

Conservation Services Programme

DRAFT

Seabird population medium term research plan 2014

February 2014

Conservation Services Programme

Department of Conservation

1. Purpose

The Conservation Services Programme (CSP) undertakes research to understand and address the effects of commercial fishing on protected species in New Zealand fisheries waters (for further details see the [CSP Strategic Statement 2013](#)).

This CSP seabird population medium term research plan 2014 (CSP seabird plan 2014) outlines a five year research programme to deliver on the seabird population research component of CSP. It has been developed as part of the work of the CSP Research Advisory Group ([CSP RAG](#)), and will be used in the development of CSP Annual Plans and any other relevant delivery mechanisms.

Seabird population research that falls outside the scope and mandate of CSP is not included in this plan.

2. Guiding objectives and risk framework

This plan is guided by the relevant objectives of CSP and the National Plan of Action – 2013 to reduce the incidental catch of seabirds in New Zealand Fisheries ([NPOA-Seabirds](#)). These are summarised in Table 1.

The risk referred to in the guiding objectives is the risk of commercial fisheries to New Zealand seabird populations. For the purposes of the implementation of the NPOA-Seabirds, and of this plan, risk estimation will primarily be based on the findings of Richard & Abraham (2013) and any future updates of that approach. Richard & Abraham (2013) compare estimated bycatch in New Zealand commercial trawl, longline and setnet fisheries to the Potential Biological Removal (PBR) for the majority of seabird taxa breeding in New Zealand.

As the CSP mandate covers all commercial fishing methods, this plan will also consider species for which risk from any other commercial fisheries has been identified. For the purposes of this plan the expert-opinion based qualitative risk assessment by Rowe (2013) will be the primary assessment for fisheries not included by Richard & Abraham (2013).

3. Data requirements

Addressing the relevant CSP and NPOA-Seabirds five-year objectives summarised in Table 1 requires the availability of certain seabird population information. In order to accurately estimate, and measure change in, fisheries risk to seabird species using the approach of Richard & Abraham (2013), the following seabird population inputs are required:

- number of annual breeding pairs (N_{BP});

- proportion of adults breeding in a given year (P_B);
- age at first reproduction (A);
- annual adult survival rate (S_A); and
- spatial distribution.

A summary of existing relevant literature has been produced for the CSP RAG (posted on the [3 Dec 2013 meeting page](#)). This plan describes a research programme to fill knowledge gaps and obtain updated estimates for the seabird population inputs listed above for higher risk seabird taxa and/or where current estimates are most uncertain.

The guiding objectives from both the NPOA-Seabirds and CSP relate to populations. The taxonomy of some seabirds remains uncertain, even at the species level. In order to understand population level risk, it is important to understand which breeding sites represent distinct populations, whether at a formal subspecies level (e.g. Gibson's and Antipodean albatross) or not. Where taxonomic experts are uncertain, or in disagreement, conducting further taxonomic work is required to meet the guiding objectives.

Other sources of information, particularly around estimation of capture rates in fisheries, is also of great importance in accurately estimating risk. This information is generally best obtained via vessel observation programmes, and is therefore not considered in this plan which focuses on population information, not interaction information.

4. Current risk and uncertainty

Table 2 lists all 25¹ seabird taxa that Richard & Abraham (2013) found to have a risk ratio with the upper 95% confidence interval exceeding 0.1 (see Richard & Abraham 2013 for full details). These taxa have been given relative risk scores from low to very high. For these 25 taxa Table 2 also indicates the findings of an expert review workshop that considered the results of Richard & Abraham (2013), and determined whether the risk ratios were reasonable, likely over-estimated or likely under-estimated (MPI 2014).

Table 2 also lists risk identified from commercial fisheries other than those considered by Richard & Abraham (2013), where the risk for any seabird taxon was found to be moderate or higher by Rowe (2013). This results in six additional seabird taxa being listed.

In addition to summarising the risk from commercial fisheries for each seabird taxon, Table 2 also provides both the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species classification and the New Zealand Conservation Status for each taxon. It should be noted that for several taxa listed the IUCN classification is for a higher level taxonomic level (all are at global species level).

¹ Note, yellow-eyed penguin – mainland population, was not reported in Richard & Abraham (2013), but calculated subsequently using the same methods.

A summary of the key sources of uncertainty in the risk estimates of Richard & Abraham (2013) for the 31 seabird taxa considered in this plan is provided in Table 3. The uncertainty in risk arising from uncertainty in a range of parameters is provided. Of relevance to this plan is the uncertainty around parameters A , S_A , N_{BP} and P_B (see Section 3 above). This research plan is focussed on obtaining better estimates of those parameters, which contribute most uncertainty in risk estimates, as well as conducting baseline population monitoring for at risk taxa, spatial tracking and taxonomic determination.

