CSP Research Advisory Group

December 2019

Department of Conservation
Te Papa Atawhai

New Zealand Government

Contents

Purpose and Scope of CSP RAG
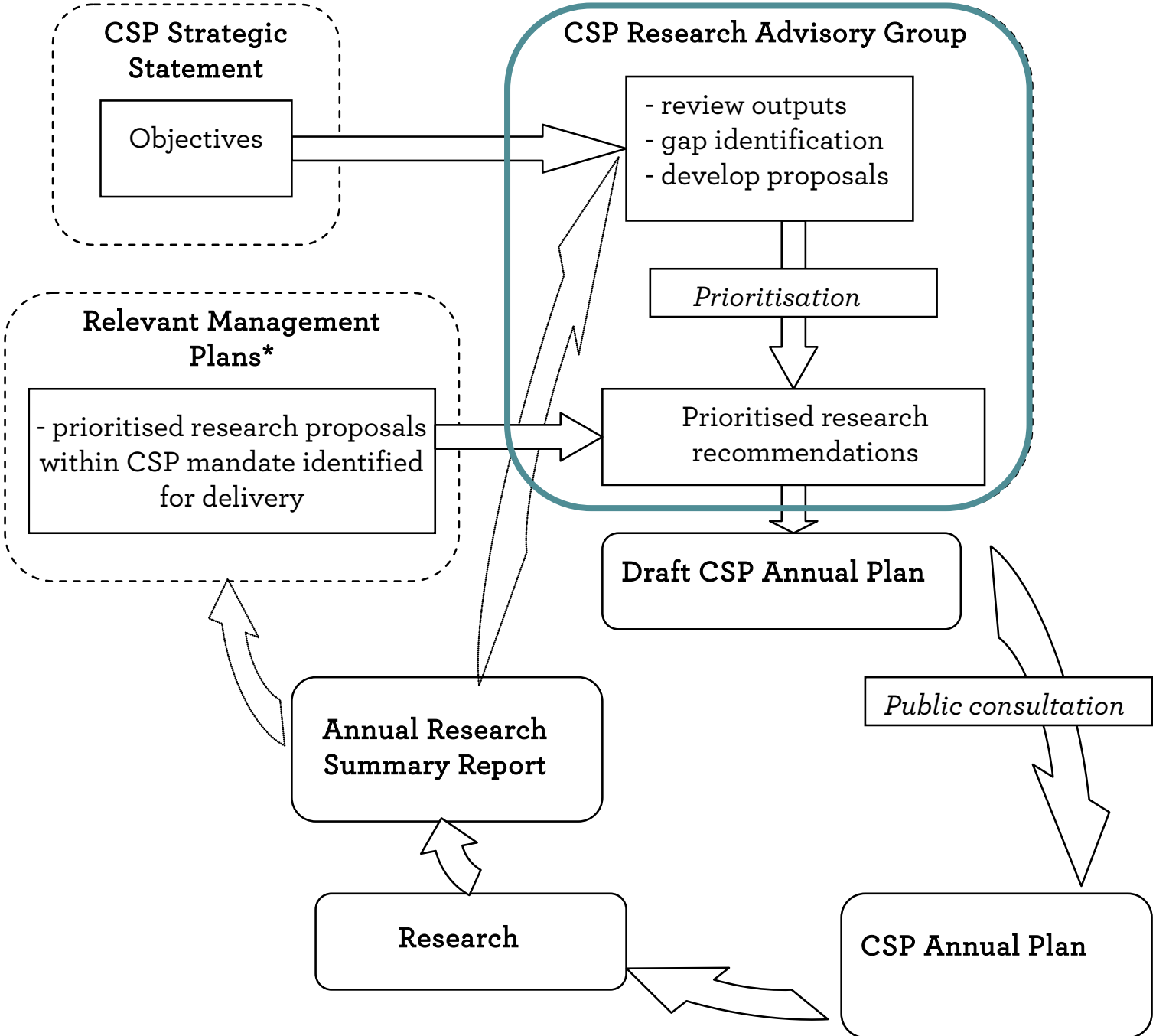
Purpose and Scope of CSP RAG

December

Review of progress in relevant research and other activities

Identify research gaps within the CSP mandate

February

Prioritise research gaps

Recommend to DOC prioritised research projects for the inclusion in the CSP Annual Plan

CSP Strategic Statement

- Revised Dec 2018
- Changes made to reflect:
    - New organisational structures
    - Progress on initialisation and review of TMPs
    - NPOA reviews
    - DOC/government plans
    - Updated risk assessments/reports

