binding on all countries as part of customary international law.

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

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

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

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

8. As well, the actions we can take to reduce the incidental catch of seabirds that breed in New Zealand inevitably vary depending on jurisdictional issues such as whether the relevant fishery is carried on in waters under New Zealand jurisdiction (or by New Zealand flagged vessels), on areas of the high seas for which an RFMO has responsibility, or in waters under the jurisdiction of other states. But useful options exist for all these circumstances.

9. This New Zealand NPOA-Seabirds 2013, taking account of the BPTG, establishes New Zealand's approach to reducing the incidental mortality of seabirds from fishing. It sets out a long term objective, some supporting high level subsidiary objectives and objectives to be met within the first five years. It outlines the management mechanisms for ensuring that the objectives are achieved including through the establishment of clear accountabilities for overall progress and a process of annual reporting and review of fisheries specific objectives contained in the national annual and five year fisheries planning documents. In broad terms the Plan seeks to ensure that:
   i) awareness of the problem and the known methods of reducing it is heightened both domestically and internationally;
   ii) relevant effective mitigation methods are applied in all New Zealand fisheries and by New Zealand vessels on the high seas;
   iii) capture rates are reducing towards negligible levels in all New Zealand fisheries;
   iv) the development of new mitigation measures, new observation and monitoring methods, and relevant research are encouraged and resourced;
   v) priority for the application of existing mitigation measures, the development of new mitigation measures and the introduction of other relevant actions are determined in accordance with the level of risk faced by particular seabird species; and
   vi) active co-operation is established with other countries whose vessels have interactions with seabirds, particularly those that breed in New Zealand, including through relevant RFMOs and through bilateral information sharing and assistance where relevant.

Background

10. Prior to the arrival of humans, the absence of mammalian predators in New Zealand made it a relatively safe breeding place for seabirds and large numbers of a wide variety of species thus bred here, including on the main North and South Islands. Today New Zealand's extensive coastline, numerous inshore and offshore islands (many of them predator free) and surrounding seas and oceans continue to make it an important breeding ground for many seabird species. Approximately ninety five of these taxa breed in New Zealand, and more than a third are endemic (i.e. breed nowhere else in the world). They include the greatest variety of albatross, petrel, penguin and shag species in the world. All but seven seabird species found in New Zealand are absolutely protected under the Wildlife Act 1953, which means that it is an offence to hunt or kill them (there are some specific exceptions granted for customary harvest).

11. Some of the seabird species that breed in New Zealand such as shags and penguins live their lives relatively close to where they breed. But many, including a large number of the albatrosses and petrels, spend large parts of their lives in international waters or in waters under the jurisdiction of other nations far away from their breeding locations.

12. Seabirds are ranked by the IUCN as the world's most threatened bird grouping [IUCN 2012]. Globally they face a number of threats. These include the loss of breeding habitat, changing climatic/oceanographic patterns and ocean pollution. But the key threat is their incidental capture and death through fishing operations.

13. At the global level, work on reducing threats to seabirds at their breeding sites is a major focus of the Agreement on the Conservation of Albatrosses and Petrels 2001 to which New Zealand is a party. In New Zealand that work is the responsibility of the Department of Conservation.

14. The responsibility to deal with the threats to seabirds through fishing operations stems, at the international level, from the United Nations Convention on the Law of the Sea 1982 (UNCLOS). Under that Convention coastal states like New Zealand are obliged to ensure their EEZ conservation and management measures take into account the effects on species like seabirds that are associated with or dependent on harvested species so as to maintain or restore their populations above levels at which their reproduction may be seriously threatened [UNCLOS 1982: Article 61(3)]. A similar obligation is placed on all states fishing on the high seas [UNCLOS 1982: Article 119(1)(b)]. These obligations are repeated and developed in the subsequent 1995 UNSFA and UNFAO's Code of Conduct for Responsible Fisheries of the same year and now could be considered binding on all countries as part of customary international law.

15. As a result of increased awareness about the incidental capture of seabirds, especially in longline fisheries, the UNFAO organised an expert consultation on the issue in 1998 that resulted in the voluntary *International Plan of Action for reducing incidental catch of seabirds in longline fisheries* (IPOA-Seabirds) of 1999. The IPOA-Seabirds provided guidance to states in preparing their own specific national plans of action (NPOA-Seabirds) for reducing the incidental catch of seabirds in longline fisheries, including the technical measures that might usefully be included.

16. New Zealand issued its first NPOA-Seabirds in April 2004. That document described what was known at that time about seabird interactions with New Zealand fisheries. It set out the mix of voluntary and mandatory measures that would be used to help reduce the incidental catch of seabirds in those fisheries, noted the ongoing research into the extent of the problem and the techniques for mitigating it and outlined the mechanisms that would be used to oversee, monitor and review the effectiveness of these measures and the overall implementation of the NPOA-Seabirds.

17. In 2007 the need to broaden the range of fishing gears covered by the IPOA-Seabirds was acknowledged by the UNFAO together with the need to strengthen its implementation by

developing best practice guidelines to support the elaboration of NPOA-Seabirds. An expert consultation was convened in 2008 and developed the BPTG [UNFAO 2009].

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

19. This New Zealand NPOA-Seabirds 2013 is a response to the fact that although progress has been made in reducing the incidental capture of seabirds in some New Zealand fisheries, much remains to be done in others and improvement is important across most. In addition more needs to be done to assess and assist in the reduction of incidental mortality of New Zealand seabirds[1] in waters beyond New Zealand jurisdiction.

20. The Rationale section of this NPOA-Seabirds 2013 describes the nature of seabird interactions with the different New Zealand fisheries (see also Annex I), the impacts those interactions can have on different species, the current sources of information for ascertaining and assessing the extent of seabird mortality, the nature and extent of incidental mortality in observed fisheries and the general complexity of the problem in relation to New Zealand seabirds. The key tool for determining which seabirds and fisheries require greatest attention is a comprehensive risk assessment (see Annex II). The risk assessment indicates that for some deepwater fisheries and some highly migratory species fisheries, fishing-related risk to seabirds has been reduced [Richard *et al.* 2011; Richard *et al.* 2013]. These fisheries are no longer major contributors of risk to the seabird populations considered most at risk from fishing related mortality in New Zealand. The risk assessment shows inshore fisheries contribute the majority of the risk in particular inshore trawl and bottom longline fisheries, and the small vessel surface-longline fleet targeting swordfish or big-eye tuna, a proportion of which is due to the level of uncertainty in the estimate of risk for these fisheries rather than the level of known impacts [MPI 2012a; Richard *et al.* 2013].

21. In general terms the commercial fisheries in which progress in reducing incidental seabird mortality has been best documented are the deepwater longline and trawl fisheries and the joint venture tuna fleet. The fisheries in respect of which we have least information are the inshore trawl, longline and set net fisheries. Due to low levels of observer coverage, there are also limitations regarding information about progress in the domestic tuna and swordfish longline fisheries. Understanding of incidental seabird captures in the non-commercial sectors is limited and whilst work in this area is at a very early stage, it is a recognised need. At the international level there have been some positive engagements with non-government organisations and fishing interests in other coastal states through the Southern Seabirds Solutions Trust (see below).

22. Some examples of the progress that has been made in the commercial sector include:
    i) in the deepwater fishing sector:
        a) industry has implemented vessel-specific seabird risk management plans comprising non-mandatory seabird scaring devices (e.g. streamer lines), offal management and other measures to reduce risks to seabirds;
        b) Government has implemented mandatory measures to reduce risk to seabirds (e.g. a prohibition on net sonde cable use and deployment of seabird scaring devices); and
        c) industry has taken a proactive stance in resourcing a 24/7 liaison officer to undertake incident response actions, mentoring, vessel-specific seabird risk management plans and regime development and reviewing, and fleet wide training;

[1] New Zealand seabirds – All seabird species absolutely or partially protected under the New Zealand Wildlife Act 1953 (New Zealand seabirds). Note that this includes all seabirds that occur within New Zealand fisheries waters, whether New Zealand breeding or not, except for the species listed in Schedule 5 to the Wildlife Act (currently one species – black backed gull – is not protected).

ii) in the bottom and surface long-line sectors, Government has implemented mandatory use of streamer lines in combination with either night setting or line weighting, and in the bottom long-line sector requires offal management;
iii) a number of research projects have been or are currently being undertaken by government and industry into offal discharge, efficacy of seabird scaring devices, line weighting and longline setting devices; and
iv) workshops organised by both industry bodies and Southern Seabird Solutions are being held for the inshore trawl and longline sectors and the inshore fisheries have developed a Protected Species Handbook that provides a comprehensive reference for those fisheries.

23. Areas which clearly require additional progress in New Zealand fisheries include:
    i) mitigation measures for, and education, training and outreach in commercial set net fisheries and inshore trawl fisheries;
    ii) implementation of spatially and temporally representative at sea data collection in inshore and some Highly Migratory Species (HMS) fisheries;
    iii) mitigation measures for net captures for deepwater trawl fisheries;
    iv) the extent of any cryptic mortality (seabird interactions which result in mortality but are unobserved or unobservable); and
    v) mitigation measures for, education, training and outreach in, and risk assessment of non-commercial fisheries (in particular the set net and hook and line fisheries).

24. In terms of collaborating with other countries facing similar seabird fisheries interactions, New Zealand's work began in 2000 with the First International Fishers Forum. This four-day meeting was attended by fishers, gear technologists, biologists and government representatives from 13 countries. The purpose of the forum was to exchange ideas and information on measures being used or developed around the world to reduce capture of seabirds in longline fisheries. This New Zealand initiative led to four more Forums, held in Hawaii, Japan, Taiwan and Ecuador.

25. Subsequently in 2002 the New Zealand government, fishing industry, Te Ohu Kaimoana, and WWF formed the Southern Seabird Solutions Trust (SSS). The aim of this partnership is to foster widespread uptake of seabird smart fishing methods in commercial and recreational fisheries that overlap with New Zealand seabirds. The Trust carries out training workshops and other awareness raising initiatives, supports development of new mitigation measures, and promotes the efforts of fishers, companies or organisations who are leading in their efforts to reduce seabird mortalities. The Trust also carries out education and awareness raising programmes with organisations in other countries that share New Zealand breeding seabirds. Descriptions of the mitigation measures that have been developed with the support of SSS, the assistance available for the development of new mitigation measures, the nature of the training workshops and the range of outreach programmes and promotion of successful mitigation efforts by fishers can be found on the Trust's website (www.southernseabirds.org).

26. The relevant New Zealand legislation relating to the protection of seabirds and the management of the impact of fishing operations on seabirds is the Wildlife Act 1953 and the Fisheries Act 1996.

27. The effective implementation of the NPOA-Seabirds 2013 requires co-ordinated and integrated action across several broad areas including: education, training and outreach; research and monitoring; and engagement in international fisheries beyond New Zealand. These action areas are described in the relevant sections. The main management mechanisms through which the NPOA-Seabirds 2013 will be implemented, monitored and reviewed are the five year and annual fisheries planning documents. These processes are described in the section on management measures and NPOA-Seabirds 2013 implementation. That section notes that there is scope for the use of different approaches ranging from the prescription by law of specific mitigation methods for specific fisheries, to independently audited self management systems (that encourage innovation and refinement of mitigation methods while identifying the practices that all participants in the fishery must meet or exceed).

Rationale for this NPOA-Seabirds

28. As outlined in the Background section, New Zealand identified it had a seabird incidental catch problem in its NPOA-Seabirds of 2004 and set out the actions required at that time to address it.

29. This section takes account of BPTG numbers 1 and 3 relating to the range of fishing gears covered by an NPOA-Seabirds and defining the extent of the problem. It summarises current knowledge of the extent and complexity of the problem in respect of seabirds that breed in New Zealand and notes that systems and processes are being established or refined to ensure that an appropriate range of actions are taken in respect of all possible fishing interactions with these seabirds.

THE SEABIRDS AT RISK OF INCIDENTAL CAPTURE IN NEW ZEALAND FISHERIES

30. As already noted New Zealand is an important breeding ground for ninety five breeding taxa of seabirds including the greatest number of albatrosses (14), petrels (32), shags (13) and penguins (9) of any area in the world [Miskelly *et al.* 2008]. Species caught in New Zealand fisheries range in IUCN threat ranking from critically endangered (e.g. Chatham Island shag), to least concern (e.g. flesh-footed shearwater) [IUCN 2012].

31. There are also a number of seabird species/populations covered by this NPOA-Seabirds 2013 which utilise New Zealand waters but do not breed here. Some visit here occasionally to feed (e.g. Indian Ocean yellow-nosed albatross and snowy wandering albatross), whilst others are frequent visitors (e.g. short-tailed shearwater), sometimes for extended durations (e.g. juvenile giant petrels).

32. Different species face different threats from fishing operations depending on their biological characteristics and foraging behaviours. Biological traits such as diving ability, agility, size, sense of smell, eyesight and diet, foraging factors such as the season and areas they forage, their aggressiveness, the boldness (or shyness) they display in their attraction to fishing activity can all determine their susceptibility to death or injury from fishing operations. Some fishing methods pose particular threats to some guilds or species of seabirds. For example, penguins are particularly vulnerable to set net operations. Another example is that of large albatrosses which appear to be almost exclusively vulnerable to all forms of longlining. The nature and extent of interactions differs spatially, temporally, seasonally and diurnally between sectors, fisheries and between fleets and vessels within fisheries.

33. In 2010/11 the species most frequently observed caught in New Zealand commercial fisheries in descending order were white-chinned petrel, sooty shearwater, southern Buller's albatross, white-capped albatross, Salvin's albatross, and flesh footed shearwater, grey petrel, cape petrel, storm petrel and black petrel [MPI 2013].

CURRENT INFORMATION SOURCES FOR, AND ASSESSMENT OF, THE EXTENT OF SEABIRD MORTALITY

34. The key information sources for identifying and assessing the nature, extent and potential consequences of seabird mortality in fisheries under New Zealand jurisdiction or undertaken by New Zealand vessels on the high seas are:
    i) government observer reported data on captures in fisheries, the use of mitigation measures and general fishing practices, and samples of captured seabirds;
    ii) commercial fisher reported effort data which provides total effort, and the spatial and temporal distribution of fishing effort;
    iii) research outputs relating to seabird biology, demography, ecology and at sea distribution; and
    iv) assessments of seabird incidental captures in RFMOs and other countries waters.

35. Information from these sources is used to provide periodic reports on seabird captures in New Zealand fisheries, assessment of risk to seabirds posed by fisheries, and seabird population status (as described in Annexes I and II). An up to date version of the capture reports (annual review[2] and web-based access to data[3]) and risk assessment documents[4] will be maintained and will be accessible through a link from the NPOA-Seabirds 2013 page of the Ministry for Primary Industries (MPI) website. Domestic and international assessments of seabird population status, by DOC and IUCN respectively, will also be accessible through a link from the NPOA-Seabirds 2013 web page. These documents provide the comprehensive and detailed assessment of seabird incidental catch in New Zealand fisheries recommended in the BPTG [UNFAO 2009]. By providing comprehensive fishery-by-fishery and species-by-species annual data, the most up to date information is available to assess implementation and performance throughout the life of the NPOA-Seabirds 2013.

36. Other sources of information include anecdotal information about interactions in the recreational and customary non-commercial sectors in New Zealand, information available from relevant RFMOs in relation to interactions with foreign flagged vessels on the high seas and information from various sources about interactions in waters under the jurisdiction of other coastal states within the range of these seabirds.

37. All such information currently available confirms that a number of seabirds that breed in New Zealand face ongoing threats from fishing operations in New Zealand and elsewhere and this NPOA-Seabirds 2013 is necessary.

[2] The Aquatic Environment Biodiversity Annual Review [MPI 2012a] contains a chapter on seabirds which is to be updated annually.
[3] A database of protected species capture information, including associated effort and observer data, is maintained at www.fish.govt.nz/en-nz/Environmental/Seabirds and is publicly available. It can be used to produce annual fishery-by-fishery or seabird-by-seabird summaries over one or many years.
[4] A comprehensive level two risk assessment has been produced and it is intended that this is updated annually in the medium term [Richard *et al.* 2013].

INCIDENTAL SEABIRD MORTALITY IN COMMERCIAL LONGLINE FISHERIES

38. Seabird captures can occur in longline fisheries when seabirds are attracted to fishing activity and interact with fishing gear. Seabirds are particularly prone to capture when they dive around lines being set in the water, and pursue baited hooks. Seabirds can be caught in lines, hooked by their beaks when they attempt to consume hooked bait, or hooked through another part of the body as they encounter hooks in the water. These types of interactions can all lead to captures. At hauling, they are attracted to unused baits and captured fish. In addition, at any time, discarding baits and processing waste attracts seabirds to longline vessels, which may subsequently lead to their injury or death through interactions with fishing gear.

39. Surface (or pelagic) longline gear is intended to fish at a range of depths in the water column. This gear typically has long and transparent snoods, little (if any) extra weighting, and can present a risk to seabirds for extended periods during its deployment, especially if it is pulled up towards the surface due to environmental or operator factors. In New Zealand there are two surface longline fleets, a smaller vessel fleet generally using American style gear adapted to New Zealand conditions, and a large vessel fleet generally using Japanese style gear also adapted to New Zealand conditions.

40. The large vessel surface longline fleet has been comprehensively observed through time, and capture rates and estimates of total captures have generally reduced through time. The small vessel surface longline fleet has had limited observer coverage and there have also been significant fluctuations in total effort and seabird capture rates, with no obvious overall trend. In these two surface longline fisheries combined in the 2010–11 fishing year, there were 740 (95 percent CI[5]: 547-1019) estimated captures of seabirds [MPI 2012a: 75; MPI 2013]. In recent years, the estimated order of magnitude of seabird captures in these fisheries combined is inferred to be in the hundreds to over a thousand per annum.

41. Appropriately weighted bottom longline gear should sink to the intended fishing depth (generally near or on the seabed) rapidly until out of seabird diving range. During setting the longline can jerk up out of the water (or be pulled up to shallow depths), exposing baited hooks and increasing risk of seabird capture. In New Zealand currently there are at least four bottom longline fleets: a smaller vessel fleet using droplines, trotlines and dahn lines in deeper coastal waters; a smaller vessel fleet using longlines in shallower coastal waters; a large vessel fleet fishing offshore using autolines; and, a large vessel fleet fishing outside the EEZ in very deep water using autolines.