5. Research plan

As well as providing information on sources of uncertainties in current risk estimates Table 3 also provides the CSP research response to obtain better information required to meet the relevant NPOA-Seabirds and CSP objectives. The CSP research response has been developed using the following principles:

- updated total population estimate for seabird taxa where there is considerable uncertainty arising from current N_{BP} estimate, or where initial work has indicated a potential decline;
- annual mark-recapture studies to estimate population parameters, including S_A , for those seabird taxa where there is considerable uncertainty arising from current the S_A estimate, and where there are existing studies in place or new studies are logistically easy and relatively low cost;
- investigation of feasibility for establishing annual mark-recapture studies to estimate population parameters, including S_A , for those seabird taxa where there is considerable uncertainty arising from the current S_A estimate, and where there are no existing studies in place and/or breeding sites are logistically difficult to access with associated higher cost;
- tracking studies for seabird taxa where little or no information exists and/or those taxa at particularly high risk where more detailed tracking information can inform spatial fisheries management responses;
- taxonomic investigation to clarify species taxonomy and understand which breeding sites represent distinct populations;
- routine population monitoring for all seabird taxa at medium or higher relative risk from Richard & Abraham (2013), or for species where the risk assessment may be underestimated; and
- routine population monitoring for all seabird taxa at moderate or higher relative risk from fisheries other than those assessed by Richard & Abraham (2013) (Rowe, 2013), and with a New Zealand Conservation Status of Threatened.

In order to plan a five-year research programme to deliver the CSP research response described in Table 3, some further operational principles were used:

- studies on highest risk species prioritised for earlier years;
- annual grouping of projects by location, in order to maximise cost effectiveness, for example a focus in the Chatham Islands in 2015/16, Campbell Island in 2016/17 and Antipodes Island 2017/18;
- conduct mark-recapture and tracking studies together, and time total population estimates to coincide with these where appropriate;
- routine monitoring (of whole population or a sample, as appropriate and feasible for the taxon) at 3 year intervals;
- aim to leverage from existing studies; and
- prioritise taxonomic and review projects in early year as these are relatively low cost and may result in finding current risk estimates are under-estimated for potential new taxa.

These principles were used to develop a five-year research plan, which is summarised in Table 4.

6. References

- Ministry for Primary Industries 2014. Review Workshop for the Level Two Seabird Risk Assessment. Draft report of a workshop held 19/20 November 2013 at the Mercy Conference Centre, Guildford Terrace, Wellington. 68 p.
- Richard, Y.; Abraham, E.R. 2013 Risk of commercial fisheries to New Zealand seabird populations. [*New Zealand Aquatic Environment and Biodiversity Report No. 109.*](#)
- Rowe, S. 2013: Level 1 risk assessment for incidental seabird mortality associated with fisheries in New Zealand's Exclusive Economic Zone. [*DOC Marine Conservation Services Series 10.*](#) Department of Conservation, Wellington. 58 p.

Tables

Table 1. Guiding objectives.

Objective type	Objective	
NPOA-Seabirds Long term objective	“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”	
	Biological Risk	Research & Development
NPOA-Seabirds High level subsidiary objectives	“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”	“Research outputs relating to seabird biology, demography and ecology provide a robust basis for understanding and mitigating seabird incidental mortality”
NPOA-Seabirds Five year objectives	“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”	“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”
CSP Objective	“Adequate information on population level and susceptibility to fisheries effects exists for protected species populations identified as at medium or higher risk from fisheries”	

Table 2. Seabird taxa at risk from commercial fishing. L2 risk – relative risk score based on Richard & Abraham (2013) VH = very high, H = high, M = medium, L= low, (L2 review – MPI 2014) + = over-estimated, - = under-estimated; other fishery – fisheries other than those considered by Richard & Abraham (2013) which pose moderate or higher risk; L1 risk – Rowe (2013); IUCN Threat – [IUCN Red List 2013](#); NZ Threat – T = Threatened, AR = At Risk, NT = Not Threatened [Robertson et al \(2013\)](#). * = assessed at species level.