CSP Objectives

A: Proven mitigation strategies are in place to avoid or minimise the adverse effects of commercial fishing on protected species across the range of fisheries with known interactions.
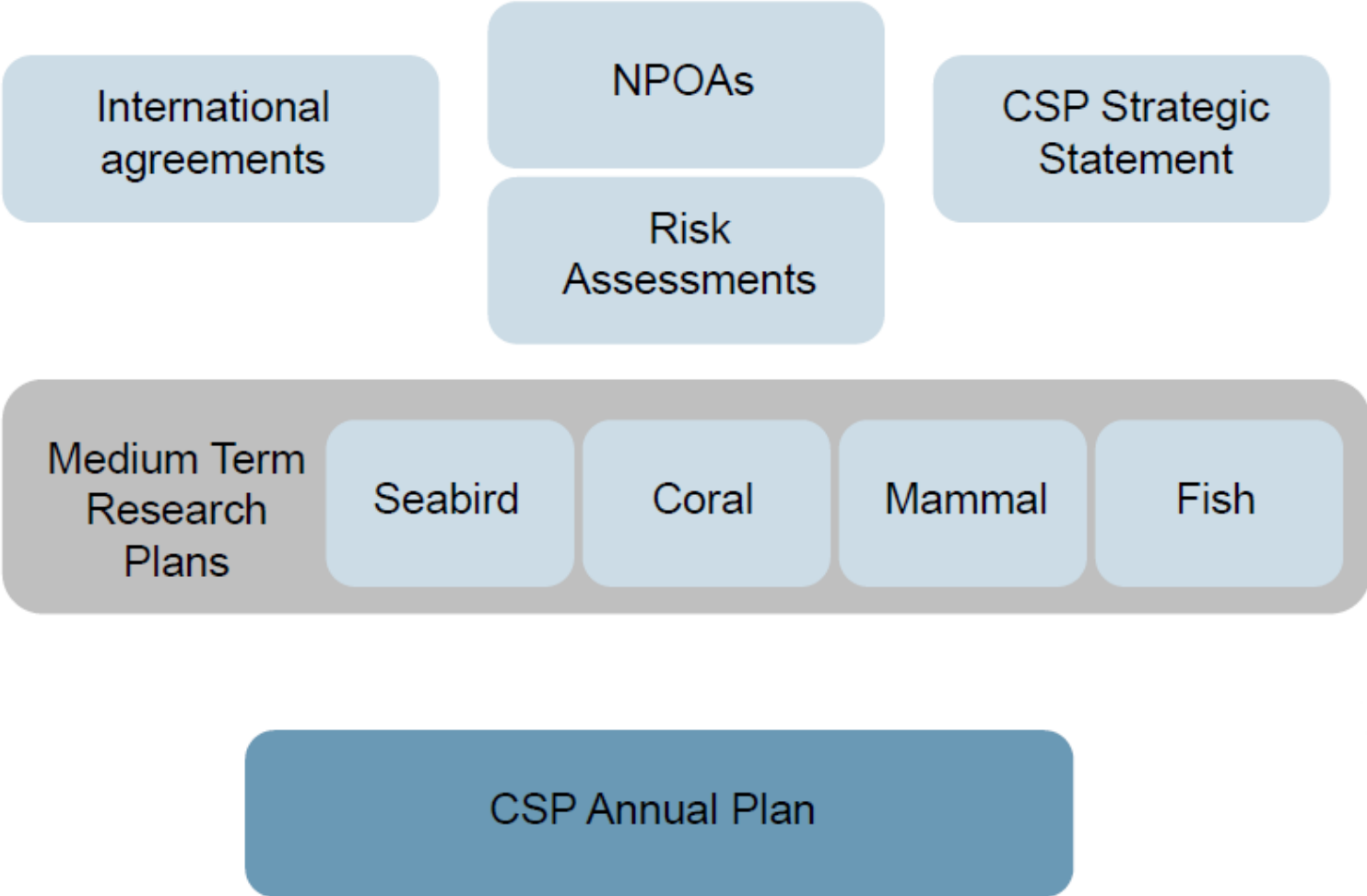
B: The nature of direct adverse effects of commercial fishing on protected species is described.

C: The extent of known adverse effects of commercial fishing on protected species is adequately understood.

D: The nature and extent of indirect adverse effects of commercial fishing are identified and described for protected species that are at particular risk to such effects.

E: Adequate information on population level and susceptibility to fisheries effects for protected species populations identified as at medium or higher risk from fisheries.