42. In the four bottom longline fleets:
    a) the large vessel fleet fishing outside the New Zealand EEZ has been comprehensively observed through time, and capture rates and total captures have been zero;
    b) the large vessel offshore fleet has consistently had some observer coverage and capture rates and estimates of total captures have generally reduced through time;
    c) the small vessel deeper water fleet has had limited observer coverage but is known to capture seabirds; and
    d) the small vessel fleet in shallow water has also had very limited observer coverage and is known to capture seabirds.

    In these four longline fisheries combined in the 2010–11 fishing year, there were 1403 (95 percent: 955-1967) estimated captures of seabirds (it should be noted that about 14 percent of bottom longline effort could not be included in the models producing this estimate) [MPI 2012a: 75; MPI 2013]. In recent years, the estimated order of magnitude of seabird captures in these fisheries combined is inferred to be in the high hundreds to low thousands per annum.

[5] Confidence Interval (CI) – in statistics, a CI is a type of interval estimate of a population parameter and is used to indicate the reliability of an estimate. The width of the confidence interval gives an idea about how uncertain we are about the unknown parameter.

INCIDENTAL SEABIRD MORTALITY IN COMMERCIAL TRAWL FISHERIES

43. In trawl fisheries, collisions with the warps can cause significant levels of seabird incidental mortality as seabirds forage on fish waste and discards from the vessel. Injuries to wings caused by collisions can prevent animals from foraging and are likely to lead to death. Some animals are drowned as they are forced under the water by the trawl warps (cables). Grease, or similar substances, applied to warps can be transferred to seabirds exacerbating risk of capture and potentially directly damaging feathers.

44. Warp strikes are uncommon when fish waste and discards are not being discharged. Vessels fishing without discharging fish waste and discards therefore present less danger to seabirds of warp strike.

45. Seabird mortalities can also occur from net captures. These occur during deployment and retrieval of the net (shooting and hauling), when seabirds dive (sometimes to considerable depths) into the trawl net or become entangled in the meshes when they are trying to seize fish or other natural food items in the net. Sometimes meshes can open and close suddenly, leading to injury and death. Seabirds may also be trapped and drown during the shooting of the net as they attempt to feed on fish that have not been removed (stickers) from the previous trawl. Risk of capture may be exacerbated if operational problems result in the net spending a long time at or near the surface. In New Zealand there are at least three trawl fleets: a smaller vessel fleet in shallower coastal waters; a large vessel fleet fishing offshore in moderate depths; and, a large vessel fleet fishing offshore in deep water.

46. In the three trawl fleets:
    i) the large vessel deepwater fleet has consistently had moderate observer coverage, and seabird capture rates and estimates of total captures have generally been low through time;
    ii) the large vessel middle depths fleet has consistently had moderate observer coverage, and seabird capture rates and estimates of total captures have generally decreased through time; and
    iii) the smaller vessel inshore fleet has had limited observer coverage but is known to capture seabirds.

    In these three trawl fisheries combined in the 2010–11 fishing year, there were 2788 (95 percent CI: 2172-3611) estimated captures of seabirds [MPI 2012a: 75; MPI 2013]. In recent years, the estimated order of magnitude of seabird captures in these fisheries combined is inferred to be in the low thousands per annum.

INCIDENTAL SEABIRD MORTALITY IN COMMERCIAL SET NET FISHERIES

47. Set nets are a risk to seabirds because they can become entangled and drown in the nets while diving for food. Depending on species and how the nets are fished, this can occur during deployment (setting or hauling) or soaking (whilst the gear is fishing).

48. Nets set overnight close to seabird colonies are considered to pose the greatest risk of seabird mortality (e.g. seabirds such as penguins transiting to and from breeding colonies or landing on beaches at dawn and dusk). In New Zealand the broad range of set net fisheries are reflected in the diversity of the fleet. Some vessels are very small and fish only in enclosed waters like estuaries, others are small and fish close to the coast and a few are larger and fish offshore and in deeper water.

49. Observer coverage in set net fisheries has in general been very limited (e.g. 0.8 percent of total effort in 2010/11), although in some limited areas in some years coverage has been as high as 20 percent of effort [Rowe 2010a, Ramm 2011]. As a result seabird capture rates are generally poorly understood. In recent years yellow-eyed penguins, Stewart Island shags, pied shags, spotted shags, sooty shearwaters, white-chinned petrels and Fiordland crested penguins have been observed captured. The order of magnitude of seabird incidental mortality in these fisheries cannot be readily inferred due to the lack of data.

INCIDENTAL SEABIRD MORTALITY IN OTHER COMMERCIAL FISHERIES

50. Observer reports and/or literature indicate seabird mortalities occur in other fisheries including trolling, hook and line, potting, and purse seining. Historical captures of shags in pot fisheries have been reported from the Chatham Islands, but based on fisher interviews this is reported by WMI [2012] as having been mitigated by changes in pot design.

INCIDENTAL SEABIRD MORTALITY IN NON-COMMERCIAL FISHERIES

51. Recreational fisheries form an important component of New Zealand's near shore fisheries, with approximately 20 percent of New Zealanders participating at some time during a year [SPARC 2008]. For some species in inshore finfish fisheries the recreational harvest is at a similar scale to the commercial harvest.

52. In set net fisheries seabirds can become entangled and drown in the nets while diving for food. In hook and line fisheries incidental captures can occur when seabirds are attracted to fishing activity, interact with fishing gear and become entangled or hooked.

53. Nets set close to seabird colonies in coastal waters are considered to pose the greatest risk of seabird mortality. Hook and line fishing in those coastal waters where seagull and petrel abundance is highest, and light tackle and/or drifted fishing gear is utilised, are considered to pose the greatest risk of seabird capture.

54. Research in southern New Zealand reports various shags and penguins captured in non-commercial set nets [Abraham *et al.* 2010]. The order of magnitude of seabird incidental mortality in these fisheries cannot be readily inferred due to the lack of data about captures elsewhere in the country and total fishing effort in these fisheries.

55. The only New Zealand study that attempts to quantify the numbers of seabirds caught by hook and line fishers is based on boat ramp surveys of fishers returning from fishing trips and observer coverage of charter vessels carrying recreational fishers [Abraham *et al.* 2010]. Much of the survey effort was carried out in the Hauraki Gulf, which has the highest recreational fishing intensity in New Zealand. Petrels (shearwaters included in this type) and gulls were the seabird types most commonly observed and reported caught [Abraham *et al.* 2010], and authors note that a large proportion of these were probably released alive. The fate of these seabirds is unknown. In total, the estimated order of magnitude of seabird captures in these fisheries was inferred to be in the high thousands per annum.

THE SECTORAL, GEOGRAPHICAL AND JURISDICTIONAL RANGE OF INCIDENTAL SEABIRD MORTALITY IN FISHERIES

56. The threats faced by seabirds that breed in New Zealand from the above range of fishing operations are not limited to operations carried out by New Zealand fishing vessels in waters under New Zealand jurisdiction. The threats can also arise from such operations carried out by New Zealand fishing vessels or foreign flagged fishing vessels on the high seas or by the operations of commercial, recreational or artisanal fishers in waters under the jurisdiction of other states.

THE IMPACT OF INCIDENTAL FISHING MORTALITY ON SEABIRD SPECIES

57. Several population characteristics of albatrosses and petrels make them susceptible to long-term population decline as a result of additional (as opposed to natural) mortalities. Albatrosses and petrels typically have late sexual maturity (3–15 years old) and low productivity (maximum of one chick per year). If the death of a breeding individual occurs, the egg or chick almost always fails or dies and the remaining partner may take several years to start nesting again with a new partner. Some species of seabirds, such as some shags, are not as susceptible to population decline due to their ability to breed more prolifically.

OTHER THREATS TO SEABIRDS

58. For many species of seabirds, there are other threats to their survival in addition to incidental mortality from fisheries. Examples include colony-based predation by invasive alien species (mainly mammals), pollution, degradation of nesting habitat by introduced animals, reduction in food supply and catastrophic weather events. All such threats add to the cumulative impact on a population's capacity to grow or sustain itself.

59. One threat which arises partly from fishing, but is shared across all vessel activity at sea and offshore platforms is seabirds colliding with these vessels and platforms, potentially fatally (superstructure collision). The potential for superstructure collision is thought to be exacerbated by bright artificial lights in low visibility (e.g. navigation lights in fog). Any mortality from superstructure collision is currently unaccounted for in risk assessments.

60. Although the purpose of the NPOA-Seabirds 2013 is to address the threats from fishing activities and operations to the seabirds that breed in New Zealand, it is important to consider the cumulative effects of all impacts on a species in determining priorities for action. Where a species is significantly adversely affected by processes other than fishing, reducing the component of the threat posed by fishing may become an important factor in reducing the overall risk of population decline.

61. Accordingly this NPOA-Seabirds 2013 proposes to take into account other threats, to the extent possible, when conducting future risk assessments, or when new information becomes available in relation to non-fishing threats. Such an approach will endeavour to treat each threat in proportion to the risk that it poses to the species, and progress in reducing all threats will be encouraged.

COMPLEXITY OF THE PROBLEM; IMPLICATIONS FOR THE NPOA-SEABIRDS

62. As outlined above and in the previous background section seabirds that breed in New Zealand face a range of threats from fishing activities within waters under New Zealand jurisdiction. The nature of the threats is different in relation to different fishing methods and fleets. Different seabirds can be more or less susceptible to different threats depending on the characteristics of the fishing method and fleet and due to differences in seabird at-sea distribution and foraging behaviour. The level and quality of information currently available about interactions with fishing operations varies between the different parts of the commercial sector and between the commercial and recreational and customary non-commercial sectors. The channels currently available for outreach to the different sectors about the problem also vary.

63. In addition many New Zealand seabirds face threats from interactions with fisheries on the high seas and in the waters under the jurisdiction of other states within their range. The level and quality of information about such interactions is generally limited. The actions available to New Zealand to take in respect of such interactions are discussed in the International Fisheries and Engagement section.

64. To enable an integrated approach to managing complex fisheries seabird capture issues this NPOA-Seabirds 2013 establishes a long term objective supported by high level subsidiary objectives that guide the development of more specific five year objectives across the main areas in which action is required if the long term objective is to realised. These objectives will be integrated into the main management processes for governing New Zealand fishing operations that include five year plans and annual plans[6]. This is intended to ensure that on a basis of continuous improvement these objectives are translated into specific year by year actions or objectives as new information about risk, or new mitigation techniques, or new opportunities for outreach, arises. These processes involve annual reviews of specific actions and objectives and changes as necessary to the annual and five year plans.

[6] Such plans are currently referred to as National Fisheries Plans (five year plans) and Annual Operating Plans (one year plans).

Scope

65. Taking account of BPTG Nos. 1 and 3 and the information about the extent and complexity of the incidental catch problem in relation to New Zealand seabirds, as set out in the preceding section on the rationale for this NPOA-Seabirds 2013, the scope of this NPOA-Seabirds 2013 is as follows:
    i) all seabird species absolutely or partially protected under the New Zealand Wildlife Act 1953 (New Zealand seabirds)[7];
    ii) commercial, recreational and customary non-commercial fisheries in waters under New Zealand fisheries jurisdiction[8];
    iii) all fishing methods which capture seabirds, including longlining, trawling, set netting, hand lining, trolling, purse seining and potting;
    iv) all waters under New Zealand fisheries jurisdiction;
    v) high seas fisheries in which New Zealand flagged vessels participate, and, as appropriate and relevant, where foreign flagged vessels catch New Zealand seabirds; and
    vi) other areas in which New Zealand seabirds are caught.

66. The scope of this NPOA-Seabirds does not include actions to improve the conservation status of seabirds by reducing threats at their breeding sites or other relevant threats (see paragraph 58).

[7] Note that this includes all seabirds that occur within New Zealand fisheries waters, whether New Zealand breeding or not, except for the species listed in Schedule 5 to the Wildlife Act (currently one species – black backed gull – is not protected).
[8] Note that this includes all fishers and vessels fishing in New Zealand waters, regardless of nationality or flag.

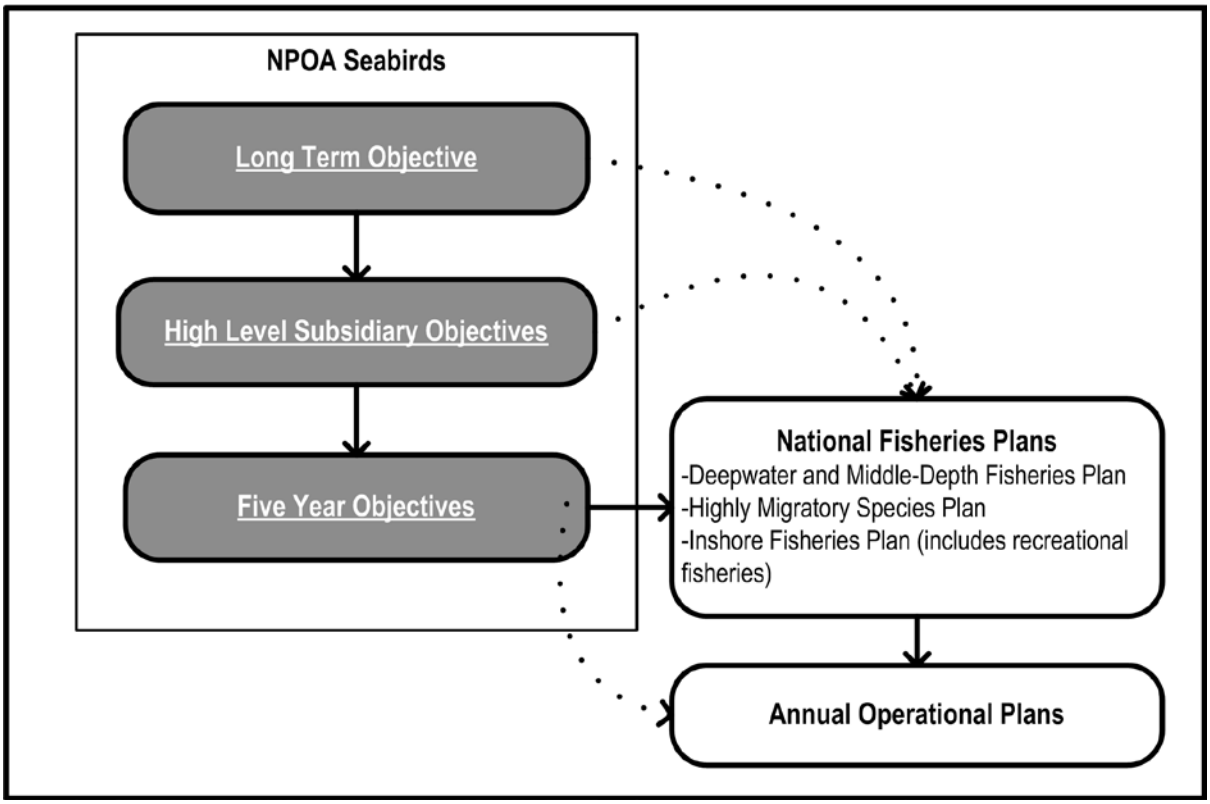
Objectives

INTRODUCTION

67. BPTG No. 8 recommends that states and RFMOs establish attainable objectives that lead to ongoing reductions in seabird mortality, that these objectives have clear and achievable timelines, that the rationale for them is explained and that when they are rate-based both total incidental mortality levels and fishing effort are considered.

68. As described in the Rationale section above the incidental capture problem in relation to New Zealand seabirds is complex. This NPOA-Seabirds 2013 itself does not attempt to record all the specific objectives in relation to the different fisheries, fleets and gear types, the different sectors and the different areas of jurisdiction. Specific and measurable objectives to meet the NPOA-Seabirds 2013 long term objective and high level subsidiary objectives will be incorporated into the national five year plans and annual plans. Many of these specific and measurable objectives, especially in the commercial sector, will be expected to be changed or modified during the life of the NPOA-Seabirds 2013 through an annual plan review process as described in the later NPOA-Seabirds 2013 sections on Management Measures. An up to date record of these specific annual objectives, together with the objectives incorporated in the five year plans will be maintained and will be accessible through a link from the NPOA-Seabirds 2013 page of the MPI website.

Diagram 1: The hierarchy of objectives in the NPOA-Seabirds 2013 and the link to implementation through the national fisheries plans. This is described in more detail in the section on Management Measures and Implementation (paragraphs 82-97).



69. The long term objective set out below (paragraph 73) is a statement of the ideal future world in relation to New Zealand seabirds. It is intended to provide a direction or vision to assist in the

planning and development of an appropriate range of more specific objectives and actions. It incorporates the following ideas:

i) that New Zealand seabirds should be able to thrive without pressure from fishing related mortalities;
ii) that all New Zealanders engaging in fishing activities should actively mitigate against any risk of incidental seabird mortalities;
iii) that, as befits its special significance in respect of the world's seabirds, New Zealand strives demonstrably to be at the leading edge of international seabird conservation and management; and
iv) that for New Zealand seabirds to thrive, engagement internationally is required as actions within waters under New Zealand jurisdiction may not be sufficient to prevent further declines in conservation status.

70. The high level subsidiary objectives (paragraph 74) recognise that if the long term objective is to be realised there are many aspects of the present situation that need to be addressed and some of these require their own high level subsidiary objectives to assist in the planning and development of a properly comprehensive set of more specific and time bound objectives. Like the long term objective, these high level subsidiary objectives will probably continue to have relevance beyond the anticipated five year life of this NPOA-Seabirds 2013.

71. Sitting below the long term objective and its high level subsidiary objectives are a set of more specific five year objectives (paragraph 75) that match the areas of the high level subsidiary objectives and are expected to be achieved within five years. These five year objectives in turn will be matched where relevant by objectives in the five year plans developed under the New Zealand Fisheries Act for each main fishery i.e. inshore (separated into finfish, shellfish and freshwater plans all of which cover recreational fisheries), deepwater and highly migratory.

72. The most specific objectives will be those contained in the annual plans, and other relevant planning documents. As noted above, and described in more detail in the Management Measures and Implementation section, they will be the subject of annual review and modification. The long term objective, the high level subsidiary objectives and the five year objectives will all be reviewed as part of the review of the NPOA-Seabirds 2013 itself. That review will commence after four years. (This NPOA-Seabirds 2013 will remain in effect until the review is completed and a revised NPOA-Seabirds is in effect).