Common name	Scientific name	L2 risk	Other fishery	L1 risk	IUCN Threat status	NZ Threat status
Black petrel	<i>Procellaria parkinsoni</i>	VH(+)	Hand line Purse seine light Troll	Mod Mod Mod	Vulnerable	T Vulnerable
Salvin's albatross	<i>Thalassarche salvini</i>	VH			Vulnerable	T Critical
Flesh-footed shearwater	<i>Puffinus carneipes</i>	VH	Hand line Purse seine light	Mod Mod	Least Concern	T Vulnerable
Southern Buller's albatross	<i>Thalassarche bulleri bulleri</i>	VH(+)			Near Threatened*	AR Uncommon
Chatham Island albatross	<i>Thalassarche eremite</i>	VH(+)			Vulnerable	AR Uncommon
New Zealand white-capped albatross	<i>Thalassarche steadi</i>	VH(+)			Near Threatened	AR Declining
Northern Buller's albatross	<i>Thalassarche bulleri platei</i>	H(+)			Near Threatened*	AR Uncommon
Gibson's albatross	<i>Diomedea antipodensis gibsoni</i>	H(-)			Vulnerable*	T Critical
Snares Cape petrel	<i>Daption capense austral</i>	H(+)			Least Concern*	AR Uncommon
Antipodean albatross	<i>Diomedea antipodensis antipodensis</i>	H(-)			Vulnerable*	T Critical
Northern royal albatross	<i>Diomedea sanfordi</i>	M(+)			Endangered	AR Uncommon
Southern royal albatross	<i>Diomedea epomophora epomophora</i>	M(+)			Vulnerable	AR Uncommon
Westland petrel	<i>Procellaria westlandica</i>	M			Vulnerable	AR Uncommon
Northern giant petrel	<i>Macronectes halli</i>	M			Least Concern	AR Uncommon
White-chinned petrel	<i>Procellaria aequinoctialis</i>	M			Vulnerable	AR Declining
Spotted shag	<i>Stictocarbo punctatus</i>	M			Least Concern	NT
Campbell Island albatross	<i>Thalassarche impavida</i>	M(+)			Vulnerable	AR Uncommon
Yellow-eyed penguin - mainland	<i>Megadyptes antipodes</i>	M			Endangered*	T Vulnerable*
Grey petrel	<i>Procellaria cinerea</i>	M(+)			Near Threatened	AR Uncommon
Little black shag	<i>Phalacrocorax sulcirostris</i>	L(+)			Least Concern	AR Uncommon
Yellow-eyed penguin – all populations	<i>Megadyptes antipodes</i>	L			Endangered	T Vulnerable
Kermadec white-faced storm petrel	<i>Pelagodroma albiclunis</i>	L			Least Concern*	T Critical
Pied shag	<i>Phalacrocorax varius varius</i>	L(+)			Least Concern*	T Vulnerable
Stewart Island shag	<i>Leucocarbo chalconotus</i>	L(+)			Vulnerable	T Vulnerable
New Zealand king shag	<i>Leucocarbo carunculatus</i>	L(-)	Trap & Pot	Mod	Vulnerable	T Endangered
New Zealand storm petrel	<i>Oceanites maorianus</i>		Purse seine light	Extreme	Endangered	T Endangered
Pitt Island shag	<i>Stictocarbo featherstoni</i>		Trap & Pot	High	Endangered	T Critical
Chatham Island shag	<i>Leucocarbo onslowi</i>		Trap & Pot	Mod	Critically Endangered	T Critical
Pycroft's petrel	<i>Pterodroma pycrofti</i>		Purse seine light	Mod	Vulnerable	AR Recovering
North Island little shearwater	<i>Puffinus assimilis haurakiensis</i>		Purse seine light	Mod	Least Concern*	AR Recovering
New Zealand white-faced storm petrel	<i>Pelagodroma marina maoriana</i>		Purse seine light	Mod	Least Concern*	AR Relict

Table 3. Risk uncertainty due to underlying parameters and CSP research response. Values are the percentage reduction in the 95% confidence interval of the risk ratio that occurs when the parameter is set to its arithmetic mean. See Richard & Abraham (2013) for full details. The parameters are: annual potential fatalities in trawl, bottom longline, surface longline and set-net fisheries (TWL, BLL, SLL, SN, respectively); the cryptic multipliers (CM); age at first reproduction (A); adult survival (S_A); the number of annual breeding pairs (N_{BP}); and the proportion of adults breeding (P_B). CSP research response: M-R = Mark-recapture study to estimate demographic parameters including S_A; Pop Est = total population estimate; Monitor = routine monitoring of population trend; Track = collecting spatial tracking information; Taxonomy = requires taxonomic investigation. I = investigate feasibility.