Medium Term Research Plans

International agreements

NPOAs

CSP Strategic Statement

Risk Assessments

Medium Term Research Plans | Seabird | Coral | Mammal | Fish

CSP Annual Plan

Seabird 5 year plan

Common name	Scientific name	L2 risk 2017	L2 risk 2015	Other fishery	L1 risk	IUCN Threat status	NZ Threat status
Black petrel	*Procellaria parkinsoni*	1.15 (VH)	✓	Hand line Purse seine light Troll	Moderate Moderate Moderate	Vulnerable	T Vulnerable
Salvin's albatross	*Thalassarche salvini*	0.78 (H)	✓			Vulnerable	T Critical
Flesh-footed shearwater	*Puffinus carneipes*	0.67 (H)	✓	Hand line Purse seine light	Moderate Moderate	Near threatened	T Vulnerable
Westland petrel	*Procellaria westlandica*	0.48 (H)	✓			Vulnerable	AR Uncommon
Southern Buller's albatross	*Thalassarche bulleri bulleri*	0.39 (H)	✓			Near threatened *	AR Uncommon
Chatham Island albatross	*Thalassarche eremite*	0.36 (H)	✓			Near threatened	AR Uncommon
New Zealand white-capped albatross	*Thalassarche steadi*	0.35 (H)	✓			Near threatened	AR Declining
Gibson's albatross	*Diomedea antipodensis gibsoni*	0.34 (H)	✓			Vulnerable *	T Critical
Northern Buller's albatross	*Thalassarche bulleri platei*	0.25 (M)	✓			Near threatened *	AR Uncommon
Antipodean albatross	*Diomedea antipodensis antipodensis*	0.20 (M)	✓			Vulnerable *	T Critical
Yellow-eyed penguin (mainland)	*Megadyptes antipodes*	0.18 (M)	✓			Endangered	T Endangered*
Otago shag	*Leucocarbo chalconotus,*	0.14 (M)	✓			Vulnerable *	AR Recovering
Northern giant petrel	*Macronectes halli*	0.14 (M)	✓			Least concern	AR Recovering
Spotted shag	*Stictocarbo punctatus*	0.09 (L)	✓			Least concern	NT
Yellow-eyed penguin	*Megadyptes antipodes*	0.08 (L)	✓			Endangered	T Endangered
Campbell black-browed albatross	*Thalassarche impavida*	0.08 (L)	✓			Vulnerable *	T Vulnerable
White-chinned petrel	*Procellaria aequinoctialis*	0.05 (N)	✓			Vulnerable	NT
Northern royal albatross	*Diomedea sanfordi*	0.04 (L)	✓			Endangered	AR Uncommon
Foveaux shag	*Leucocarbo stewarti*	0.04 (N)	✓			Vulnerable *	T Vulnerable
Grey petrel	*Procellaria cinerea*	0.04 (N)	✓			Near threatened	AR Uncommon
Southern royal albatross	*Diomedea epomophora epomophora*	0.02 (N)	✓			Vulnerable	AR Uncommon
Chatham petrel	*Pterodroma axillaris*	<0.01 (N)	✓			Vulnerable	T Vulnerable
Chatham Island taiko	*Pterodroma magentae*	<0.01 (N)	✓			Critically endangered	T Critical
Snares Cape petrel	*Daption capense austral*	<0.01 (N)	✓			Least concern *	AR Uncommon
Little black shag	*Phalacrocorax sulcirostris*	<0.01 (N)	✓			Least concern	AR Uncommon
Fiordland crested penguin	*Eudyptes pachyrhynchus*	<0.01 (N)	✓			Vulnerable	T Vulnerable
Grey-headed albatross	*Thalassarche chrysostoma*	<0.01 (N)	✓			Endangered	T Vulnerable
Light-mantled sooty albatross	*Pheobetria palpebrata*	<0.01 (N)	✓			Near threatened	AR Declining
New Zealand white-faced storm petrel	*Pelagodroma marina maoriana*	<0.01 (N)		Purse seine light	Moderate	Least concern	AR Relict
North Island little shearwater	*Puffinus assimilis haurakiensis*	<0.01 (N)		Purse seine light	Moderate	Least concern*	AR Recovering
Chatham Island shag	*Leucocarbo onslowi*	<0.01 (N)		Trap & Pot	Moderate	Critically endangered	T Critical
New Zealand king shag	*Leucocarbo carunculatus*	<0.01 (N)	✓	Trap & Pot	Moderate	Vulnerable	T Endangered
New Zealand storm petrel	*Pealeornis maoriana*	<0.01 (N)	✓	Purse seine light	Extreme	Critically endangered	T Vulnerable
Pitt Island shag	*Stictocarbo featherstoni*	<0.01 (N)		Trap & Pot	High	Endangered	T Critical
Pycroft's petrel	*Pterodroma pycrofti*	<0.01 (N)		Purse seine light	Moderate	Vulnerable	AR Recovering