LONG-TERM OBJECTIVE

73. The long term objective of this NPOA-Seabirds 2013 is:

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

HIGH LEVEL SUBSIDIARY OBJECTIVES

74. The high level subsidiary objectives of this NPOA-Seabirds 2013 are:
    i) Practical objective: All New Zealand fishers implement current best practice mitigation measures relevant to their fishery and aim through continuous improvement to reduce and where practicable eliminate the incidental mortality of seabirds.
    ii) Biological risk objective: Incidental mortality of seabirds in New Zealand fisheries is at or below a level that allows for the maintenance at a favourable conservation status or recovery to a more favourable conservation status for all New Zealand seabird populations.
    iii) Research and Development objectives:

a) the testing and refinement of existing mitigation measures and the development of new mitigation measures results in more practical and effective mitigation options that fishers readily employ;
b) research and development of new observation and monitoring methods results in improved cost effective assurance that mitigation methods are being deployed effectively; and
c) research outputs relating to seabird biology, demography and ecology provide a robust basis for understanding and mitigating seabird incidental mortality.

iv) International objective: In areas beyond the waters under New Zealand jurisdiction, fishing fleets that overlap with New Zealand breeding seabirds use internationally accepted current best practice mitigation measures relevant to their fishery.

FIVE-YEAR OBJECTIVES

75. The five year objectives of this NPOA-Seabirds 2013, all to be achieved by 30 June 2018, are:

i) Five year practical objectives:
a) all New Zealand commercial fishing vessels are shown to be implementing current best practice mitigation measures relevant to their area and fishery;
b) recreational and customary non-commercial fishers understand the risks their fishing activities pose to seabirds, relevant organisations support and promote the use of best practice mitigation measures and it is the cultural norm in New Zealand to use such measures; and
c) capture rates are reducing in all New Zealand fisheries in accordance with reduction targets in the relevant planning documents for those fisheries.

ii) Five year biological risk objective: The level of mortality of New Zealand seabirds in New Zealand commercial fisheries are reduced so that species currently categorised as at very high or high risk from fishing move to a lower category of risk.

iii) Five year research and development objectives:
a) where existing mitigation measures are impractical or of limited effectiveness in reducing the mortality of New Zealand seabirds, new or improved mitigation measures have been sought and where identified are under development for all priority fisheries or fishing methods (e.g. those identified in paragraph 23 and via the risk assessment);
b) new observation and monitoring methods, especially in relation to poorly observed fisheries, are researched, developed and implemented; and
c) programmes of research to improve our understanding of and ability to mitigate seabird incidental mortality for at risk species are underway and key projects for very high risk species have been completed.

Five year international objectives: In areas beyond the waters under New Zealand jurisdiction, relevant RFMOs and governments (and also relevant industry organisations, fishing companies and fishers) understand the potential risk posed to New Zealand seabirds from fishing activities for which they have responsibility and are taking actions to reduce that risk where it is likely to be high.

ELABORATION OF THE RATIONALE FOR THE HIGH LEVEL SUBSIDIARY AND FIVE-YEAR OBJECTIVES

76. The following comments expand on paragraphs 70 to 72 above and outline the reasoning behind the establishment of the high level subsidiary objectives.

77. The practical high level subsidiary objective (paragraph 74 i)) is focused on the mortality of seabirds in New Zealand fisheries. It recognises that development and implementation of best

practice mitigation measures is a process of continuous improvement. It provides the basis for specific objectives in relation to:

i) the implementation of the relevant best practice mitigation measures in each fishery or in respect of each gear type;
ii) the ongoing development of awareness of the risks of incidental seabird mortality and the means of mitigating such risks including amongst the recreational and customary non-commercial sectors; and
iii) developing targets for the reduction of seabird incidental mortality, including appropriate monitoring to ensure they are achieved.

78. The biological risk high level subsidiary objective (paragraph 74 ii)) provides, at a fundamental level, the basis for setting priorities for action in respect of New Zealand seabirds at risk through interactions with fisheries. The main focus is priority setting for action within New Zealand fisheries under both the practical and research and development subsidiary objectives. But it is also relevant for setting priorities for action under the international subsidiary objective.

79. The research and development high level subsidiary objective (paragraph 74 iii)) recognises that New Zealand fishers have played a leading role in the development and practical implementation of mitigation measures but that if continued improvement is to be achieved then further research and development will be required. The second element recognises that the development of new practical and cost effective observation and monitoring methods may be just as important as the development of mitigation methods for the overall effectiveness of the NPOA-Seabirds 2013, especially in regard to fisheries where adequate observer coverage is difficult to achieve. The third element acknowledges that to better understand risk and mitigation we need a broader knowledge base on seabird biology, demography and ecology to make informed decisions. This subsidiary objective establishes the basis for specific objectives to ensure the momentum of research and development is maintained.

80. The international high level subsidiary objective (paragraph 74 iv)) reflects the fact that even if the incidental mortality of New Zealand seabirds reduces to negligible levels in New Zealand fisheries, and in interactions with New Zealand fishing vessels elsewhere, their conservation status may still decline as a result of interactions with foreign flagged vessels on the high seas or in waters under the jurisdiction of other coastal states. New Zealand needs to seek active co-operation with all countries whose vessels may have interactions with New Zealand seabirds through global forums, through relevant RFMOs and through bilateral information sharing and assistance as appropriate. Again this subsidiary objective provides the basis for specific objectives to ensure that cooperative engagement is achieved at all relevant levels.

81. The following points should be noted in relation to the five year objectives (paragraph 75). With respect to the practical objective there will be a lag time between the introduction of a new or refined mitigation method and its implementation across an entire fishery but the intention of the objective is to encourage the movement of the entire fleet up to best practice within the fleet in as short a time as practicable. The biological risk objective is focussed on setting priorities for action within New Zealand commercial fisheries but it is acknowledged that its achievement could be affected by mortalities within the recreational and customary non-commercial sectors as well as other fishing activity outside New Zealand jurisdiction. To this extent it is also relevant for priority setting in outreach to the recreational and customary non-commercial sectors and for priority setting for action by New Zealand under the international objective. The achievement of the international five year objective is dependent on the actions of other countries and accountability is therefore limited to ensuring appropriate engagement with them bilaterally or through relevant international organisations.

Management Measures and Implementation

82. Any set of objectives is only as good as the mechanisms in place for their achievement. To be effective such mechanisms must ensure that:
    i) there is clear accountability for achieving the objectives and for selecting the implementation actions;
    ii) stakeholders have appropriate opportunity to contribute to implementation decisions;
    iii) the effectiveness of the implementation actions is actively reviewed on at least an annual basis; and
    iv) they can be promptly amended or replaced as necessary.

THE NPOA-SEABIRDS AND THE NATIONAL FISHERIES PLANNING PROCESS

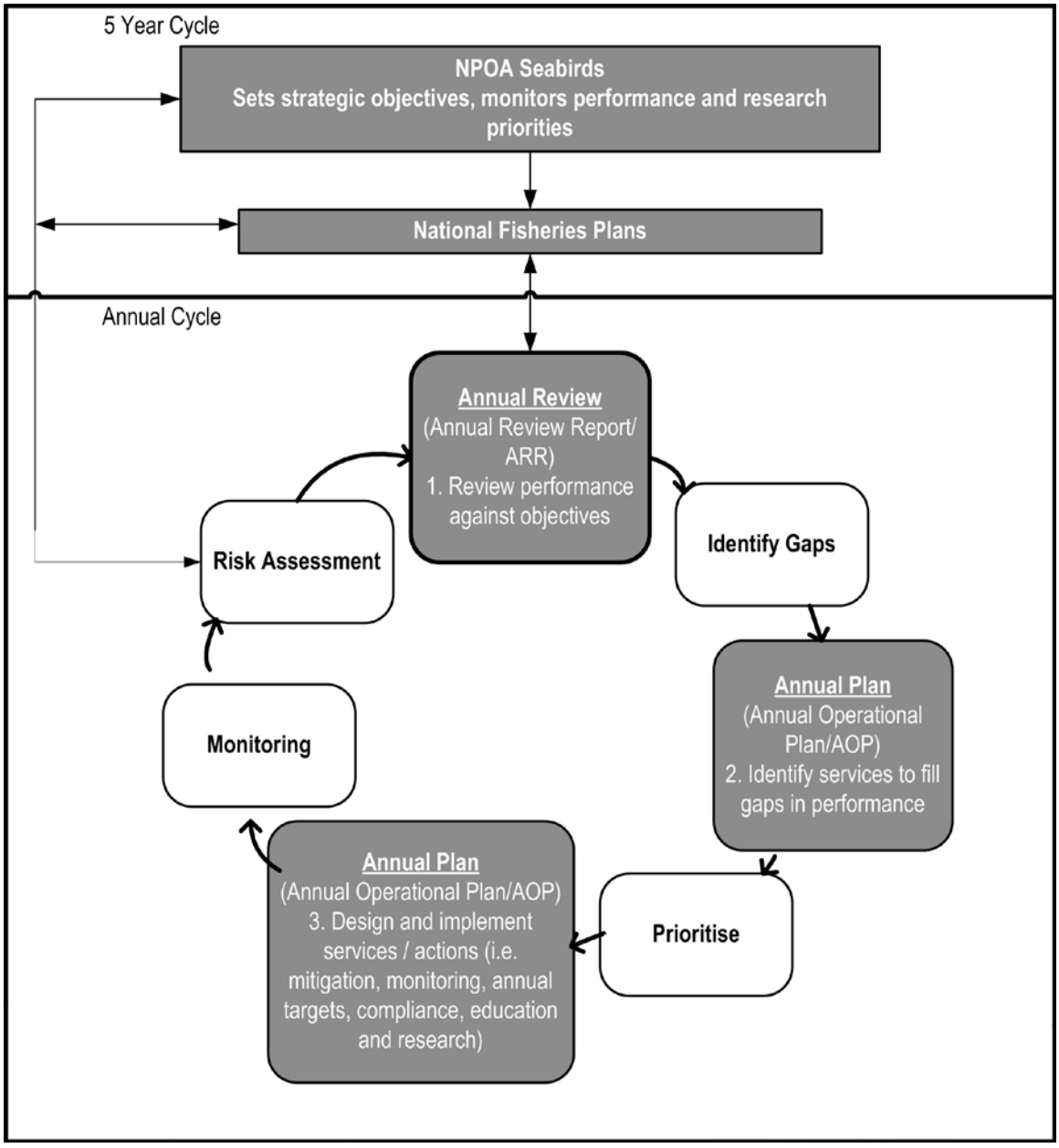
83. The main mechanism through which this NPOA-Seabirds 2013 will be given effect is the national fisheries planning process. This process involves the development and implementation of national fisheries plans. For the NPOA-Seabirds 2013 the three relevant plans are the National Fisheries Plan for Deepwater and Middle-Depth Fisheries, the National Fisheries Plan for Highly Migratory Species and the National Fisheries Plans for Inshore Fisheries (which includes recreational fisheries). These plans have a five year life and, amongst other things, set out objectives for the five year period.

84. To ensure achievement of the objectives in the Plans they are supported in each case by a process involving an annual review[9] and an annual plan. Each year the fisheries managers within MPI, who are accountable for achieving the objectives in the plans, assess performance against the objectives through the annual review process. The annual review process will assess performance against those objectives and identify any gaps in performance. Any gaps identified will be addressed through the prioritisation process involved in the preparation of the annual plan for the following year. Actions not prioritised for the next financial year are carried over for consideration in the next financial year or alternative actions are agreed to fill the gap. The diagram below illustrates how the national fisheries planning process operates and how the NPOA-Seabirds 2013 is situated within it.

85. The NPOA-Seabirds 2013 will be the driver for all New Zealand actions to reduce the incidental mortality of seabirds from fishing and the objectives of the National Fisheries Plans will in 2013 be aligned with the NPOA-Seabirds 2013. Specifically the five year plans will set objectives and targets to address all the five year objectives of this NPOA-Seabirds 2013. The annual plans will set the prioritised actions and services needed to meet the five year objectives. In this way the fisheries managers accountable for the achievement of the objectives in the national fisheries plans will be accountable for the achievement of the objectives in the NPOA-Seabirds 2013. This overall accountability does not mean that all the necessary services need to be carried out by MPI. Some services will be carried out by other Government agencies such as DOC or the Ministry of Foreign Affairs and Trade (MFAT) and others may be contracted out to service providers. The five year plans, annual plans and annual reviews are all available on MPI's website.

[9] Such reviews are currently referred to as Annual Review Reports.

Diagram 2: The national fisheries management planning process. Note that the advisory group (paragraph 95) will provide advice across the annual and five year cycle. Further, the process detailed below is informed by and in turn informs the DOC and MPI technical processes (Annex I), and New Zealand engagement internationally (paragraphs 111-120).



86. In appropriate circumstances a seabird species specific plan may be developed e.g. where there are grounds for serious concerns about the status of a particular species and a potential need to understand and manage a range of threats including non-fishing threats and/or threats from fishing in waters beyond New Zealand's jurisdiction. Any fisheries related actions developed under any such species specific plan will need to be fully integrated into fisheries plans.

MITIGATION MEASURES AND THEIR IMPLEMENTATION

87. The BPTG encourages states and RFMOs to prescribe appropriate mitigation methods that are proven to be effective, practical and cost effective for the fishing industry. The New Zealand Government has prescribed mitigation methods for the surface and bottom longline fleets and the large deepwater and middle depths trawl fleets. In several fisheries non-regulatory measures are included as part of a voluntary fleet wide code, a fishing company policy or in a government

audited self management system. A list of the mitigation measures currently in use in New Zealand fisheries is attached in Annex III.

88. As already noted in this NPOA-Seabirds 2013 and highlighted in the BPTG there are a range of different mitigation measures available across different fisheries and gear types with different levels of effectiveness. Further research, development and testing are ongoing with a view to continuous improvement. For other fishing methods and sectors mitigation measures are either not yet developed or those available are considered ineffective (e.g. purse seine fisheries, recreational fisheries). Research is required to develop mitigation measures in these fisheries as identified in the research and monitoring section.

89. The annual review and planning processes will inter alia take account of the development of new mitigation measures and the refinement of existing measures with a view to continuous improvement in the different fisheries. In particular, account will be taken of best practice techniques identified through ACAP.

90. Specific mitigation measures are prescribed by law for some fisheries. In other cases the measures are part of a self management system that may be audited by the relevant government agencies or by an independent third party as part of a market based sustainability assurance scheme. As noted in the BPTG there can be advantages in having some level of flexibility that allows fishers to innovate and adjust their mitigation measures based on their own particular situation to achieve continuous improvement. The fishers take ownership of the problem and are in control of identifying the best means of reducing it. But, to ensure that seabird capture reduction objectives are met, self management systems must:
    i) clearly identify the management practices that all in the fishery must meet or exceed; and
    ii) be backed by an independent auditing and compliance system that checks on the level of implementation of the identified practices and requires any non performers to implement those practices.

    In the event that an independently audited self management system is shown not to be operating effectively it will be necessary to resort to prescription by law.

91. In the New Zealand context risk assessment is a key factor in determining whether particular mitigation measures should be prescribed by law. In general, the higher the level of seabird risk in a fishery, the higher the level of certainty required that effective measures are being implemented, and accordingly, the greater likelihood that their implementation will be required by law.

92. Typically two or more mitigation measures are needed to adequately address the risk of seabird capture. When assessing mitigation options, critical considerations include: the interaction between different mitigation measures; the effectiveness of the methods across the range of species at risk; and, the impacts on fishers, fishing, the environment and non-target species other than seabirds (e.g. night setting may work for some seabirds and not others, can mean more lighting and thus an increase in super structure collision risk, and if deck lighting is reduced that may create a safety hazard for fishers).

93. The mitigation measures that are to be applied in each fishery in any particular year (whether prescribed by law or as a component of an audited self management system such as vessel-specific seabird risk management plans) will be recorded in the annual plan for that fishery

STAKEHOLDER ENGAGEMENT

94. In view of the central importance of the national fisheries planning process (Diagram Two) in respect of all fisheries management matters, including the implementation of the NPOA-Seabirds 2013, it is essential that all interests have appropriate opportunities to contribute to that process. This is currently recognised in the process of establishing forums for engaging with all relevant interests. At present these include iwi forums and regional recreational forums.

95. To monitor and assist the implementation of the NPOA-Seabirds 2013 a Seabirds Advisory Group will be formed. The group will comprise experts in the field of fishery-seabird interactions who should be drawn from environmental groups, fishers, MPI and DOC. A terms of reference for the group is attached in Annex IV. Its essential role will be to provide advice relating to the implementation and review of the NPOA-Seabirds 2013. It will meet sufficiently regularly to enable it to keep abreast of progress under the annual plans and also be in a position to offer timely advice regarding any unexpected developments or urgent matters as well as to contribute advice to the annual fisheries review and planning process and the review of the five year plans and the NPOA-Seabirds 2013 itself.

CO-ORDINATION

96. As described above the main mechanism for ensuring the implementation of the NPOA-Seabirds 2013 will be the national fisheries planning process and the fisheries managers in charge of each fishery will have principal accountability for achieving the objectives of the NPOA-Seabirds 2013. The actions necessary to achieve the objectives will also require the co-operation of other Government agencies such as DOC and MFAT. In some areas those agencies may have a lead role in the necessary actions. In addition there will also need to be close co-operation between the fisheries managers themselves and between the fisheries managers and other organisations that are performing services under contracts or other arrangements. Accordingly the establishment of a specific coordination process or processes will need to be considered.

SUPPORTING MEASURES

97. In addition to the management measures necessary to give full effect to the NPOA-Seabirds 2013 a range of supporting activities in several different categories are necessary. The main categories are:
    i) education, training and outreach;
    ii) research and monitoring; and
    iii) international fisheries and engagement beyond New Zealand.

The work to be undertaken in these categories is described in more detail in the following sections.

Education, Training, and Outreach

98. Education, training and outreach initiatives will play an important role in achieving the objectives of the NPOA-Seabirds 2013. While the messages and delivery will vary according to the audience, all such initiatives will contribute to the NPOA-Seabirds 2013 long term objective of New Zealand seabirds thriving without pressure from fishing related mortalities.

99. Examples of audiences in New Zealand include fishers, crew, fishing company managers, quota owners, industry representative groups, Maori (iwi), public, school children, seafood markets, consumers, non-commercial fishers, fishing communities, government officials, and environmental organisations.

100. Internationally the audiences include individuals and organisations that could potentially influence fisheries that overlap with New Zealand seabirds. Examples include RFMOs, ACAP, UNFAO, UN General Assembly, governments, fishing organisations and companies, fleet managers, environmental groups, and seafood markets.

101. The purpose of education, training and outreach initiatives will be to share information on:
    i) New Zealand's importance in terms of global seabird diversity and the role of seabirds in ecosystems;
    ii) the risk fishing poses to New Zealand seabirds;
    iii) measures available to mitigate risks to seabirds from fishing; and
    iv) the role of each audience in reducing the risk to seabirds from fishing.