Common name	Risk parameter									CSP research response				
	TWL	BLL	SLL	SN	CM	A	S _A	N _{BP}	P _B	M-R	Pop Est	Monitor	Track	Taxonomy
Black petrel	1	14	0	0	4	1	30	8	2	Y	Y	Y	Y	
Salvin's albatross	7	0	0	0	4	1	27	24	1		Y	Y		
Flesh-footed shearwater	6	7	0	0	1	1	42	7	2	Y	Y	Y	Y	
Southern Buller's albatross	9	1	1	0	1	1	51	7	2	Y	Y	Y		
Chatham Island albatross	3	24	1	0	7	3	27	6	0			Y		
New Zealand white-capped albatross	1	0	0	0	2	0	61	19	0	I	Y	Y		
Northern Buller's albatross	1	4	6	0	0	0	47	5	1			Y		
Gibson's albatross	3	1	12	1	2	1	45	9	2	Y		Y	Y	
Snares Cape petrel	0	4	1	0	0	0	38	29	0	I	Y	Y	Y	
Antipodean albatross	2	4	18	0	4	1	16	9	5	Y		Y	Y	
Northern royal albatross	1	2	3	0	0	0	22	32	0		Y	Y		
Southern royal albatross	3	2	20	1	5	1	14	9	5			Y		
Westland petrel	27	6	11	1	3	0	8	15	1		Y	Y		
Northern giant petrel	23	0	0	0	2	0	36	8	0	I		Y		
White-chinned petrel	7	0	0	0	0	0	21	35	0	I	Y	Y	Y	Y
Spotted shag	13	0	2	1	8	11	2	38	1		Y	Y		Y
Campbell Island albatross	3	17	1	0	0	0	2	34	0		Y	Y		
Yellow-eyed penguin - mainland	0	5	0	31	2	1	14	5	2			Y		Y
Grey petrel	3	10	5	0	0	2	30	26	2	I	Y	Y		
Little black shag	13	0	9	3	3	8	3	19	1					
Yellow-eyed penguin - all populations	0	5	0	31	2	1	14	5	2					
Kermadec white-faced storm petrel	0	0	0	0	0	0	16	64	0					
Pied shag	0	2	9	22	0	0	0	33	0					
Stewart Island shag	13	0	0	50	0	1	1	1	0					
New Zealand king shag	1	56	0	9	0	0	0	0	0			Y	Y	
New Zealand storm petrel	27	0	0	18	0	0	1	79	0		Y	Y	Y	
Pitt Island shag	0	86	0	0	0	1	0	6	0			Y	Y	
Chatham Island shag	1	93	0	0	0	0	0	2	0			Y	Y	
Pycroft's petrel	0	42	5	1	3	0	16	5	0					
North Island little shearwater	2	44	2	0	0	1	7	9	0					
New Zealand white-faced storm petrel	5	19	2	7	1	0	7	31	0					

Table 4. Five year CSP seabird research plan. M-R study = Mark-recapture study to estimate demographic parameters including S_A ; Pop est = population estimate; Track = spatial tracking project; Taxonomy = requires taxonomic investigation. I = investigate feasibility; Antip = Antipodes Island; Auck Is = Auckland Islands; Bounty = Bounty Islands; Campbell = Campbell Island; Chat = Chatham Islands; GBI = Great Barrier Island; LBI = Little Barrier Island; Snares = The Snares.

Common name	2014/15	2015/16	2016/17	2017/18	2018/19
Black petrel	M-R study & track GBI Pop est GBI, LBI	M-R study GBI Pop est GBI, LBI	M-R study GBI	Review	
Salvin's albatross	Pop est Bounty & Snares	Pop est Bounty	Review		
Flesh-footed shearwater	M-R study & track	M-R study & track Pop est various	M-R study	M-R study review	Pop est various
Southern Buller's albatross	M-R study	M-R study	M-R study Pop est Snares	M-R study	M-R study
Chatham Island albatross		Pop est Chat			Pop est Chat
New Zealand white-capped albatross	Pop est Auck Is Investigate M-R study	Pop est Auck Is	Review		
Northern Buller's albatross		Pop est Chat			Pop est
Gibson's albatross	M-R study & track Pop est	M-R study	M-R study	Review M-R study Pop est	
Snares Cape petrel	Investigate M-R study		Pop est Snares		
Antipodean albatross	M-R study & track Pop est Antip	M-R study	M-R study	Review M-R study Pop est Antip	
Northern royal albatross		Pop est Chat			Pop est Chat
Southern royal albatross			Pop est Campbell		
Westland petrel			Pop est mainland		
Northern giant petrel	Pop est Antip	Investigate M-R study Pop est Chat Pop est Auck Is	Pop est Campbell		
White-chinned petrel	Investigate M-R study Track Auck Is Taxonomic study	Pop est & track Auck Is	Pop est Campbell	Pop est Antip	
Spotted shag	Pop est review year 1	Pop est review year 2 Taxonomic study	Review		
Campbell Island albatross			Pop est Campbell		
Yellow-eyed penguin - mainland	Taxonomic study Pop est mainland		Pop est mainland		Pop est mainland
Grey petrel		Investigate M-R study	Pop est Campbell	Pop est Antip	
New Zealand king shag	Pop est mainland	Track mainland	Pop est mainland		Pop est mainland
New Zealand storm petrel	Pop est LBI			Pop est LBI	
Pitt Island shag		Pop est & track Chat			Pop est Chat
Chatham Island shag		Pop est & track Chat			Pop est Chat