Seabird plan:
Research progress & gaps

Common name	2019/20	2020/21
Black petrel		Juvenile recruitment study
Salvin's albatross	Pop est & Track Bounty	
	Nest camera analysis	
Flesh-footed shearwater		
Westland petrel		
Southern Buller's albatross		
Chatham Island albatross		
New Zealand white-capped albatross	Pop est Auck Is	Pop est Auck Is
Gibson's albatross	Pop est Auck Is	Pop est Auck Is
Northern Buller's albatross	Pop est Chat	
Antipodean albatross		
Yellow-eyed penguin (mainland)		
Otago shag		Pop est mainland
Northern giant petrel		Pop est Campbell
		Tracking study Chatham's
Spotted shag	Pop est & taxonomy review year 2	
Campbell black-browed albatross		Pop est Campbell
White-chinned petrel		Pop est Campbell
		Pop est Antip
Northern royal albatross	Pop est Chat	Banding study
Foveaux shag		
Grey petrel		
Snares Cape petrel	Pop est & Track Snares	
Little black shag		Pop est mainland
Fiordland crested penguin		Pop est & Track mainland
		Investigate M-R study
Grey-headed albatross		
Light-mantled sooty albatross		Pop est & Track Adams
New Zealand white-faced storm petrel	Pop est Chat	Pop est mainland
North Island little shearwater		Pop est mainland
Chatham Island shag	Pop est & Track Chat	
New Zealand king shag		
New Zealand storm petrel		Pop est & Track LBI
Pitt Island shag	Pop est & Track Chat	

Seabird plan:

Mitigation

Risk ratio broken down by fishery for species identified with low through to very high L2 risk for aid in prioritisation of mitigation efforts

Common Name	Deepwater trawl	Flatfish trawl	Hake trawl	Hoki trawl	Inshore trawl	Jack mackerel trawl	Ling trawl	Middle depth trawl	SBW trawl	Scampi trawl	Squid trawl
Black petrel	0.0020	0.0000	0.0000	0.0090	0.2020	0.0000	0.0000	0.0070	0.0000	0.0110	0.0000
Salvin's albatross	0.0220	0.0280	0.0040	0.1200	0.2980	0.0000	0.0110	0.0850	0.0090	0.0770	0.0020
Flesh-footed shearwater	0.0010	0.0080	0.0000	0.0080	0.2860	0.0000	0.0020	0.0090	0.0000	0.0320	0.0000
Westland petrel	0.0000	0.0470	0.0080	0.0680	0.1465	0.0000	0.0040	0.0310	0.0000	0.0000	0.0000
Southern Buller's albatross	0.0010	0.0120	0.0060	0.1440	0.0260	0.0020	0.0050	0.0440	0.0000	0.0070	0.0480
Chatham Island albatross	0.0600	0.0000	0.0000	0.0150	0.0050	0.0000	0.0000	0.0050	0.0000	0.0020	0.0000
New Zealand white-capped albatross	0.0000	0.0530	0.0040	0.0420	0.1530	0.0010	0.0060	0.0320	0.0000	0.0080	0.0280
Gibson's albatross	0.0020	0.0000	0.0000	0.0000	0.0040	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Northern Buller's albatross	0.0020	0.0000	0.0000	0.0330	0.0120	0.0000	0.0000	0.0150	0.0000	0.0300	0.0000
Antipodean albatross	0.0020	0.0000	0.0000	0.0000	0.0030	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Yellow-eyed penguin (mainland)	0.0000	0.0030	0.0000	0.0000	0.0030	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Otago shag	0.0000	0.1310	0.0000	0.0000	0.0110	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Foveaux shag	0.0000	0.0320	0.0000	0.0000	0.0030	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Northern giant petrel	0.0050	0.0000	0.0000	0.0300	0.0040	0.0000	0.0000	0.0080	0.0000	0.0080	0.0000
Spotted shag	0.0000	0.0630	0.0000	0.0000	0.0190	0.0000	0.0000	0.0020	0.0000	0.0000	0.0000
Yellow-eyed penguin	0.0000	0.0030	0.0000	0.0000	0.0030	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Campbell black-browed albatross	0.0000	0.0020	0.0000	0.0100	0.0030	0.0000	0.0010	0.0030	0.0020	0.0030	0.0000
Northern royal albatross	0.0010	0.0020	0.0000	0.0020	0.0040	0.0000	0.0000	0.0010	0.0000	0.0000	0.0010
White-chinned petrel	0.0000	0.0010	0.0000	0.0060	0.0010	0.0000	0.0000	0.0010	0.0000	0.0060	0.0090
Northern royal albatross	0.0010	0.0020	0.0000	0.0020	0.0040	0.0000	0.0000	0.0010	0.0000	0.0000	0.0010
Foveaux shag	0.0000	0.0320	0.0000	0.0000	0.0030	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Grey petrel	0.0000	0.0010	0.0000	0.0010	0.0020	0.0000	0.0000	0.0000	0.0060	0.0000	0.0000
Southern royal albatross	0.0000	0.0000	0.0000	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010
Snares Cape petrel	0.0000	0.0000	0.0010	0.0020	0.0000	0.0000	0.0010	0.0010	0.0000	0.0000	0.0000