102. The information will be prepared and delivered in ways to maximise the likelihood that each audience will take whatever actions are appropriate to help meet the objectives of this NPOA-Seabirds 2013.

103. Two-way information exchange with many of the key audiences listed above will be critically important. For instance fishers will be provided with opportunities to share their mitigation ideas with others.

104. Information flow needs to be regular and timely. For instance, New Zealand fishers will need to be kept abreast of the latest developments in mitigation so that they can adjust their practices and techniques and remain current. Also New Zealand fishers, quota holders, companies and other industry groups need to be informed about such things as the performance of their fishery, performance of other fisheries, actions being taken overseas to reduce seabird mortalities, and actions being taken to reduce the impact of non- fishing related threats. This information helps motivate fishers and others to continue their mitigation efforts.

105. The lead responsibility for ensuring that appropriate education, training, and outreach activities are undertaken will be the fisheries managers within MPI. But the delivery of the activities may be undertaken by a range of agencies and organisations.

106. In the interests of transparency, efficiencies at the national level, coordination at central government level and clarity of accountabilities, the activities will be incorporated into a comprehensive education, awareness and information plan to be prepared by MPI in the first year of the NPOA-Seabirds 2013. This plan, that will take account of BPTG 6, will describe how it helps deliver the objectives of the NPOA-Seabirds 2013, and in particular how it contributes to the 5 year objectives. The plan will be designed to guide this area of work for the duration of the NPOA-Seabirds 2013.

107. Within the plan, the key audiences, objectives of working with each key audience, messages and delivery mechanism will be described. The lead delivery organisation(s) or agency(ies) will be identified, as well as timeframes and funding sources.

108. On an annual basis, a list of communication, information and education tasks will be included in the annual planning for the NPOA-Seabirds 2013 implementation.

109. To the extent possible, all key stakeholders will coordinate their education, training, and outreach initiatives, to collectively help achieve the NPOA-Seabirds 2013 objectives. However, this commitment to work together in no way limits each organisation's ability to carry out its own business.

International Fisheries and Engagement

110. As already noted, many New Zealand seabirds spend a significant portion of their lives well beyond the waters under New Zealand jurisdiction. Accordingly they can be at risk through interactions with New Zealand vessels or foreign flagged vessels on the high seas and through interactions with commercial, recreational or artisanal fishing operations in waters under the jurisdiction of other states.

ACAP

111. Improving the worldwide conservation status of seabirds is the focus of the Agreement for the Conservation of Albatrosses and Petrels (ACAP) to which New Zealand is a party and in whose establishment New Zealand played a significant role. The purpose of that Agreement is much broader than reducing the incidental mortality of seabirds through interactions with fishing operations. However, because fishing related mortality is a key threat for albatrosses and petrels, ACAP has been very active in this area. For example, it has developed a tool to help prioritise fisheries according to their impact on different seabird species, encouraged RFMOs to adopt seabird conservation measures and developed best practice mitigation fact sheets for different fisheries in conjunction with Birdlife International. New Zealand will continue to contribute actively to the work of ACAP.

HIGH SEAS FISHERIES

112. UNCLOS and UNFSA impose obligations on all states fishing on the high seas to cooperate for the conservation and management of the living resources and in doing so to take into account the effects on species such as seabirds that are dependent on or associated with harvested species so as to maintain or restore their populations above levels at which their reproduction may be seriously threatened. Under those Conventions the principal responsibility for ensuring that proper effect is given to those obligations rests today with RFMOs. At the same time the United Nations General Assembly maintains an overview of the state of the oceans and world fisheries through discussion and negotiation of annual resolutions.

113. In view of New Zealand's special significance as a breeding place for seabirds it is well placed to play a leading role in promoting awareness of the risks to seabirds through fishing operations on the high seas and encouraging co-operation in the reduction of those risks, in particular through the relevant regional organisations.

114. The Commission for the Conservation of Antarctic Living Resources (CCAMLR), a conservation organisation with responsibilities for fishing operations that have the potential to interact with New Zealand seabirds, has already developed effective conservation and management measures to reduce the risks from any such interactions. In addition a number of RFMOs whose areas of application include waters traversed by New Zealand seabirds, have either adopted seabird conservation measures or are considering the adoption of such measures.

115. In all RFMOs of which it is a member and in whose areas of application New Zealand seabirds may have interactions with fishing operations, New Zealand should draw attention to the conservation status of relevant seabirds and advocate for the collection and sharing of robust seabird capture data, and the adoption of seabird conservation and management measures (including as appropriate support for the development of national and regional plans of action in accordance with the BPTG). New Zealand should also establish communication with other RFMOs of which it is not a member but in whose areas of application New Zealand seabirds

may have interactions. The purpose of such communication should be to share information with those organisations on:

i) the status of relevant seabirds;
ii) the nature of likely interactions with fishing operations; and
iii) the known effectiveness of risk mitigation methods being deployed in New Zealand waters or by New Zealand vessels on the high seas and by other vessels on the high seas under conservation and management measures established by other RFMOs.

116. In view of the international standing and responsibility it has by virtue of the fact that more species of seabirds, particularly albatross and petrel species, breed in New Zealand than anywhere else in the world, New Zealand should seek appropriate opportunities to increase awareness in the wider international community of the threatened status of many seabirds species, the particular risks from interactions with fishing operations and the availability of mitigation measures that reduce those risks. One such opportunity is the discussion and negotiation of the annual resolution on sustainable fisheries of the United Nations General Assembly. In this regard, consideration should be given to whether the language of the resolution relating to seabirds could be further developed to heighten awareness of the problem and call for the full exchange with RFMOs of seabird interaction data and the urgent deployment in all fisheries of best practice mitigation measures. Other opportunities, such as meetings convened under the auspices of the UNFAO, joint meetings of relevant RFMOs, or meetings of the International Coalition of Fisheries Associations (ICFA), should be actively sought.

BILATERAL CO-OPERATION

117. Beyond waters under New Zealand jurisdiction the seabirds that breed here are known to have interactions with fishing operations not only on the high seas but also in waters under the jurisdiction of other states. A number of connections and cooperative arrangements have already been established with some of these other countries. Scientists have exchanged information and worked together in a number of forums and practical information on mitigation measures has been shared and discussed both through the work of ACAP and in workshops such as those organised by SSS. In addition, the New Zealand Government has sponsored skipper exchanges with Peru for the purpose of exchanging information on mitigation methods and visits by SSS personnel to South Africa to assist in the transfer of practices and establishment of a similar fishing industry/Non Government Organisation (NGO) partnership in that country.

118. There are several levels at which cooperative contact can usefully be made. They can include government to government, industry to industry, company to company, scientist to scientist, training/awareness raising organisation to organisation, local NGO to local NGO. The particular arrangements will vary from country to country. But they should be the subject of deliberate consideration, planning and coordination rather than being left to develop in an ad hoc manner. At the highest level, co-operation on this shared issue should be acknowledged as forming part of New Zealand's bilateral relationships with the countries concerned.

119. The responsibility for identifying and overseeing the practical steps needed to broaden and deepen these relationships with a view to achieving the NPOA-Seabirds 2013 objectives will rest with the fisheries managers. However, the steps or actions themselves may need to be initiated or undertaken by other agencies or organisations such as DOC, MFAT, industry, SSS and environmental NGOs.

UNFAO

120. The BPTG of 2008 were prepared to support the effective implementation of the 1999 IPOA-Seabirds. They represent a substantial advance on the 1999 document. But the reduction of risk to seabirds through fishing operations is an issue that is characterised by continuous improvement and is not a quick fix. The lessons learned in the development, implementation and review of this NPOA-Seabirds 2013 will enable New Zealand to contribute effectively to the review of the IPOA-Seabirds and further development of the BPTG in the future.

Research and Monitoring

121. This section describes why research and monitoring relating to the effects of fishing related mortality on seabirds is necessary, what key areas of research and monitoring are likely to be necessary in the future, and how research and monitoring priorities will be determined.

122. As Government already has research and monitoring planning and prioritisation processes for allocating resources, this section does not seek to duplicate existing or future processes. Rather, it feeds into existing processes by providing guidance on how research within the area of seabirds should be considered and prioritised.

123. Research and monitoring discussed here relates specifically to quantifying, understanding and mitigating fishing related mortality on seabirds in all fisheries (commercial and non-commercial). Other research targeted at different objectives may also yield results useful to managing fishing effects, but are not discussed here.

WHY IS RESEARCH AND MONITORING NECESSARY?

124. A lack of information can make it difficult to understand the effects of fishing-related mortality on seabirds and the effectiveness of management measures, leading to uncertainty over whether objectives are being met. The lack of information may also limit the range of options available to managers to such an extent that there is a greater cost to fisheries utilisation than would be necessary if better information were available.

125. Better information can help to determine if, when and where management measures are necessary and what the most effective and cost-effective management measures may be. Achieving the right balance between taking decisions now or gathering better information, through either research or monitoring, requires careful judgement of the costs and benefits of each option. Furthermore, because resources to fund and deliver research are limited, research needs to be closely aligned to NPOA-Seabirds 2013 objectives and priorities.

126. The performance of the NPOA-Seabirds 2013 must be monitored on a number of levels to ensure the success of the management framework. Several aspects of the NPOA-Seabirds 2013 need to be monitored and reported on including education, implementation, and actual captures of seabirds across priority fisheries.

WHAT KEY AREAS OF RESEARCH ARE LIKELY TO BE NECESSARY IN THE FUTURE?

127. Seabird research can be grouped as a) research into understanding the effects of fishing-related mortality on populations of seabirds, and b) research into managing fishing-related mortality of seabirds.

128. Research into understanding the effects of fishing-related mortality on seabirds can be broken into research on demographics, population trends, spatial and temporal distribution, interactions between seabirds and fishing operations, and assessment of the risk to seabirds from fishing operations.

129. Research into managing the effects of fishing-related mortality on seabirds can be broken into research on mitigation measures and fishing practices, including assessing the effectiveness of management options. Understanding the interactions of seabirds and fishing vessels is critical for the development of effective mitigation techniques and practices (and for monitoring the

effectiveness of management measures that have been adopted). Developing mitigation measures for those fisheries where interactions are known but measures do not exist or are of limited effectiveness is a priority (e.g. in recreational fisheries).

WHAT KEY AREAS OF MONITORING ARE LIKELY TO BE NECESSARY IN THE FUTURE?

130. The categories of monitoring are:
    i) captures of seabirds through time[10];
    ii) changes in risk level for a seabird population through time;
    iii) extent and effectiveness of education and outreach;
    iv) extent of uptake and effectiveness of the use of mitigation measures; and
    v) NPOA-Seabirds 2013 implementation.

131. Monitoring of captures of seabirds through time, along with research on demographic and distribution data for seabird species will inform monitoring of changes in risk level.

132. At present it is not possible to reliably estimate seabird incidental mortality in all fisheries due to cost and logistical challenges associated with observer coverage in some sectors and the subsequent low levels of coverage achieved to date in some fisheries. For a few fisheries, current estimates of incidental seabird mortality may be of limited value for managing and mitigating seabird incidental mortality due to the unrepresentative nature of data and small number of sampled events. Targeted monitoring will reduce the uncertainty in the estimates of total seabirds caught and may allow for an assessment of mortalities by species. Developments in electronic monitoring have the potential to complement and improve data on seabird incidental mortality in those fisheries previously not comprehensively observed, and more generally across fisheries (see additional comments on electronic monitoring in paragraphs 133 and 143 below).

133. Commercial fishers are required to report all protected species captures to Government. To date, compliance by fishers has varied between fisheries. In addition there is no current process to confirm the identification of the seabird species from fisher reported captures. Given greater focus on education and implementation, it is envisioned that fisher self-reporting may improve over time. Because of the lower rate of fisher-reported captures, and issues with the species identification, it would not be straightforward to use these fisher-reported data to estimate total captures. Over time, other monitoring methods, such as electronic monitoring, may be introduced to improve compliance and data quality and as an auditable form of self reporting.

134. Some at sea data collection may occur in non-commercial fisheries. But, as these fishers are generally not required to report fishing effort data, such information, although informative for achieving various NPOA-Seabirds 2013 objectives, cannot be used to assess and monitor the magnitude of seabird captures in these sectors. Accordingly, the extent and effectiveness of education and outreach, and the extent of uptake and use of mitigation measures is likely to be the focus of future monitoring.

[10] Note that within the New Zealand fisheries management regime detailed effort data are reported by commercial fishers and readily available for analysis.

HOW RESEARCH AND MONITORING PRIORITIES WILL BE DETERMINED

135. Priority will be given to research on understanding the effects of fishing-related mortality on populations of seabirds. Such research will address:
    i) species with highest risk of fishing related effects; and
    ii) factors that are leading to the greatest level of uncertainty in the risk scores.

136. Research and monitoring will be prioritised to focus on fisheries that:
    i) pose the highest risk to seabirds either through effect on at-risk populations or where captures are numerous or where capture rates are highest; and
    ii) where good practice is not achieving objectives.

137. To achieve this, priority will be given to research and monitoring on managing the effects of fishing-related mortality on seabirds that addresses:
    i) information on the location, circumstances and other factors affecting seabird mortality;
    ii) uncertainty around estimates of incidental catch of seabirds;
    iii) demographic parameters, population trends and behaviours that are directly relevant to assessing and monitoring risk status;
    iv) behavioural ecology which is directly relevant to designing and improving mitigation measures;
    v) uncertainty around the effectiveness of best practice measures, including determining appropriate specifications for their application in a particular fishery; and
    vi) development of more cost-effective measures.

138. In making decisions about which research to pursue, additional factors which need to be considered include technical feasibility, likely return on investment with respect to quality as well as utility, and fit to the overall research programme.

139. In some cases, reducing uncertainty through better measuring or estimation of fishing-related mortalities may be more cost effective than reducing uncertainties around the precise effects of fishing on populations. Similarly, taking management action such as increased mitigation may be more effective than more research. In some circumstances, a combination of mitigation, research and monitoring may be necessary, to varying degrees. The costs and benefits should be examined on a case by case basis.

COLLECTING DATA AT SEA

140. The principal method of at sea data collection in fisheries is currently the use of observers. New Zealand has a large scale observer programme which has been in place for many years. Historic levels of observer coverage are described in detail in the protected species database [MPI 2013]. Future levels of coverage will be identified in national fisheries planning process (Diagram 2) with services for a particular year specified in the annual planning documents (paragraph 84).

141. Observers are comprehensively trained in seabird related issues and record data on levels of observation, incidental mortality and the use and effectiveness of mitigation measures. Whilst at sea they are also able to collect samples of captured seabirds for onshore analysis to confirm species identification and provenance at a population level.

142. Constraints on the use of observers include, but are not limited to, vessel size, trip duration, governance structure of the fleet, the level of Government engagement in the sector and other monitoring priorities. Many of these considerations are closely linked to cost. At present, vessel size and safety issues are tangible concerns that must be assessed on a vessel specific basis prior to observer placement.

143. It is anticipated that other forms of monitoring, such as electronic monitoring and fisher self-reporting will become more important for fisheries management in New Zealand. Electronic monitoring is used or being trialled overseas (e.g. Canada, Denmark and Australia) to monitor fisheries. Several trials have been undertaken in New Zealand on longline and trawl vessels. This method shows promise, particularly for monitoring small vessels which can be challenging with observers. Further work is required in relation to fishery specific at-sea electronic monitoring system design, data storage, transfer and use protocols, and the method, systems and policy for interpretation and analysis of the data produced. As robust electronic monitoring systems become available their wide-scale uptake should rapidly provide for more comprehensive data collection at sea.

NPOA-Seabirds Implementation and Review

IMPLEMENTATION

144. As described in the Management Measures and Implementation section the main mechanism for ensuring the effective implementation of this NPOA-Seabirds 2013 is the national fisheries planning process and the annual reviews and annual plans under that process. The annual review and planning process will ensure that any shortfall in performance against the objectives in the NPOA-Seabirds 2013 will be identified and corrective action taken. The NPOA-Seabirds Advisory Group will have the opportunity to monitor and provide advice in relation to those processes.

REVIEW

145. The review of the NPOA-Seabirds 2013 will commence after four years. It will involve an assessment of whether the five year objectives have been met and to what extent they and the longer term objectives are still relevant or require review, modification or substitution. In addition the review will assess the effectiveness of the implementation processes outlined in the NPOA-Seabirds 2013. The NPOA-Seabirds 2013 will remain in effect until the review is complete and a revised NPOA-Seabirds is in effect.

ANNEX I – Characterising seabird interactions with fisheries

1. This annex provides an introduction to the issues associated with characterising seabird interactions with fisheries and this is illustrated through a review of seabird incidental capture in two case study fisheries – the deepwater commercial trawl fishery for hoki and the inshore mixed-method multi-sector fishery for snapper.

INTRODUCTION

2. Information with which to characterise seabird interactions with fisheries comes from a variety of sources. Some is opportunistically collected, whilst other information collection is targeted at specifically describing the nature and extent of seabird captures in fisheries. This annex is focussed on the targeted information collection.

3. Many New Zealand commercial fisheries have MPI observer coverage. For these fisheries we have independent data describing captures of seabirds (how many seabirds were captured, the scanning rate – the number of fishing events observed, and at-sea identification of the seabirds). All commercial fishers are required to provide effort data in standardised forms which provides us with the total number of fishing events in a fishery. For larger vessels these data can be validated through a regulated Vessel Monitoring System (VMS). In combination these data sources can be, and are, used to describe the nature and extent of seabird captures in fisheries. Observer information also describes the nature of seabird interactions (e.g. the numbers of seabirds attracted to fishing vessels, the use and efficacy of mitigation measures). Specimens are also collected allowing necropsy ashore which provides two additional key sorts of information – verified identification of the seabird species/population, and biological characters (sex, age, condition, nature of injuries and stomach contents etc).

4. The relevant fishing and seabird interaction data are stored in secure relational databases from which they can be extracted for research purposes. MPI and DOC contract independent research providers to summarise these data and provide technical reports as required. Typically annual reports are compiled on: the necropsy of captured seabirds (DOC); quantitative and qualitative characterisations of seabird captures in fisheries in the most recent fishing year, including historical data for comparative purposes (MPI and DOC); and, summaries of capture information included with fish specific chapters in the summary of fish stock status (MPI). The Aquatic Environment Biodiversity Annual Review [MPI 2012a] contains a chapter on seabirds which will be updated annually. A database of protected species capture information, including associated effort and observer data, is maintained online [MPI 2013] and is publicly available. It can be used to produce annual fishery-by-fishery or seabird-by-seabird summaries over one or many years. Summaries of quantitative and qualitative information on seabird captures are produced annually by DOC [Ramm 2012]. Data extracts and summary reports are also provided to RFMOs, CCAMLR and ACAP as required. References to the current versions of all these reports will be maintained at the NPOA Seabirds 2013 web page at www.fish.govt.nz/en-nz/Environmental/Seabirds.