Seabird plan:

Mitigation

Risk ratio broken down by fishery for species identified with low through to very high L2 risk for aid in prioritisation of mitigation efforts (continued)

Common Name	Bluenose BLL	Hapuka BLL	Large ling BLL	Minor BLL	Small ling BLL	Snapper BLL	Large SLL	Small SLL	Swordfish SLL	Setnet
Black petrel	0.1840	0.0620	0.0000	0.0350	0.0000	0.2180	0.0000	0.2890	0.0260	0.0000
Salvin's albatross	0.0000	0.0020	0.0020	0.0050	0.0880	0.0000	0.0000	0.0040	0.0000	0.0000
Flesh-footed shearwater	0.0010	0.0380	0.0000	0.0410	0.0010	0.1850	0.0000	0.0180	0.0050	0.0075
Westland petrel	0.0000	0.0090	0.0000	0.0100	0.0220	0.0000	0.0000	0.0470	0.0030	0.0150
Southern Buller's albatross	0.0010	0.0010	0.0030	0.0010	0.0170	0.0000	0.0140	0.0400	0.0000	0.0000
Chatham Island albatross	0.0000	0.0060	0.0090	0.0080	0.2025	0.0000	0.0000	0.0000	0.0000	0.0000
NZ white-capped albatross	0.0000	0.0000	0.0000	0.0000	0.0030	0.0000	0.0010	0.0150	0.0010	0.0000
Gibson's albatross	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1090	0.1930	0.0000
Northern Buller's albatross	0.0030	0.0040	0.0030	0.0030	0.0210	0.0010	0.0000	0.1030	0.0010	0.0000
Antipodean albatross	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0710	0.0980	0.0000
Yellow-eyed penguin (mainland)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0570
Otago shag	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Northern giant petrel	0.0000	0.0160	0.0000	0.0070	0.0000	0.0050	0.0000	0.0000	0.0000	0.0000
Spotted shag	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0050
Yellow-eyed penguin	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0250	0.0040	0.0000
Campbell black-browed albatross	0.0030	0.0020	0.0010	0.0020	0.0010	0.0000	0.0000	0.0010	0.0020	0.0000
Northern royal albatross	0.0000	0.0000	0.0010	0.0000	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000
White-chinned petrel	0.0000	0.0000	0.0050	0.0010	0.0180	0.0000	0.0000	0.0060	0.0000	0.0000
Foveaux shag	0.0000	0.0160	0.0000	0.0070	0.0000	0.0050	0.0000	0.0000	0.0000	0.0000
Grey petrel	0.0000	0.0000	0.0020	0.0000	0.0100	0.0000	0.0000	0.0080	0.0020	0.0000
Southern royal albatross	0.0000	0.0000	0.0010	0.0000	0.0010	0.0000	0.0000	0.0050	0.0000	0.0000

Coral plan:

Research priorities

*Note: Priority level has been assigned qualitatively by DOC based on the importance of the work (i.e. whether the research addresses significant data gaps and whether it is a prerequisite to another project).