5. Considerations when reviewing seabird capture information and estimates specifically include:
   - whether the capture data reflect dead seabirds, seabirds released alive and unharmed, or seabirds which whilst released alive may not survive;
   - the proportion of fishing effort observed and whether the observer coverage is spatially and temporally representative of the fishery, especially where there are known seasonal peaks in seabird captures;
   - whether there may be seabird captures in the non-commercial sectors of the same fishery;
   - whether the data reflect at-sea or verified identifications;
   - the extent of any cryptic mortality (seabird interactions which result in mortality but are unobserved or unobservable);
   - changes in the management of the fishery which may substantially reduce/increase effort; and

- the timing of the introduction of management measures to reduce seabird captures in a particular fishery.

6. In some fisheries observer data are temporally and spatially well stratified, whilst in others data are only available from a spatially select part of the fishery, or a limited part of the year [see MPI 2013 for fishery-by-fishery data]. Where sufficient observer data are available, estimates of total seabird captures in the fishery are calculated. The methods currently used in estimating seabird captures in New Zealand fisheries are comprehensively described by Abraham and Thompson [2011].

CASE STUDY ONE: HOKI

7. The hoki fishery is New Zealand's largest fishery by volume and is essentially a commercial only fishery (this case study only includes information describing the commercial fishery). Most vessels which fish for hoki are greater than 28 m in length and hoki are fished exclusively using trawl methods. The fishery occurs in offshore oceanic waters from Cook Strait south.

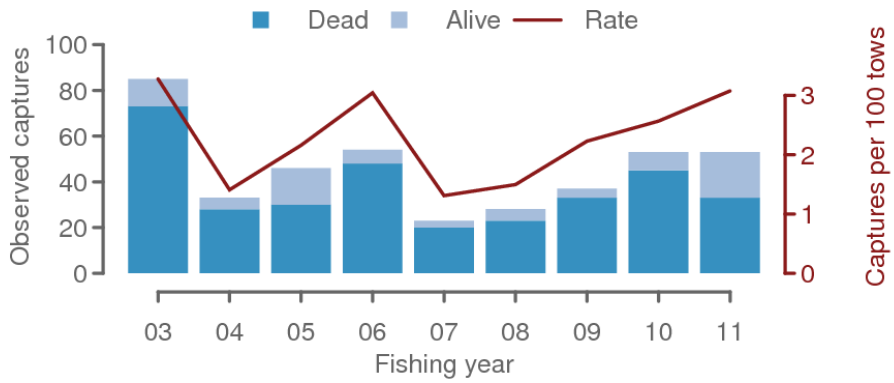
8. Vessels targeting hoki incidentally capture seabirds. Baird [2005] summarised observed seabird captures for the fishing years 1998–99 to 2002–03 and calculated total seabird captures for the areas with adequate observer coverage using ratio based estimations. Baird and Smith [2007, 2008] summarised observed seabird captures and used both ratio-based and model-based predictions to estimate the total seabird captures for 2003–04, 2004–05 and 2005–06. Abraham and Thompson [2011] summarised captures of protected species and used model and ratio-based predictions of the total seabird captures for 1989–90 and 2008–09.

9. Observer coverage in this fishery has been at, or greater than, 15 percent of tows observed from 2004-05 (Figure A1). Effort in the fishery more than halved between 2002-03 and 2005-06, but has been relatively stable since that time (Figure A1).

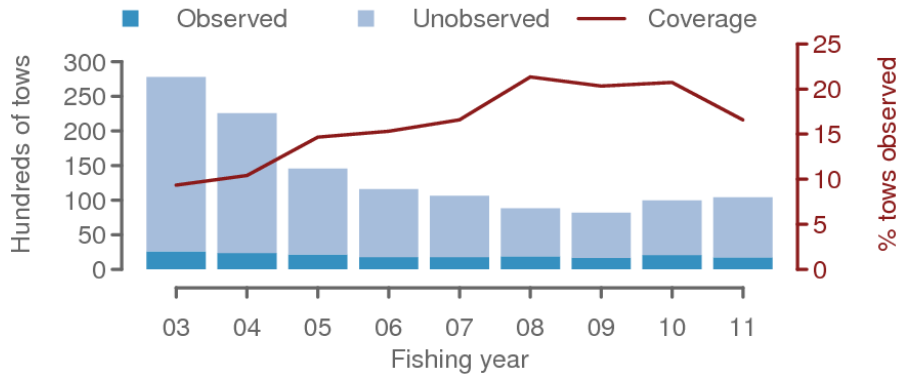
10. In the 2009-2010 fishing year there were 53 observed captures of seabirds in hoki trawl fisheries. It was estimated by a statistical model that there were a total of 228 (95 percent CI: 178 – 290) captures in hoki trawl fisheries [MPI 2012a]. In the 2010-2011 fishing year there were again 53 observed captures of seabirds in hoki trawl fisheries. It was estimated by a statistical model that there were a total of 305 (95 percent CI: 227 – 418) captures in hoki trawl fisheries [MPI 2012a].

11. Annual observed seabird capture rates have ranged from 1.31 to 8.34 per 100 tows in the hoki fishery between 1998-99 and 2009-10, without obvious trend (Table A1, Figure A1). These estimates include all bird species and should be interpreted with caution. The average capture rate in hoki trawl fisheries over the last eight years is about 2.2 seabirds per 100 tows, a low rate relative to trawl fisheries for scampi (3.53 seabirds per 100 tows) and squid (13.33 seabirds per 100 tows) over the same years. The hoki fishery accounted for about 9 percent of seabird captures in the trawl fisheries modelled [MPI 2012a].

(a) Observed captures of birds in hoki trawl fisheries



(b) Fishing effort and observations in hoki trawl fisheries



(c) Estimated captures of birds in hoki trawl fisheries

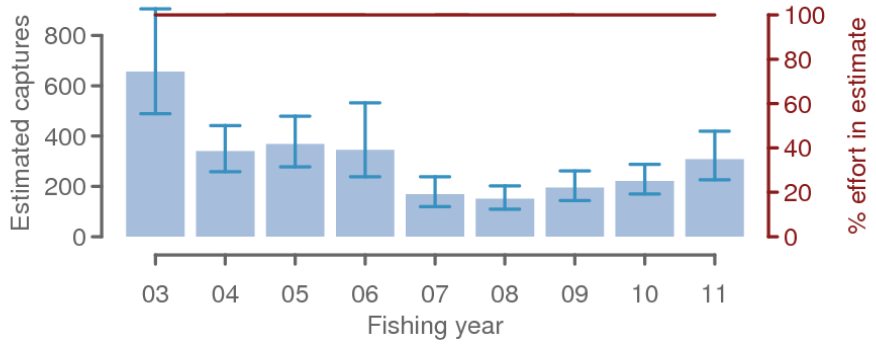


Figure A1: Hoki trawl fisheries from 2002-03 through 2010-11: (a) Observed captures of seabirds, capture rate and proportion alive/dead; (b) fishing effort, tows observed and proportion of fishing effort observed; and, (c) estimated capture, 95 percent CIs and proportion of effort included in estimation model [reproduced from MPI 2013].

12. Observed seabird captures since 2002–03 have been dominated by six species: Salvin's, white-capped, and southern Buller's albatrosses make up 44 percent, 27 percent, and 20 percent of the albatrosses captured, respectively; and sooty shearwaters, white-chinned petrels, and cape petrels make up 61 percent, 13 percent, and 13 percent of other seabirds, respectively [MPI 2012b]. A high proportion of captures were observed off the east coast of the South Island, including the Chatham Rise (60 percent), off the west coast of the South Island (17 percent) or on the Stewart-Snares shelf (13 percent). These numbers should be regarded as only a general guide on the distribution of captures because observer coverage is not uniform across areas and may not be representative.

Table A1: Number of tows by fishing year and observed and model-estimated total seabird captures in hoki trawl fisheries, 1998–99 to 2009–10. No. obs, number of observed tows; % obs, percentage of tows observed; Rate, number of captures per 100 observed tows, % inc, percentage of total effort included in the statistical model. * Estimates 1998–99 to 2001–02 from McKenzie and Fletcher [2006]. Other estimates and data are from MPI [2012a].

		Observed				Estimated		
	Tows	No. obs	% obs	Capture	Rate	Capture	95% CI	% inc.
1998-99	32 242	3 558	11.0	133	3.74	1 144 *	950-1374	100
1999-00	33 061	3 273	9.9	91	2.78	993 *	821-1199	100
2000-01	32 018	3 549	11.1	296	8.34	2 055 *	1803-2348	100
2001-02	27 224	3 274	12.0	50	1.53	1 133 *	941-1358	100
2002–03	27 784	2 594	9.3	85	3.28	578	459-731	100
2003–04	22 535	2 344	10.4	33	1.41	354	272-456	100
2004–05	14 540	2 131	14.7	46	2.16	385	295-494	100
2005–06	11 590	1 775	15.3	54	3.04	274	208-359	100
2006–07	10 610	1 758	16.6	23	1.31	165	122-220	100
2007–08	8 786	1 876	21.4	28	1.49	148	107-196	100
2008–09	8 177	1 662	20.3	37	2.23	205	155-266	100
2009–10	9 963	2 066	20.7	53	2.57	228	178-290	100
2010–11	10 403	1 724	16.6	53	3.07	305	227-418	100

13. Mitigation methods such as streamer (tori) lines, Brady bird bafflers, warp deflectors, and offal management are used in the hoki trawl fishery. Warp mitigation was voluntarily introduced from about 2004 and made mandatory in April 2006 [MFish 2006]. The 2006 notice mandated that all trawlers > 28 m in length use a seabird scaring device while trawling (being "paired streamer lines", "bird baffler" or "warp deflector" as defined in the notice). In the four complete fishing years after mitigation was made mandatory, the average rates of capture for Salvin's and white-capped albatross (71 percent of albatross captures in this fishery) were 0.20 and 0.21 seabirds per 100 tows, respectively, compared with 0.61 and 0.26 per 100 tows in the three complete years before mitigation was made mandatory. This trend is masked in Table A1 by continued captures of smaller seabirds, especially sooty shearwater, in trawl nets (as opposed to on trawl warps where mitigation is applied). Observer data on location within the fishing activity where captures occurs, e.g. net captures versus warp strikes, show that observed warp captures accounted for only 5 percent of all captures in 2010-11 [MPI 2012a]. The most substantive gains in reducing seabird captures in this fishery are to be made in addressing net captures (74-86 percent of all captures over the period 2007-08 to 2010-11 [MPI 2012a].

14. In summary, the nature and extent of seabird captures in the hoki trawl fishery are reasonably well known. Key areas for future work include resolving net captures and understanding the extent of cryptic mortality.

CASE STUDY TWO: SNAPPER

15. The snapper fishery is New Zealand's largest inshore fishery by volume for commercial and non-commercial fishers. Most vessels which fish for snapper are smaller, with commercial vessels typically 8-18 m in length and non-commercial vessels typically 4-8 m in length. Snapper are targeted using trawl, Danish seine, set net, longline, hook and line methods. The main fishery occurs in coastal waters from East Cape to North Cape (the fisheries management area known as SNA1). Non-commercial and commercial vessels targeting snapper incidentally capture seabirds.

Commercial fisheries

16. There were only two observed captures of seabirds (one flesh-footed shearwater and one unidentified small bird) in trawls targeting snapper between 2002-03 and 2009-10, but low observer coverage of inshore trawlers (average 0.85 percent in SNA1 and SNA8 over these years [MPI 2013]) means that the frequency of interactions is highly uncertain.

17. Between 2002–03 and 2010–11, there were 84 observed captures of seabirds in snapper longline fisheries (Table A2). The rate of capture varied between 0 and 0.1 seabirds per 1000 hooks observed, fluctuating without obvious trend. Seabirds observed captured in snapper longline fisheries were mostly flesh-footed shearwater (43 percent), black (Parkinson's) petrel (34 percent) or fluttering shearwater (14 percent) and all were taken in the Northland-Hauraki area (Table A3). These numbers should be regarded as only a general guide on the composition of captures because the observer coverage is low, is not uniform across the area, and may not be representative.

Table A2: Number of hooks by fishing year and observed seabird captures in the snapper bottom longline fishery, 2002–03 to 2009–10. No. obs, number of observed hooks; % obs, percentage of hooks observed; Rate, number of captures per 1000 observed hooks. Data from MPI [2013].

	All hooks	No. obs	% obs	Captures	Rate
2002–03	13 730 262	0	0.0	–	–
2003–04	12 276 448	193 893	1.6	10	0.052
2004–05	11 548 941	250 985	2.2	13	0.052
2005–06	11 696 613	116 290	1. 0	12	0.103
2006–07	10 351 591	62 360	0.6	0	0
2007–08	9 052 322	0	0.0	–	–
2008–09	8 970 134	268 746	3.0	21	0.078
2009–10	11 033 455	486 578	4.4	29	0.060
2010–11	11 343 732	0	0.0	–	–

Table A3: Number of observed seabird captures in the snapper longline fishery, 2002–03 to 2010–11, by species or species group. The risk ratio is an estimate of aggregate potential fatalities across trawl and longline fisheries relative to the Potential Biological Removals, PBR (from Richard *et al.* [2013] where full details of the risk assessment approach can be found – see also Annex II of this document). It is not an estimate of the risk posed by fishing for snapper. Other data from MPI [2013].

Species	Median risk ratio	Total observed captures 2002-2011
Flesh footed shearwater	1.41	37
Black petrel	19.90	28
Fluttering shearwater	0.00	12
Gannets	0.01	2
Pied shag	0.06	2
Black backed gull	0.00	1
Petrels, prions, and shearwaters	–	1
Red billed gull	–	1
Total other seabirds		84

18. The estimated number of seabird captures in the snapper bottom longline fishery declined from 3436 in 2000-01 to 247–644 in 2003-04 (depending on the model used, Table A4, estimates from McKenzie and Fletcher [2006], Baird and Smith [2007, 2008], Abraham and Thompson [2011]). The estimated number of captures between 2003-04 and 2006-07 appears to have been relatively stable at about 400–600 seabirds each year (Table A4). Estimates are not available for more recent years. These estimates should be regarded as only a general guide because the observer coverage is low, is not uniform across the area, and may not be representative.

Table A4: Model based estimates of seabird captures in the SNA 1 bottom longline fishery from 1998-99 to 2006-07 (from McKenzie and Fletcher [2006] (for vessels under 28 m), Baird and Smith [2007, 2008], and Abraham and Thompson [2011]). Numbers in parentheses are 95 percent confidence limits or estimated cvs.

	Estimate	95% C.I.	Estimate	CV	Model based estimates of captures Estimate	95% C.I.
Fishing year	MacKenzie and Fletcher		Baird and Smith		Abraham and Thompson	
1998-99	1 464	(271 – 9 392)	–	–	–	–
1999-00	2 578	(513 – 13 549)	–	–	–	–
2000-01	3 436	(697 – 17 907)	–	–	–	–
2001-02	1 856	(353 – 11 260)	–	–	–	–
2002-03	1 583	(299 – 9 980)	–	–	739	(332 – 1 997)
2003-04	247	(51 – 1 685)	546	(c.v. = 34%)	644	(301 – 1 585)
2004-05	–	–	587	(c.v. = 42%)	501	(245 – 1 233)
2005-06	–	–	–	–	469	(222 – 1 234)
2006-07	–	–	–	–	457	(195 – 1 257)

19. The deployment of mitigation measures in these fisheries is not well understood.

Non-commercial fisheries

20. Information from these fisheries is very limited. A boat ramp survey was carried out during the summer of 2007–08. During the survey 654 interviews were conducted in SNA1 providing the first information on the rates of seabird capture by recreational fishers, as well as information on the nature of the interactions.

21. Based on the data from those interviews and effort data from a separate survey on the recreational SNA1 fishery [Hartill *et al.* 2007], Abraham *et al.* [2010] estimated total seabird captures in north eastern New Zealand, for line fishing from trailer vessels. Captures were estimated to be 11 500 (95 percent CI: 6600 to 17 200) seabird captures per year [*ibid*]. Observers on 57 charter trips

monitored and reported seabird captures as part of the same study, and observed similar interaction rates [*ibid*].

22. Although the number of interactions is high, the seabirds were reported as unharmed in 77 percent of the capture incidents that were recalled, and only three people reported incidents where the seabird died [*ibid*]. Because of the qualitative nature of the survey, the fate of seabirds that have been hooked or tangled remains unclear [*ibid*]. The most frequently reported type of bird caught were petrels, followed by seagulls [*ibid*].

23. There are opportunities for line fishers to mitigate seabird captures, for example by ensuring that weighted baits leave the surface rapidly. For fishers to change their behaviour, they must be made aware of the potential impacts of recreational fishing on seabird populations.

Summary

24. In summary, the nature and extent of seabird captures in the commercial and non-commercial snapper fisheries are not well known. Key areas for future work include improving understanding of the nature and extent of captures (especially for black petrels), and the development of fishery specific mitigation measures.

ANNEX II – Risk assessment

INTRODUCTION TO THE NPOA-SEABIRDS RISK ASSESSMENT FRAMEWORK

1. A risk assessment framework is central to the implementation of this NPOA-Seabirds 2013. The risk assessment framework assesses the likelihood that the biological risk objective of the NPOA-Seabirds 2013 is not met. That is, it is an assessment whether and to what extent the incidental mortality of seabirds in New Zealand fisheries is in excess of a level that allows for the maintenance at a favourable conservation status or recovery to a more favourable conservation status for all New Zealand seabird populations.

2. The role of risk assessment is to inform risk management. Because risks are seldom perfectly understood, risk management is an iterative process of information gathering, research prioritisation, risk-reduction interventions and ongoing monitoring to evaluate the effectiveness of risk management actions, with the ultimate goal of ensuring that risks have been reduced to an acceptable level with high certainty. To remain useful, risk assessments must be updated as risk management progresses.