Research priority	Priority level*
Interaction studies:	
• An updated formal risk assessment estimating the impact of commercial fishing (e.g. trawling) on protected coral populations	Medium-High
• Investigate recovery dynamics post trawling impacts	High
• Determine what facilitates the recovery of corals/habitat after trawling	Medium-High
• Determine the impact of trawling on ecosystem function/services of deep sea protected corals	Medium-High
• Characterisation of the impact of commercial fishing on protected corals in shallow waters (e.g. 10-40m, Fiordland, Port Pegasus)	High
Population studies:	
• Increase understanding of taxonomy	High
• Determine small effective population sizes and their implication on resilience to fishing impacts	Medium-High
• Determine reproductive and dispersal capabilities	High
• Determine larval biology, duration and settlement patterns	Medium-High
• Determine population connectivity	High
• Identify source and sink populations	Medium-High
• Determine age and growth characteristics	High
• Identification of biodiversity hot spots/ areas of high protection value	High
• Monitor changes in genetic and community structure, as well as species distribution over a time in relation to spatial fishing effort	High
• Modelling distribution including abundance/ biomass (not just presence/absence)	Medium-High
Mitigation studies:	
• Analysis of potential mitigation measures to minimise the impact of commercial fishing on protected coral species	Medium-High
• Determine the effectiveness of spatial closures; considering design, how long the closure needs to be in place, and if recovered areas will provide similar ecosystem function/services.	Medium-High

Protected fish plan

Marine mammal plan:

Development process

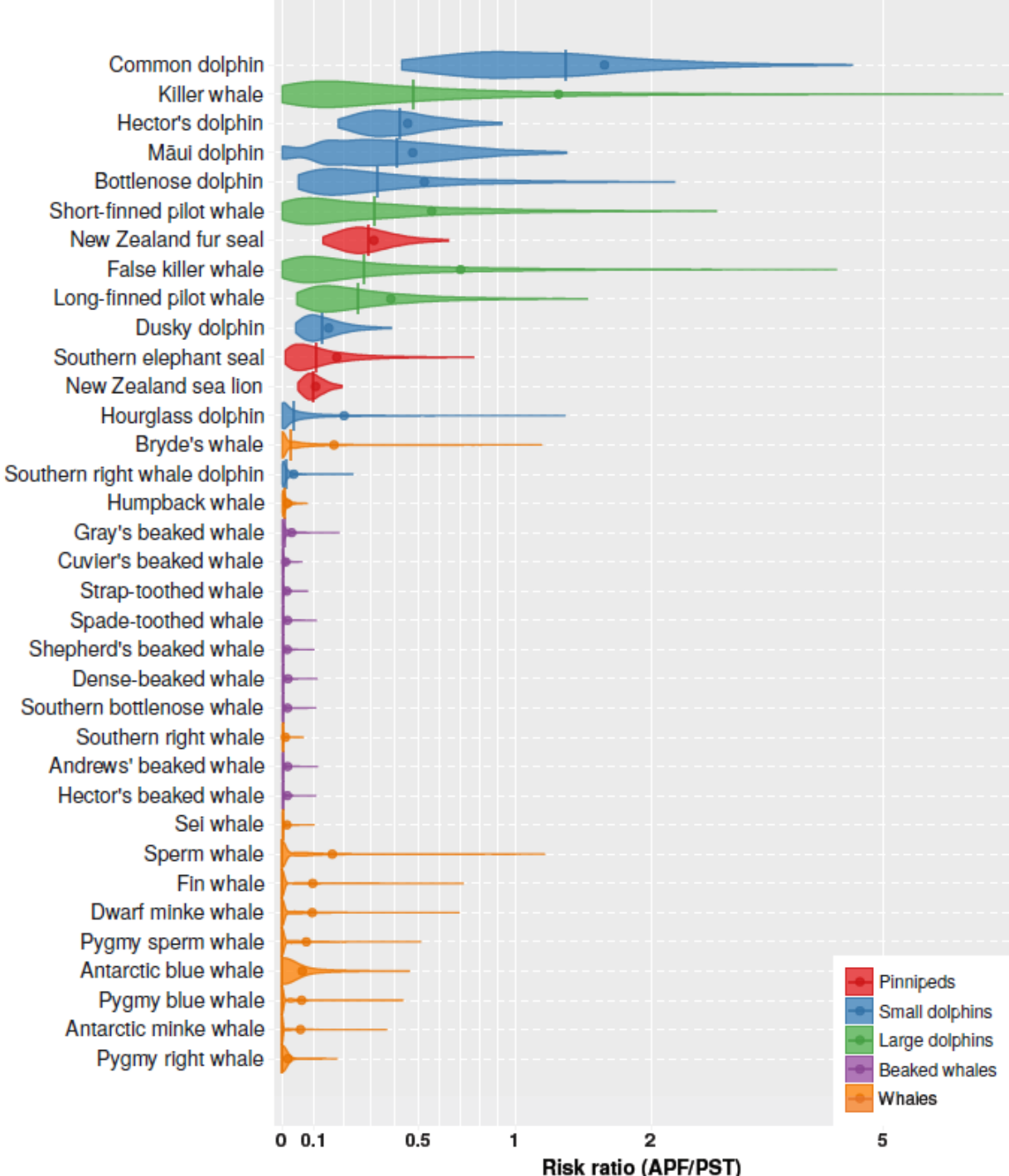| Species group	Common name	Scientific name	New Zealand threat status
Whales	Bryde's whale	*Balaenoptera brydei*	Nationally critical
	Southern right whale	*Eubalaena australis*	Nationally endangered