RISK AND UNCERTAINTY

3. To inform proper risk management it is important to maintain the distinction between risk and uncertainty. For example, an activity identified as high risk with high certainty might be expected to trigger an immediate risk management response; conversely, no urgent response would be anticipated in the case of an activity where the assessment indicates – with high certainty – that it poses a very low risk. In contrast where the level of risk cannot be estimated with certainty appropriate responses may be to act immediately, and/or to prioritise additional data collection or analysis to reduce the uncertainty in the risk assessment before deciding whether a risk management intervention is required. The selection of the appropriate response to a risk assessment will generally require consideration of trade-offs that are outside the scope of the risk assessment process.

THE "EXPOSURE-EFFECTS" APPROACH TO RISK ASSESSMENT

4. The NPOA-Seabirds 2013 risk assessment framework follows the 'exposure-effects' approach to risk assessment [US EPA 1998] in which risk is a function of the level of impact arising from a threatening activity measured on a continuous scale (i.e. numbers of seabirds killed per species and fishery group). This is in contrast to the 'likelihood-consequence' approach [Australian/ New Zealand Standards 1999] with its emphasis on discrete low-probability events. 'Exposure' refers to the level of the threat (i.e. the number of encounters between seabirds and fishing effort) and 'effect' refers to the consequence of that exposure (e.g. population decline). 'Risk' is then the sum of all such effects, or in a probabilistic sense the sum of all possible effects multiplied by their probability of occurrence [see Kaplan 1997]. However because impacts are not always known or readily observable, the exposure-effects approach implies a two-stage process: first an impact assessment to estimate numbers of seabirds killed by fishing, and second a risk assessment to evaluate the population level effect [see Sharp *et al.* 2009].

THE HIERARCHICAL APPROACH

5. The NPOA-Seabirds 2013 risk assessment framework can be usefully described using the hierarchical approach of Hobday *et al.* [2007] in which risk assessments are classified into one of three tiers:
    - level 1 risk assessments utilise expert knowledge to characterise risks on a qualitative scale;
    - level 2 risk assessments apply "semi-quantitative" methods, utilising available data in a standardized and reproducible algorithmic approach; and

- level 3 risk assessments are fully quantitative and data intensive, generally including species-specific population modelling and simulations of threats and alternate risk management strategies, equivalent to a comprehensive fisheries stock assessment model.

6. Underlying the hierarchical risk assessment approach is the idea of risk screening wherein activities identified with reasonable certainty as 'low risk' can be "screened out" thus allowing subsequent efforts to focus on remaining higher risk activities. In this way the decision to undertake a more intensive (level 2 or 3) risk assessment is a risk management response to those risks that are not screened out in lower level risk assessments (but does not preclude taking other actions in the meantime to manage those risks identified at the lower level). Activities are only "screened out" when there is reasonable certainty that the risk is low. In statistical terms, risk assessment tolerates Type I errors (false positives, i.e. not screening out activities that may actually present a low risk) in order to avoid Type II errors (false negatives, i.e. incorrectly screening out activities that actually constitute high risk). In this way it is important to distinguish risk assessment calculations from normal estimation. While normal estimation strives for a lack of bias, and a fair assessment of uncertainty, risk assessment asks "how bad could it be?" The divergence between the risk assessment approach and normal, unbiased estimation approaches should diminish at higher levels in the risk assessment hierarchy, where the assessment process should be informed by good data that support robust estimation.

NEW ZEALAND SEABIRD RISK ASSESSMENT – METHOD OVERVIEW AND SUMMARY OF PROGRESS

7. The overall goal of this seabird risk assessment framework is to evaluate the level of risk to New Zealand seabird populations arising from incidental mortality associated with commercial fisheries in the New Zealand EEZ. Consistent with other 'exposure-effects' approaches this constitutes first an impact assessment to estimate the number of seabirds killed, followed by estimation of the associated population-level risk as a function of population size and biological characteristics. The framework does not address potential indirect fisheries impacts, e.g. ecosystem or trophic effects.

8. Since 2008 a series of studies have been commissioned by the New Zealand Government to assess the risk to seabirds from incidental mortality in fisheries as described below.

LEVEL 1 RISK ASSESSMENT

9. Rowe [2010b] describes a qualitative (level 1) risk assessment to examine the likelihood of fisheries effects on populations of New Zealand seabirds in New Zealand fisheries waters. Risk scores were estimated for 101 seabird taxa and 26 fishing methods. Thalassarche albatrosses, or smaller albatrosses, Procellaria petrels and large shearwaters were found to be at greatest national risk from fishing. Other species at risk from one or just a few fisheries included yellow-eyed penguins, shag species, little blue penguins and Hutton's and fluttering shearwaters. The fishery group estimated to pose the greatest risk to seabirds was commercial set nets, followed by all inshore bottom longline fisheries.

LEVEL 2 RISK ASSESSMENT

10. The level 2 method underlying much of the NPOA-Seabirds 2013 risk assessment framework arose initially from an expert workshop hosted by the Ministry of Fisheries in 2008 and attended by experts with specialist knowledge of New Zealand fisheries, seabird-fishery interactions, seabird biology, population modelling, and ecological risk assessment. The overall framework is described in Sharp *et al.* [2011] and has been variously applied and improved in multiple iterations [Waugh *et al.* 2009, Richard *et al.* 2011, Richard and Abraham 2013 and Richard *et al.* 2013]. The level 2 method estimates the relative encounter rate of each seabird species with each fishery group as a function of the spatial overlap between seabird distributions and fishing effort distributions, and compares these estimates with observed captures from fisheries observer data to estimate species vulnerability (capture rates per encounter) to each fishery group, yielding estimates of total observable captures and population-level mortality from all New Zealand

commercial fisheries. Impact estimates are subsequently evaluated with reference to population estimates and biological characteristics to yield estimates of population-level risk. The method offers the following necessary advantages:

- risk is assessed is per seabird species or distinct population – to meet obligations under legislation fisheries managers must assess risk to seabirds with reference to units that are biologically meaningful;
- the method does not rely on the existence of universal or representative fisheries observer data to estimate seabird mortality, as fisheries observer coverage is generally too low and/or too spatially unrepresentative to allow direct impact estimation at a species level – the method can be applied for any fishery for which some observer data exists;
- the method does not rely on species-specific population models, which are unavailable for the great majority of species, as risk is a function of population-level impact and of biological parameters that are generally available from published sources – risk can be estimated even for species for which no estimate of population size is available;
- the method assigns risk to each species in an absolute sense, i.e. species are not merely ranked relative to one another – an absolute as opposed to relative risk score allows managers to define minimum performance standards for conservation goals, and to track changes in performance over time arising from changing fishing practices or risk management interventions;
- risk scores are quantitative and objectively scalable between fisheries or areas, so that risk at a species level can be disaggregated and assigned to different fisheries or areas based on their proportional contribution to total impact, to inform risk management prioritisation;
- the method allows explicit statistical treatment of uncertainty, and does not conflate uncertainty with risk – because risk is calculated algorithmically from numerical inputs for which error distributions may be explicitly defined, it is possible to track the source and propagation of uncertainty from input parameters through to output estimates of risk; and
- the method readily incorporates new information – assumptions in the impact assessment stage are transparent and testable; as new data becomes available, the consequences for the subsequent impact and risk calculations arise logically without the need to revisit other assumptions or repeat the entire risk assessment process.

11. Richard *et al.* [2011] applied this method for sixteen commercial fishery groups and 64 seabird species. Inshore fisheries were identified as responsible for the majority of species-level seabird risk, in part reflecting high uncertainty arising from historically low levels of inshore observer coverage, as well as high effort levels and high spatial overlap with the distributions of vulnerable seabird species.

12. Commercial set net fisheries were not included in the level 2 analysis of Richard *et al.* [2011] despite having been identified by the level 1 analysis of Rowe *et al.* [2010b] as posing substantial risk to seabirds. In the absence of other information for these fishery groups in 2011, the Ministry of Fisheries combined the level 1 and level 2 results to generate risk estimates for all New Zealand commercial fisheries. The level 1 results were also used to screen the level 2 outputs for likely errors arising from poor input data (e.g. spatial distribution layers) or faulty structural assumptions for particular seabird species, for correction in subsequent iterations.

13. In early 2013 the level 2 seabird risk assessment was updated as follows [see Richard and Abraham 2013 and Richard *et al.* 2013]:
    - the number of seabird populations assessed increased from 64 to 70;
    - estimated population sizes and biological parameters were updated for those populations for which new data were available, and seabird spatial distributions were revised where the previous distributions were found lacking;
    - levels and patterns of spatial overlap were evaluated separately for breeding-season vs. non-breeding-season seabirds, to account for seasonal variation in the distributions of both seabirds and fishing effort;
    - commercial set net fisheries were included in the level 2 analysis, effectively eliminating the need to directly utilise the level 1 results of Rowe [2010b];

- captures were estimated in a single model for all seabird species, so that species vulnerability for each species/fishery interaction is the product of a fishery group-specific vulnerability and a species-specific vulnerability – in this way capture rates for rare species or poorly-observed fisheries are informed and constrained by capture data from more common species or better-observed fisheries;
- in the previous assessment the level of risk associated with the estimated level of fishery-related mortality was assigned with reference to a PBR (i.e. "potential biological removals"; see Wade [1998]) limit using a formula originally intended for and applied to marine mammals – in the updated level 2 assessment of Richard and Abraham [2013] the PBR is derived from simulations using a novel seabird population model, which includes a calibration factor, rho, for each species type, defined with reference to a clearly defined population objective (i.e. to ensure that human-caused mortalities are sufficiently low that the population can remain at – or recover to – a level half the original carrying capacity).

14. Two key outputs of the Richard *et al.* [2013] level 2 risk assessment are given in Table A5 and Figure A2. These outputs will be updated and reported annually via the NPOA Seabirds 2013 web page.

15. The updated level 2 assessment successfully resolved known anomalous results identified in the previous iteration and generates up-to-date risk estimates for seventy seabird populations across all New Zealand commercial fisheries. Black petrels are the species most at risk from commercial fishing activities within the New Zealand EEZ (Table A5, Figure A2). The other highest risk species include five smaller albatross species, three large albatross species of the wandering albatross group, flesh-footed shearwater, and cape petrel (Table A5, Figure A2).

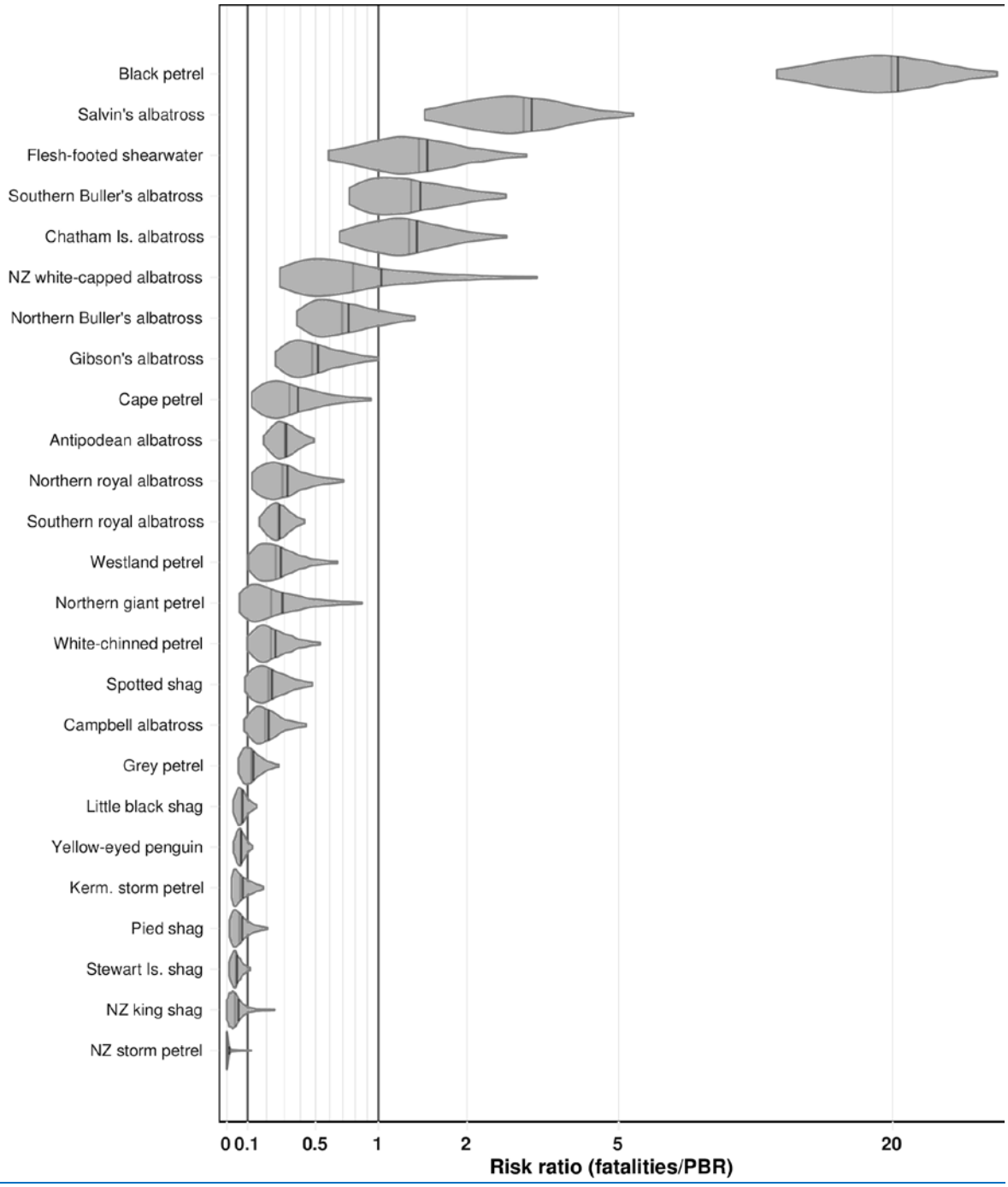
16. The majority of species-level risk in the level 2 risk assessment is attributable to inshore fisheries, primarily flatfish trawl fisheries followed by snapper, bluenose, and other inshore bottom-longline fisheries and also to domestic surface-longline vessels targeting swordfish or big-eye tuna. Risks from deepwater trawl fisheries are generally low but some species remain exposed to risk from interactions with large-vessel trawl fisheries targeting hoki, scampi and squid.

Table A5: Outputs from the 2013 level 2 risk assessment showing the risk ratio and its key components[11] [reproduced from Richard *et al.* 2013].

	PBR_1		APF		Risk ratio		P_1	$P_{0.5}$	$P_{0.1}$
	Mean	95% c.i.	Mean	95% c.i.	Median	95% c.i.			
Black petrel	74	47-117	1 440	1 070-1 900	19.90	11.40-32.80	100.00	100.00	100.00
Salvin's albatross	975	521-1 740	2 690	2 100-3 420	2.88	1.47-5.41	99.80	100.00	100.00
Flesh-footed shearwater	590	288-1 200	780	523-1 090	1.41	0.59-2.94	80.60	99.00	100.00
Southern Buller's albatross	513	270-831	663	520-839	1.32	0.75-2.58	79.20	100.00	100.00
Chatham Island albatross	159	94-264	205	136-316	1.30	0.68-2.59	78.20	99.70	100.00
NZ white-capped albatross	4 040	908-9 840	2 830	2 080-3 790	0.78	0.28-3.13	36.20	76.70	100.00
Northern Buller's albatross	617	325-1000	418	312-560	0.69	0.38-1.36	17.20	82.30	100.00
Gibson's albatross	260	132-425	121	86-164	0.48	0.25-1.00	2.52	45.40	100.00
Cape petrel	840	283-1 890	254	175-361	0.33	0.12-0.93	1.74	23.30	99.10
Antipodean albatross	295	203-419	89	63-121	0.30	0.18-0.49	0.00	2.06	100.00
Northern royal albatross	396	164-782	108	72-160	0.29	0.12-0.70	0.30	11.70	99.50
Southern royal albatross	441	302-630	116	82-160	0.27	0.16-0.43	0.00	0.30	100.00
Westland petrel	241	142-384	63	28-129	0.25	0.10-0.66	0.10	7.68	97.90
Northern giant petrel	217	66-486	47	18-103	0.23	0.06-0.85	1.44	13.60	87.40
White-chinned petrel	7 920	3 280-15 800	1 670	1 210-2 330	0.22	0.10-0.53	0.04	3.54	97.10
Spotted shag	3 780	1 730-7 570	745	485-1 100	0.21	0.09-0.48	0.00	1.64	94.60
Campbell black-browed albatross	1 020	514-1 830	192	111-324	0.19	0.08-0.44	0.00	1.12	94.00
Grey petrel	2 170	1 010-3 900	247	169-364	0.12	0.06-0.27	0.00	0.00	65.10
Little black shag	120	67-216	8	5-14	0.07	0.03-0.15	0.00	0.00	18.00
Yellow-eyed penguin	537	352-805	35	19-56	0.07	0.03-0.12	0.00	0.00	10.20
Kermadec storm petrel	4	1-9	0	0-0	0.06	0.02-0.18	0.00	0.00	25.70
Pied shag	172	75-329	10	3-24	0.06	0.01-0.20	0.00	0.02	22.50
Stewart Island shag	269	218-334	13	3-29	0.04	0.01-0.11	0.00	0.00	4.44
NZ king shag	16	13-20	1	0-4	0.04	0.00-0.24	0.00	0.12	12.10
Light-mantled sooty albatross	237	167-319	7	2-20	0.02	0.01-0.09	0.00	0.00	1.94
Chatham petrel	11	5-26	0	0-1	0.02	0.00-0.10	0.00	0.00	2.30
Grey-headed albatross	333	157-613	6	1-20	0.01	0.00-0.07	0.00	0.00	0.76
Australasian gannet	4 190	1 500-9 770	62	7-222	0.01	0.00-0.07	0.00	0.00	1.12
Fiordland crested penguin	488	255-866	6	1-17	0.01	0.00-0.04	0.00	0.00	0.02
Soft-plumaged petrel	171	32-553	1	0-3	0.01	0.00-0.05	0.00	0.00	0.04
Grey-faced petrel	14 000	6 290-31 200	108	51-207	0.01	0.00-0.02	0.00	0.00	0.00
Cook's petrel	2 430	1 140-5 500	17	6-35	0.01	0.00-0.02	0.00	0.00	0.00
Pycroft's petrel	109	48-241	1	0-2	0.01	0.00-0.02	0.00	0.00	0.00
Northern little penguin	1 360	869-2 000	9	2-23	0.01	0.00-0.02	0.00	0.00	0.00
Sooty shearwater	348 000	115 000-751 000	1 760	1 260-2 480	0.01	0.00-0.02	0.00	0.00	0.00
Fluttering shearwater	5 220	1 240-13 700	19	5-54	0.00	0.00-0.02	0.00	0.00	0.00
White-flippered little penguin	421	263-657	2	0-4	0.00	0.00-0.01	0.00	0.00	0.00
Mottled petrel	15 300	7 040-33 500	45	17-98	0.00	0.00-0.01	0.00	0.00	0.00
Southern little penguin	1 360	864-2 030	3	1-9	0.00	0.00-0.01	0.00	0.00	0.00
Hutton's shearwater	6 370	3 490-10 600	15	4-36	0.00	0.00-0.01	0.00	0.00	0.00
Black-bellied storm petrel	4 550	2 410-8 220	8	2-17	0.00	0.00-0.00	0.00	0.00	0.00
Snares crested penguin	4 910	2 520-8 800	8	2-19	0.00	0.00-0.00	0.00	0.00	0.00
White-headed petrel	18 500	6 760-44 000	23	11-41	0.00	0.00-0.00	0.00	0.00	0.00
Chatham Island little penguin	1 350	856-2 030	3	0-14	0.00	0.00-0.01	0.00	0.00	0.00
Common diving petrel	64 600	19 400-152 000	36	15-77	0.00	0.00-0.00	0.00	0.00	0.00
Buller's shearwater	14 800	5 530-33 800	10	2-32	0.00	0.00-0.00	0.00	0.00	0.00
Kermadec petrel	336	153-752	0	0-1	0.00	0.00-0.00	0.00	0.00	0.00
Little shearwater	7 800	4 090-13 200	4	1-10	0.00	0.00-0.00	0.00	0.00	0.00
NZ white-faced storm petrel	105 000	38 800-226 000	45	12-111	0.00	0.00-0.00	0.00	0.00	0.00
Western rockhopper penguin	7 510	5 580-9 990	3	1-8	0.00	0.00-0.00	0.00	0.00	0.00
Southern black-backed gull	371 000	148 000-751 000	94	25-231	0.00	0.00-0.00	0.00	0.00	0.00
Antarctic prion	40 100	9 230-110 000	5	2-10	0.00	0.00-0.00	0.00	0.00	0.00
Fairy prion	159 000	62 800-330 000	22	7-56	0.00	0.00-0.00	0.00	0.00	0.00
Erect-crested penguin	12 600	10 200-15 600	2	0-5	0.00	0.00-0.00	0.00	0.00	0.00
Broad-billed prion	106 000	48 700-201 000	11	4-26	0.00	0.00-0.00	0.00	0.00	0.00
NZ storm petrel	16	1-64	0	0-0	0.00	0.00-0.12	0.00	0.00	3.56
Chatham Island taiko	1	0-2	0	0-0	0.00	0.00-0.00	0.00	0.00	1.90
Chatham Island shag	51	38-68	0	0-4	0.00	0.00-0.08	0.00	0.00	1.56
Pitt Island shag	100	51-178	1	0-6	0.00	0.00-0.06	0.00	0.00	0.98
South Georgian diving petrel	5	2-8	0	0-0	0.00	0.00-0.00	0.00	0.00	0.02
Bounty Island shag	17	11-26	0	0-0	0.00	0.00-0.02	0.00	0.00	0.02
Wedge-tailed shearwater	4 120	2 720-5 760	0	0-0	0.00	0.00-0.00	0.00	0.00	0.00
White-naped petrel	2 990	1 060-7 410	0	0-0	0.00	0.00-0.00	0.00	0.00	0.00
White-bellied storm petrel	66	29-131	0	0-0	0.00	0.00-0.00	0.00	0.00	0.00
Masked booby	46	26-76	0	0-0	0.00	0.00-0.01	0.00	0.00	0.00
Auckland Island shag	305	132-581	0	0-1	0.00	0.00-0.00	0.00	0.00	0.00
Campbell Island shag	298	153-534	0	0-0	0.00	0.00-0.00	0.00	0.00	0.00
Subantarctic skua	31	19-45	0	0-0	0.00	0.00-0.01	0.00	0.00	0.00
Caspian tern	176	92-299	0	0-1	0.00	0.00-0.00	0.00	0.00	0.00
White tern	18	13-26	0	0-0	0.00	0.00-0.00	0.00	0.00	0.00