	Sperm whale	*Physeter macrocephalus*	Not threatened
	Antarctic minke whale	*Balaenoptera bonaerensis*	Not threatened
	Dwarf minke whale	*Balaenoptera acutorostrata*	Not threatened
	Antarctic blue whale	*Balaenoptera musculus intermedia*	Migrant
	Fin whale	*Balaenoptera physalus*	Migrant
	Pygmy blue whale	*Balaenoptera musculus brevicauda*	Migrant
	Sei whale	*Balaenoptera borealis*	Migrant
	Humpback whale	*Megaptera novaeangliae*	Migrant
	Pygmy right whale	*Caperea marginata*	Data deficient
	Pygmy sperm whale	*Kogia breviceps*	Data deficient
Blackfish	Killer whale Type A	*Orcinus orca*	Nationally critical
	Long-finned pilot whale	*Globicephala melas*	Not threatened
	False killer whale	*Pseudorca crassidens*	Not threatened
	Short-finned pilot whale	*Globicephala macrorhynchus*	Migrant
Beaked whales	Andrews' beaked whale	*Mesoplodon bowdoini*	Data deficient
	Cuvier's beaked whale	*Ziphius cavirostris*	Data deficient
	Dense-beaked whale	*Mesoplodon densirostris*	Data deficient
	Gray's beaked whale	*Mesoplodon grayi*	Data deficient
	Hector's beaked whale	*Mesoplodon hectori*	Data deficient
	Shepherd's beaked whale	*Tasmacetus shepherdi*	Data deficient
	Southern bottlenose whale	*Hyperoodon planifrons*	Data deficient
	Spade-toothed whale	*Mesoplodon traversii*	Data deficient
	Strap-toothed whale	*Mesoplodon layardii*	Data deficient
Dolphins	Māui dolphin	*Cephalorhynchus hectori maui*	Nationally critical
	Hector's dolphin	*Cephalorhynchus hectori hectori*	Nationally endangered
	Bottlenose dolphin	*Tursiops truncatus*	Nationally endangered
	Southern right whale dolphin	*Lissodelphis peronii*	Not threatened
	Common dolphin	*Delphinus delphis*	Not threatened
	Dusky dolphin	*Lagenorhynchus obscurus*	Not threatened
	Hourglass dolphin	*Lagenorhynchus cruciger*	Data deficient
Pinnipeds	New Zealand sea lion	*Phocarctos hookeri*	Nationally critical
	Southern elephant seal	*Mirounga leonina*	Nationally critical
	New Zealand fur seal	*Arctophoca australis forsteri*	Not threatened