[11] Potential Biological Removal (PBR_1, i.e. with a recovery factor $f = 1$), total annual potential fatalities (APF) in trawl, longline, and set-net fisheries, risk ratio with $f = 1$ (RR = APF/PBR_1), and the probability that APF > PBR with $f = 1$, $f = 0.5$, and $f = 0.1$ (P_1, $P_{0.5}$, and $P_{0.1}$ respectively). Species are ordered in decreasing order of the median risk ratio.

Figure A2: Outputs from the 2013 level 2 risk assessment showing the risk ratio for the most at risk species[12] [reproduced from Richard *et al.* 2013].



17. A major difference in the results of Richard *et al.* [2013] relative to previous risk estimates is that set net risk to diving seabirds was found to be substantially lower than previously estimated by the level 1 assessment of Rowe [2010b].

[12] This covers set net trawl and longline. Risk ratio (total annual potential fatalities/Potential Biological Removal, PBR with the recovery factor *f* set at 1). The risk ratio is displayed on a logarithmic scale, with the threshold of the number of potential bird fatalities equalling the PBR with $f = 0.1$ and $f = 1$ indicated by the two vertical black lines, and the distribution of the risk ratios within their 95 percent confidence interval indicated by the coloured shapes, including the mean risk ratio (solid black line), and median (grey line). Seabird species are listed in decreasing order of the mean probability risk ratio. Species with a risk ratio almost zero are not included (95 percent upper limit with $f = 1$ less than 0.1) [Richard *et al.* 2013].

LEVEL 3 RISK ASSESSMENT

18. Below the status of level 3 risk assessment in New Zealand is reviewed along with a two case studies of population models for southern Buller's albatross and black petrel [as presented in MPI 2012a], a key input to future full level 3 risk assessments.

19. At present no full level 3 risk assessments exist for any New Zealand seabird species, but in their present form the results of existing species-specific population estimates and modelling exercises may be used selectively to inform or constrain the input parameters or outputs of the updated level 2 risk assessment method.

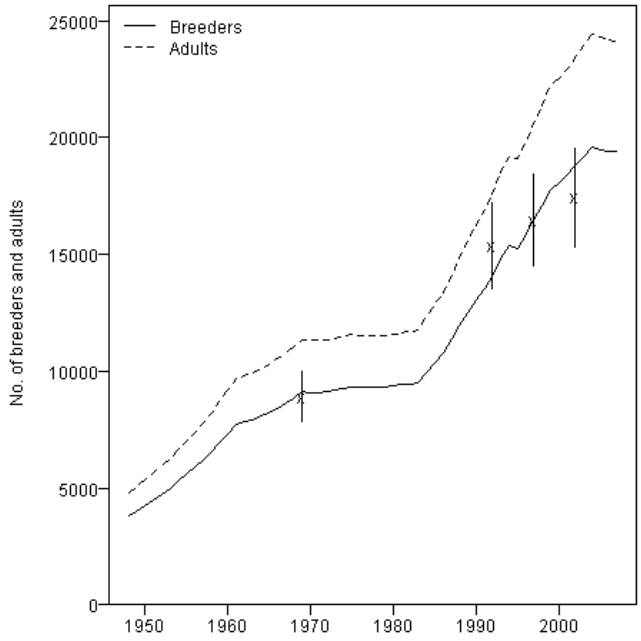
20. Relevant data (e.g. nesting surveys or repeat aerial census) are currently available for some New Zealand seabird species. As a result, fully quantitative population modelling has been conducted for southern Buller's albatross [Francis and Sagar 2011], black (Parkinson's) petrel [Bell *et al.* 2011; and Bell *et al.* 2012], white capped albatross [Francis 2012], and Gibson's (wandering) albatross [Francis *et al.* in press]. Data of similar quality and quantity are available for Antipodean (wandering) albatross, and this work should be commissioned soon, but data for other species or populations appear unlikely to be adequate for comprehensive population modelling. The poor estimates of observable and cryptic fishing-related mortality have restricted such work to comprehensive population modelling rather than full level 3 risk assessments. Population models such as these are necessary (but not sufficient) components of full level 3 risk assessments.

CASE STUDY 1: QUANTITATIVE MODELS FOR SOUTHERN BULLER'S ALBATROSS

21. Francis *et al.* [2008], see also Francis and Sagar [2012] assessed the status of the Snares Islands population of southern Buller's albatross (*Thalassarche bulleri bulleri*). They estimated (see also Sagar and Stahl [2005]) that the adult population had increased about 5-fold since about 1950 (Figure A3) at a rate of about 2 percent per year, and concluded from this that the risk to the viability of this population posed by fisheries had been small. This conclusion depends critically on the reliability of the first census of nesting birds conducted in 1969, but the authors give compelling reasons to trust that information. They noted, however, that population growth had slowed by about 2005 (and perhaps reversed) and adult survival rates were falling, but could discern neither the cause nor significance of these changes because they had included survival data only up to 2007. An additional 5 years of survival and other demographic data have since been recorded [Sagar *et al.* 2010] and all monitored sites at the Snares Islands show substantial declines in the number of breeding pairs since 2006. The modelling has not yet been repeated.

22. Fishery discards are an important component of the diet of chicks, but Francis *et al.* [2008] were not able to assess whether the associated positive effect on population growth (e.g. from increased breeding success) is greater or less than the negative effect of fishing-related mortality.

Figure A3: Estimates from model SBA21 of numbers of breeders (solid line) and adults (broken line) in each year [reproduced from Francis *et al.* 2008]. Also shown are the census observations (after Sagar and Stahl [2005]) of numbers of breeders (crosses), with assumed 95 percent confidence intervals (vertical lines).

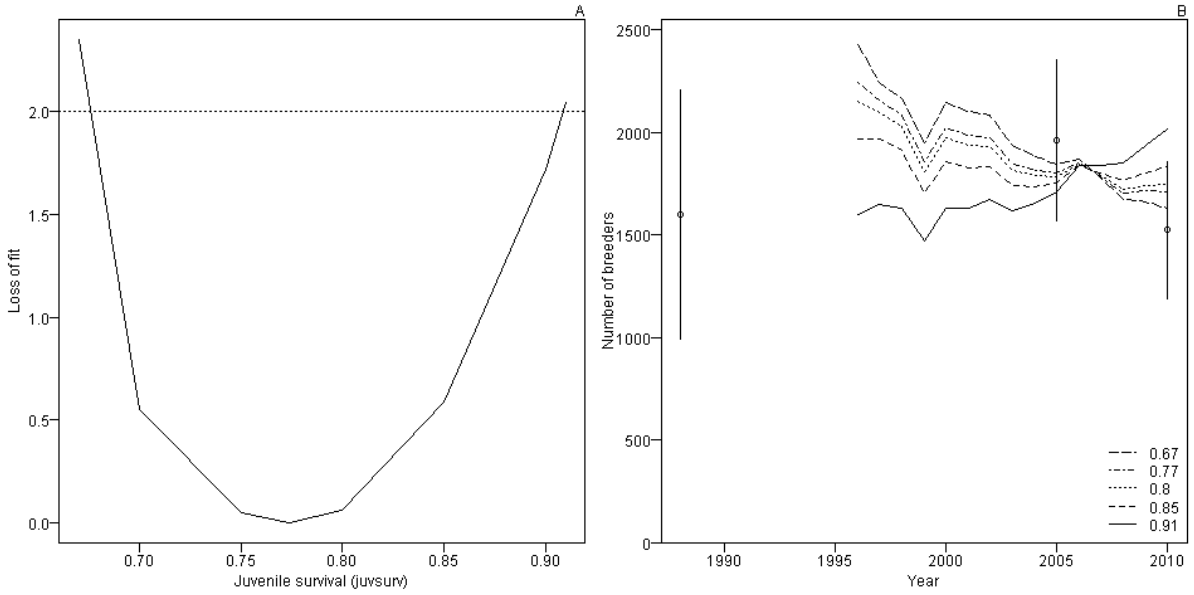


CASE STUDY 2: QUANTITATIVE MODELS FOR BLACK PETREL

23. Francis and Bell [2010] analysed data from the main population of black (Parkinson's) petrel (*Procellaria parkinsoni*), which breeds on Great Barrier Island. Abundance data from transect surveys were used to infer that the population was probably increasing at a rate between 1.2 percent and 3.1 percent per year. Mark-recapture data were useful in estimating demographic parameters, like survival and breeding success, but contained little information on population growth rates. Fishery bycatch data from observers were too sparse and imprecise to be useful in assessing the contribution of fishing-related mortality. Francis and Bell [2010] suggested that, because the population was probably increasing, there was no evidence that fisheries posed a risk to the population at that time. They cautioned that this did not imply that there was clear evidence that fisheries do not pose a risk.

24. Subsequent analysis [Bell *et al.* 2012] included an additional line transect survey in 2009/10 in which the breeding population was estimated to be ~22 percent lower than in 2004/05 (the latest available to Francis and Bell [2010]). Updating the model of Francis and Bell [2010] made little difference to estimates of demographic parameters such as adult survival, age at first breeding, and juvenile survival (which had 95 percent confidence limits of 0.67 and 0.91). The uncertainty in juvenile survival gave rise to uncertainty in the estimated population trend, with a mean rate of population growth over the modelling period ranging from -2.5 percent per year (if juvenile survival = 0.67) to +1.6 percent per year (if juvenile survival = 0.91, close to the average annual survival rate for older birds) (Figure A4). Bell *et al.* [2012] concluded that the mean rate of change of the population over the study period had not exceeded 2 percent per year, though the direction of change was uncertain.

Figure A4: Likelihood profile for annual probability of juvenile survival showing: A, the loss of fit (the horizontal dotted line shows a 95 percent confidence interval for this parameter); and B, population trajectories corresponding to different values of juvenile survival, together with population estimates from transect counts (crosses with vertical lines indicating 95 percent confidence intervals. Note that the 1988 population estimate was not used in the model (reproduced from Bell *et al.* 2012).



GENERAL CONCLUSIONS FROM QUANTITATIVE MODELLING

25. Fully quantitative modelling has now been conducted for four of the five seabird populations for which apparently suitable data are available. That modelling suggests very strongly that one population had been increasing steadily (southern Buller's albatross, but note this trend may have reversed) and another is declining quite rapidly (Gibson's albatross). White-capped albatross and black petrel are both more likely to be declining than not but, even for these relatively data rich populations, the conclusions are uncertain. General conclusions from the modelling conducted to date, therefore, can be summarised as:
    - very few seabird populations have sufficient data for modelling;
    - except for the two most complete data sets (southern Buller's and Gibson's albatross) it has been difficult to draw firm conclusions about trends in population size;
    - information from surveys or census counts is much more powerful for detecting trends in population size than data from the tagging programmes and plot monitoring implemented for New Zealand seabirds to date;
    - the available information on incidental captures in fisheries have not allowed rigorous tests of the role of fishing-related mortality in driving population trends; and
    - although comprehensive modelling provides additional information to allow interpretation, we will have to rely on level 2 risk assessment approaches for much of our understanding of the relative risks faced by different seabird taxa and posed by different fisheries.

SEABIRD RISK ASSESSMENT – REPORTING RISK

26. The application of a hierarchical risk assessment and risk screening process implies that not all potential causes of risk are necessarily assessed using the same methodology. The NPOA-Seabirds 2013 risk assessment framework therefore requires a process for integrating and consolidating the results of separate risk assessment analyses at different tiers.

27. Reporting results from a hierarchical assessment is conceptually straightforward: in the absence of other considerations level 2 results supersede level 1 results, and level 3 results replace level 2 results. In practice, the process of integrating risk assessment results should proceed cautiously; for example lower-level results may be useful to identify errors or faulty structural assumptions at

a higher level, or higher-level results may be simplified to enable reporting in a common framework with lower-level results. It is important that, for any such assessment that combines multiple risk assessments as inputs, the original sources of various outputs in the combined analysis are clearly identified.

28. To appropriately inform the development of risk management responses within fisheries five-year plans and annual plans, the outputs of the NPOA-Seabirds 2013 risk assessment allows species-level risk to be disaggregated into component parts, e.g. by fishing method, fishery group, or in space and time. Such disaggregated outputs should always be considered in the context of the estimated total species-level risk (with associated uncertainty) as this is the scale at which risk estimates are biologically relevant. Similarly, these discussions should also consider risk arising from sources other than New Zealand commercial fisheries, e.g. non-commercial fisheries captures, and fisheries captures outside the New Zealand EEZ (of likely high importance for migratory species). In this regard a global scale seabird fisheries risk assessment, e.g. applying the methods of Waugh *et al.* [2012a; 2012b], would be useful.

SEABIRD RISK ASSESSMENT – NEXT STEPS

29. Risk assessment is an ongoing process of iterative improvement. The NPOA-Seabirds 2013 risk assessment framework will be continuously updated as methods improve and new data become available. The process by which new results are integrated with current risk assessments under the existing framework will require ongoing refinement.

30. The following steps are identified in order to improve the risk assessment framework that supports the implementation of this NPOA-Seabirds 2013:
    - implementation of a framework and process to consolidate different risk assessment and population monitoring results into an integrated assessment, including:
        - checking the algorithmic level 2 assessment results for particular high risk species-fishery interactions, in light of other available data or identifiable structural biases on a case-by-case basis;
        - a mechanism to incorporate issues associated with seabird mortalities outside the EEZ and recreational fisheries risk in future assessments;
        - the use of species population models or census data to constrain input parameters or output estimates of risk;
    - routine update of the integrated fisheries risk assessment with relevant new information; and
    - periodic review and update of risk management priorities in light of current risk estimates.

ANNEX III – Summary of mitigation measures in place

EXPLANATORY NOTES

1. The table below sets out a summary of current mitigation measures applied to New Zealand vessels fishing in New Zealand waters to avoid incidental seabird captures. In the waters of the Western and Central Pacific Fisheries Commission (WCPFC) Convention Area and the CCAMLR Area outside the New Zealand EEZ, New Zealand flagged vessels use the mitigation measures prescribed by those Commissions.

2. Within cells in the table:
   - R = regulated;
   - SM = required via a self-managed regime (non-regulatory, but required by industry organisation and audited independently by Government);
   - V = voluntary with at least some use known;
   - Cells blacked out indicate that the measure is not relevant in a particular fishery;
   - A year in ( ) indicates the year of implementation;
   - Measures annotated with * are part of a vessel-specific seabird risk management plan; and
   - Large vessels are those 28m and greater in length.

3. A vessel-specific seabird risk management plan is a plan which specifies seabird mitigation devices to be used, operational management requirements to minimise the attraction of seabirds to vessels, and incident response requirements and other techniques or processes in place to minimise risk to seabirds from fishing operations.

4. In surface longline fisheries the minimum standard for streamer (tori) lines is based on international best practice drawn from CCAMLR, Commission for the Conservation of Southern Bluefin Tuna (CCSBT), and WCPFC recommendations. The approved line weighting configuration is as specified in the WCPFC conservation and management measure for seabirds.

Mitigation Measure	*Surface longline*		*Bottom longline*			*Trawl*		*Set net*	*Notes*
	Large-vessel	*Small-vessel*	*Vessels >20m*	*Vessels 7-20m*	*Vessels <7m*	*Large-vessel*	*Small-vessel*		
Net sonde cable prohibition						R (1992)	R (1992)		Net sonde cables are also referred to as third wires
Seabird scaring device	R (Streamer line)	R (Streamer line)	R (Streamer line)	R (Streamer line)		R (2006)	V		On trawlers this is a recognised device which is designed to prevent warp captures and collisions
Additional seabird scaring device			V (second streamer line, gas cannon)			SM (2008)*	V		
Night setting	R (or line weighting)	R (or line weighting)	R (or line weighting)	R (or line weighting)	R (or line weighting)				Longline fleets must use night setting if not line weighting, or vice-versa.
Line weighting	R (or night setting)	R (or night setting)	R (or night setting)	R (or night setting)	R (or night setting)				
Dyed bait	V	V							
Offal management	V	V	R	R	R	SM (2008)*			
Vessel-specific seabird risk management plans						SM (2008)	V		Some vessel-specific seabird risk management plans have been developed for vessels < 28m
Code of Practice	V	V	V			SM (Vessel-specific seabird risk management plans)			

ANNEX IV – Terms of reference for NPOA-Seabirds Advisory Group

PURPOSE

1. The purpose of the group is to monitor and assist the implementation of the NPOA-Seabirds 2013 and to contribute to the review of the Plan that, in accordance with its provisions, is scheduled to commence after its fourth year of operation.

MEMBERSHIP

2. 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 Plan is implemented. It should include members from environmental groups, the fishing industry, the recreational and customary non-commercial sectors, the Department of Conservation (DOC) and the Ministry for Primary Industries (MPI).

3. 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.

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

ROLE

5. The group is an advisory body, not a decision-making body. It will monitor progress against the objectives of the NPOA-Seabirds 2013 and provide advice and assistance to MPI and, as appropriate, to DOC in relation to the implementation of the NPOA-Seabirds 2013.

6. To fulfil its role the group will, as appropriate[13]:
   - review of 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 of 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 RFMO 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;
   - evaluate the effectiveness of training, education, and outreach in New Zealand fisheries in achieving behaviour change in commercial and non-commercial fisheries;

[13] Consideration of these matters by this group are not intended to duplicate the work of the MPI and DOC science review processes, or the MPI fish planning processes.

- consider multi-year reports summarising progress against the objectives of the NPOA-Seabirds 2013.

7. The group will, taking account of the above, provide an annual report to MPI and DOC on progress against annual and five year plans, the NPOA-Seabirds 2013 objectives and make recommendations for the following year. It will offer advice to MPI and DOC as and when needed. The group will also contribute to the review of the Plan.

MODUS OPERANDI

8. In consultation with MPI the group will elect a Chair who may be an independent person from outside the group.

9. 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.

10. The group will be provided in a timely manner with all information relevant for its role. In particular MPI 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. DOC will provide the group with any relevant information or recommendations developed by ACAP.

11. 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.

12. Meetings of the group will be co-ordinated and serviced by MPI.

References

Abraham, E. R., Berkenbusch, K. N., and Richard, Y. 2010. The capture of seabirds and marine mammals in New Zealand non-commercial fisheries. *New Zealand Aquatic Environment and Biodiversity Report No. 65*. 52p.

Abraham, E. R., and Thompson F. N. 2011. Estimated capture of seabirds in New Zealand trawl and longline fisheries, 2002-03 to 2008-09. *New Zealand Aquatic Environment and Biodiversity Report No. 79*. 74p.

Australian/ New Zealand Standards. 1999. Standard for Risk Management. AS/NZS 4360. Standards Association of Australia, Stratfield, NSW. 46p.

Baird S. J. 2005. Incidental capture of seabird species in commercial fisheries in New Zealand waters, 2002-03. *New Zealand Fisheries Assessment Report 2005/2*. 50p.

Baird S. J., and Smith, M. H. 2007. Incidental capture of seabird species in commercial fisheries in New Zealand waters, 2003-04 and 2004-05. *New Zealand Aquatic Environment and Biodiversity Report No. 9*. 108p.

Baird S. J., and Smith, M. H. 2008. Incidental capture of seabird species in commercial fisheries in New Zealand waters, 2005-06. *New Zealand Aquatic Environment and Biodiversity Report No. 18*. 125p.

Bell, E. A., Sim, J. L., Scofield, P., and, C. 2011. Population parameters of the black petrels (*Procellaria parkinsoni*) on Great Barrier Island (Aotea Island), 2009/10. Unpublished report held by the Department of Conservation, Wellington. 82p.

Bell, E. A., Sim, J.L., Scofield, P., and Francis, R. I. C. C. 2012. Population parameters of the black petrels (*Procellaria parkinsoni*) on Great Barrier Island (Aotea Island), 2009/10. Report for Conservation Services Programme Project POP2009-01, near-final (post-review) draft. 82 p. Department of Conservation, Wellington.

Francis, R. I. C. C. 2012. Fisheries risks to the population viability of White-capped albatross Thalassarche steadi. *New Zealand Aquatic Environment and Biodiversity Report No. 104.* 24 p.

Francis, R. I. C. C., Sagar, P. M., and Fu, D. 2008. Status of the Snares Islands population of southern Buller's albatross. Final Research Report for Year 2 of Ministry of Fisheries Research Project PRO200602. 138 p.

Francis, R. I. C. C., and Bell, E. A. 2010. Fisheries risks to the population viability of black petrel (*Procellaria parkinsoni*). *New Zealand Aquatic Environment and Biodiversity Report No. 51*. 57p. Ministry of Fisheries, Wellington

Francis, R. I. C. C., Elliot, G., and Walker, K. in press. Fisheries risk to the population viability of Gibson's wandering albatross *Diomedea gibsoni*. *New Zealand Aquatic Environment and Biodiversity Report No. xx*. yyp.

Francis, R. I. C. C., and Sagar, P. M. 2011. Modelling the effect of fishing on southern Buller's albatross using a 60-year dataset. *New Zealand Journal of Zoology*, DOI:10.1080/03014223.2011.600766.

Francis, R. I. C. C., and Sagar, P. M. 2012. Modelling the effect of fishing on southern Buller's albatross using a 60-year dataset, *New Zealand Journal of Zoology*. 39 (1): 3–17.

Hartill, B., Bian, R., Armiger, H., Vaughan, M., and Rush, N. (2007). Recreational marine harvest estimates of snapper, kahawai and kingfish in QMA 1 in 2004-05. *New Zealand Fisheries Assessment Report 2007/26*. 44p.

Hobday, A. J., Smith, A., Webb, H., Daley, R., Wayte, S., Bulman, C., Dowdney, J., Williams, A., Sporcic, M., Dambacher, J., Fuller, M., and Walker, T. 2007. Ecological Risk Assessment for the Effects of Fishing: Methodology. Report R04/1072 for the Australian Fisheries Management Authority, Canberra.

International Union for the Conservation of Nature (IUCN). 2012. The IUCN Red List of Threatened Species. Version 2012.1. Accessed at http://www.iucnredlist.org on 01 August 2012.

Kaplan, S. 1997. The words of risk analysis. *Risk Analysis*, 17(4): 407-417.

MacKenzie D., and Fletcher, D., 2006. Characterisation of seabird captures in commercial trawl and longline fisheries in New Zealand 1997/98 to 2003/04. Final Research Report for project ENV2004/04. Unpublished report held by the Ministry of Fisheries, Wellington. 102p.

Ministry of Fisheries (MFish) 2006. Fisheries (Commercial Fishing) Amendment Regulations 2006. Seabird Scaring Devices – Circular Issued Under Authority of the Fisheries (Commercial Fishing) Amendment Regulations 2006 (No. F361). *NZ Gazette*. 33: 842-846.

Ministry for Primary Industries (MPI). 2012a. Aquatic Environment and Biodiversity Annual Review 2012. Compiled by the Fisheries Management Science Team, Ministry for Primary Industries, Wellington, New Zealand. 387 p.

Ministry for Primary Industries (MPI). 2012b. Report from the Fisheries Assessment Plenary, May 2012: stock assessments and yield estimates. Compiled by the Fisheries Science Group, Ministry for Primary Industries, Wellington, New Zealand. 1194 p.

Ministry for Primary Industries (MPI). 2013. Protected species database. A database of protected species capture information, including associated effort and observer data, is maintained at www.fish.govt.nz/en-nz/Environmental/Seabirds and is publicly available. It can be used to produce annual fishery-by-fishery or seabird-by-seabird summaries over one or many years.

Miskelly, C. M., Dowding, J. E., Elliot, G. P., Hitchmough, R. A., Powlesland, R. G., Robertson, H. A., Sagar, P. M., Scofield, R. P., and Taylor, G. A. 2008. Conservation status of New Zealand birds, 2008. *Notornis* 55: 117-135.

Ramm, K. 2011. Conservation Services Programme Observer Report for the period 1 July 2008 to 30 June 2009. Unpublished report held by the Department of Conservation, Wellington. 126p.

Ramm, K. 2012. Conservation Services Programme Observer Report for the period 1 July 2009 to 30 June 2010. Unpublished report held by the Department of Conservation, Wellington. 130p.

Richard, Y., Abraham, E. R., and Filippi, D. 2011. Assessment of the risk to seabird populations from New Zealand commercial fisheries. Final Research Report for projects IPA2009/19 and IPA2009/20. Unpublished report held by the Ministry of Fisheries, Wellington. 137p.

Richard, Y., and Abraham, E. R. 2013. Application of Potential Biological Removal methods to seabird populations. *New Zealand Aquatic Environment and Biodiversity Report No. 108.* 30p.

Richard, Y., Abraham, E. R., and Filippi, D. 2013. Assessment of the risk of commercial fisheries to New Zealand seabirds, 2006-07 to 2010-11. *New Zealand Aquatic Environment and Biodiversity Report No. 109.* 58 + 70p.

Rowe, S. J. 2010a. Conservation Services Programme Observer Report for the period 1 July 2007 to 30 June 2008. DOC Marine Conservation Services Series 4. Unpublished report held by the Department of Conservation, Wellington. 97p.

Rowe, S. J. 2010b. Level 1 Risk Assessment for incidental seabird mortality associated with New Zealand fisheries in the NZ-EEZ. Unpublished report held by the Department of Conservation, Wellington. 75p.

Sagar P. M., and Stahl, J. C. 2005. Increases in the numbers of breeding pairs in two populations of Buller's albatross (Thalassarche *bulleri bulleri*). *Emu 105*: 49–55.

Sagar P. M., Torres, L., and Thompson, D. 2010. Demography and distribution of Buller's Albatrosses *Thalassarche bulleri bulleri*: Final research report of the 2010 field season. NIWA Client Report: CHC2010-156, December 2010, prepared for Department of Conservation project.

Sharp, B. R., Parker, S. J., and Smith, N. 2009. An impact assessment framework for bottom fishing methods in the CCAMLR area. *CCAMLR Science*, 16: 195-210.

Sharp, B. R., Waugh, S. M., and Walker, N. A. 2011. A risk assessment framework for incidental seabird mortality associated with commercial fishing in the New Zealand EEZ. Unpublished report held by the Ministry for Primary Industries, Wellington.

Sport and Recreation New Zealand (SPARC). 2008. Sport, Recreation and Physical Activity Participation Among New Zealand Adults: Key Results of the 2007/08 Active NZ Survey. Wellington: SPARC. 24pp.

United Nations Convention on the Law of the Sea 1982 (UNCLOS). 1982. United Nations Convention on the Law of the Sea of 10 December 1982.

United Nations Food and Agriculture Organisation (UNFAO). 2009. Best practices to reduce incidental catch of seabirds in capture fisheries. UNFAO Technical Guidelines for Responsible Fisheries . No. 1, Suppl. 2. Rome, UNFAO. 49p.

United States of America Environmental Protection Agency (US EPA). 1998. Guidelines for ecological risk assessment. Document EPA/630/R-95/002F. Risk Assessment Forum, U.S. Environmental Protection Agency, Washington, DC.

Wade, P. R. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. *Marine Mammal Science*. 14 (1): 1-37.

Waugh, S., Filippi, D., and Abraham, E. 2009. Ecological risk assessment for seabirds in New Zealand fisheries. Final Research Report for Ministry for Primary Industries Research Project PRO2008/01. Unpublished report held by the Ministry for Primary Industries, Wellington.

Waugh, S. M., Filippi, D., Kirby, D. S., Abraham, E., Walker, N. 2012a. Ecological Risk Assessment for seabird interactions in Western and Central Pacific longline fisheries. *Marine Policy*. 36 (4): 933-946.

Waugh, S., FIllipi, D., Sharp, B., and Weimerskirch, H. 2012b. Ecological Risk Assessment for seabird interactions in surface longline fisheries managed under the Convention for the Conservation of Southern Bluefin Tuna. 38pp. CCSBT-ERS/1203/09 (Rev.1). Commission for the Conservation of Southern Bluefin Tuna, Canberra.

Wildlife Management International (WMI). 2012. Shag interactions with commercial rock lobster pot and trap fishing methods in the Chatham Islands. Unpublished report held by the Department of Conservation, Wellington. 24p.

Glossary

ACAP – Agreement on the Conservation of Albatrosses and Petrels

Annual plans – such plans are currently referred to as Annual Operating Plans (AOPs) by MPI and include specification of services for the period 01 July through the following 30 June.

Annual review reports – such reviews are currently referred to as Annual Review Reports (ARRs) by MPI and include review of fisheries for the period 01 July through the following 30 June.

Bottom longline – a demersal longline, see http://www.fao.org/fishery/fishtech/search/en for a detailed description of this fishing method.

BPTG – Best Practice Technical Guidelines

Captures – captures of seabirds includes any interaction where the bird is captured by the fishing gear, noting that this can include seabirds being killed, seabirds being released alive and unharmed, or seabirds which whilst released alive may not survive.

CCAMLR – Commission for the Conservation of Antarctic Living Resources

CCSBT – Commission for the Conservation of Southern Bluefin Tuna

CI – Confidence Interval

Continuous improvement – refers to the longstanding business practice of seeking improvement in performance through a process or cycle of i) identifying a problem or issue, ii) taking remedial action, iii) reviewing the effectiveness of the action and iv) modifying or refining the remedial action in light of the review. Although major breakthroughs are sometimes achieved in the process or cycle the general expectation is that performance will be improved through incremental changes. A key element in the practice is the involvement of the workers or staff closest to the relevant actions and the idea that effective changes can emerge from their observations and recommendations. (Although there have been many developments and variations, the origin of the practice is often attributed to the work of W. Edwards Deming with the motor industry in post war Japan and later with Ford Motors in the USA in the 1980s).

Deepwater fisheries – fisheries which target species occurring in deeper water, typically offshore and on the continental shelf and slope. Examples include squid trawl, jack mackerel trawl and scampi trawl. Within this NPOA-Seabirds 2013 the term "deepwater" refers to the fisheries managed through MPI's National Fisheries Plan Deepwater and Middle Depth Fisheries. This differs from some other uses of the term "deepwater fisheries" (including within the level 2 seabird risk assessment report of Richard *et al.* [2011]), where it describes only the very deepwater complex of fisheries, such as oreo and cardinalfish and excludes the middle-depth fisheries, such as hoki, squid etc.

DOC – Department of Conservation

Dropline(s) – a subset of demersal longline fishing, see http://www.fao.org/fishery/fishtech/search/en for a detailed description of this fishing method.

EEZ – Exclusive Economic Zone

Five year plans – such plans are currently referred to as National Fisheries Plans by MPI and currently cover deepwater fisheries, HMS fisheries and inshore fisheries.

HMS – Highly Migratory Species

ICFA – International Coalition of Fisheries Associations

IPOA-Seabirds – International Plan of Action for reducing incidental catch of seabirds in longline fisheries

IUCN – International Union for the Conservation of Nature

MFAT – Ministry of Foreign Affairs and Trade

MPI – Ministry for Primary Industries

Netsonde cable – a wire that transmits data from sounders on a trawl net to on-board monitors on a fishing vessel (trawler). These are sometimes referred to as a third wire.

New Zealand seabirds – all seabird species absolutely or partially protected under the New Zealand Wildlife Act 1953. All seabird species absolutely or partially protected under the New Zealand Wildlife Act 1953 (New Zealand seabirds). Note that this includes all seabirds that occur within New Zealand fisheries waters, whether New Zealand breeding or not, except for the species listed in Schedule 5 to the Wildlife Act (currently one species – black backed gull – is not protected).

NGO – Non Government Organisation

Non-commercial fisheries – recreational and customary fisheries.

PBR – Potential Biological Removals

Purse seine – see http://www.fao.org/fishery/fishtech/search/en for a detailed description of this fishing method.

R – Regulated

RFMO(s) – Regional Fisheries Management Organisation(s)

Set net – a gill net, see http://www.fao.org/fishery/fishtech/search/en for a detailed description of this fishing method.

SM – Self-Managed

Snood – side branch of a fishing line that is attached to the main long line. The snood terminates in a hook. A snood is also called a branchline, a ganglion or a trace.

SSS – Southern Seabird Solutions Trust

Surface/Pelagic longline – see http://www.fao.org/fishery/fishtech/search/en for a detailed description of this fishing method.

Streamer line – a line with streamers that is towed from a high point on the vessel at or near the stern. The streamers deter seabirds from gaining access to baited hooks, and create a visual deterrent near warp cables. A streamer line is also known as a tori line or a bird scaring line.

Trawl – see http://www.fao.org/fishery/fishtech/search/en for a detailed description of this fishing method.

UNCLOS – United Nations Convention on the Law of the Sea

UNFAO – United Nations Food and Agriculture Organisation

V – Voluntary

VMS – Vessel Monitoring System

Warps – steel cables that are attached to a trawl net and tow it through the water.

WCPFC – Western and Central Pacific Fisheries Commission