Marine mammal plan:

Development process

Species group	Species	Trawl		Set net		SLL		BLL		Purse seine		Total	
		Mean	95% c.i.	Mean	95% c.i.	Mean	95% c.i.	Mean	95% c.i.	Mean	95% c.i.	Mean	95% c.i.
Pinnipeds	New Zealand fur seal	569.9	345.0–917.0	236.5	97.0–517.6	138.6	19.0–314.0	2.5	0.4–7.3	1.5	0.0–5.5	948.9	610.9–1 401.6
	New Zealand sea lion	24.5	13.0–41.0	1.2	0.0–6.0	0.0	0.0–0.1	0.0	0.0–0.3	0.0	–	25.8	13.5–43.0
	Southern elephant seal	0.9	0.1–3.5	0.4	0.0–3.3	0.0	0.0–0.3	0.0	0.0–0.1	0.0	0.0–0.1	1.4	0.1–5.7
Small dolphins	Bottlenose dolphin	5.1	0.2–23.8	3.5	0.0–21.4	0.6	0.0–2.4	0.0	0.0–0.2	0.0	0.0–0.1	9.3	1.1–36.0
	Common dolphin	157.3	72.0–299.0	71.3	14.4–207.5	1.7	0.1–5.1	0.1	0.0–1.4	0.1	0.0–0.9	230.4	115.8–421.7
	Dusky dolphin	9.8	2.5–28.1	18.4	5.7–43.2	0.3	0.0–1.6	0.0	0.0–0.2	0.0	0.0–0.1	28.6	11.7–58.4
	Hector's dolphin	9.0	1.1–26.6	32.3	13.8–65.8	0.0	0.0–0.1	0.0	0.0–0.1		–	41.3	19.1–77.7
	Hourglass dolphin	0.8	0.0–6.3	0.9	0.0–6.1	0.0	0.0–0.3	0.0	0.0–0.1		–	1.7	0.0–11.2
	Māui dolphin	0.0	0.0–0.1	0.2	0.0–0.5		–		–		–	0.2	0.0–0.5
	Southern right whale dolphin	0.5	0.0–3.8	0.3	0.0–3.1	0.0	0.0–0.1		–		–	0.9	0.0–6.6
Large dolphins	False killer whale	0.2	0.0–1.2	1.1	0.0–9.1	0.1	0.0–0.8	0.5	0.0–3.4	0.0	0.0–0.3	1.9	0.0–10.8
	Killer whale	0.2	0.0–1.4	1.0	0.0–7.9	0.1	0.0–0.4	0.4	0.0–2.6	0.0	0.0–0.2	1.6	0.0–9.5
	Long-finned pilot whale	3.3	0.2–8.7	3.4	0.0–13.9	0.5	0.0–2.3	1.5	0.1–7.1	0.0	0.0–0.3	8.7	2.1–25.2
	Short-finned pilot whale	0.9	0.0–4.9	3.1	0.0–20.9	0.3	0.0–1.6	2.8	0.0–11.9	0.1	0.0–0.6	7.0	0.0–30.5
Beaked whales	Andrews' beaked whale	0.1	0.0–0.6	0.0	0.0–0.4	0.1	0.0–0.5	0.0	0.0–0.1	0.0	0.0–0.1	0.2	0.0–1.2
	Cuvier's beaked whale	0.2	0.0–1.3	0.1	0.0–0.9	0.1	0.0–0.8	0.0	0.0–0.1	0.0	0.0–0.2	0.4	0.0–2.4
	Dense-beaked whale	0.1	0.0–0.6	0.0	0.0–0.3	0.1	0.0–0.5	0.0	0.0–0.1	0.0	0.0–0.1	0.2	0.0–1.3
	Gray's beaked whale	0.3	0.0–2.4	0.1	0.0–1.0	0.2	0.0–1.1	0.0	0.0–0.1	0.0	0.0–0.1	0.6	0.0–3.8
	Hector's beaked whale	0.1	0.0–0.6	0.0	0.0–0.4	0.1	0.0–0.5	0.0	0.0–0.1	0.0	0.0–0.1	0.2	0.0–1.4
	Shepherd's beaked whale	0.1	0.0–0.6	0.0	0.0–0.3	0.1	0.0–0.5	0.0	0.0–0.1	0.0	0.0–0.1	0.2	0.0–1.2
	Southern bottlenose whale	0.1	0.0–0.6	0.0	0.0–0.3	0.1	0.0–0.5	0.0	0.0–0.1	0.0	0.0–0.1	0.2	0.0–1.2
	Spade-toothed whale	0.1	0.0–0.6	0.0	0.0–0.3	0.1	0.0–0.5	0.0	0.0–0.1	0.0	0.0–0.1	0.2	0.0–1.2
	Strap-toothed whale	0.1	0.0–0.8	0.1	0.0–0.6	0.1	0.0–0.6	0.0	0.0–0.1	0.0	0.0–0.1	0.3	0.0–1.6
Whales	Antarctic blue whale	0.0	0.0–0.1	0.0	0.0–0.1	0.0	0.0–0.1	0.0	0.0–0.1		–	0.0	0.0–0.3
	Antarctic minke whale	0.1	0.0–0.5	0.0	0.0–0.2	0.0	0.0–0.1	0.0	0.0–0.1	0.0	0.0–0.1	0.1	0.0–1.0
	Bryde's whale	0.0	0.0–0.3	0.1	0.0–0.9	0.0	0.0–0.1	0.0	0.0–0.3	0.0	0.0–0.1	0.2	0.0–1.6
	Dwarf minke whale	0.0	0.0–0.2	0.1	0.0–0.3	0.0	0.0–0.2	0.0	0.0–0.1	0.0	0.0–0.1	0.1	0.0–0.8
	Fin whale	0.0	0.0–0.1	0.0	0.0–0.2	0.0	0.0–0.1	0.0	0.0–0.1	0.0	0.0–0.1	0.1	0.0–0.5
	Humpback whale	0.4	0.0–3.8	0.3	0.0–3.3	0.4	0.0–2.1	0.1	0.0–0.8	0.1	0.0–0.7	1.4	0.0–6.6
	Pygmy blue whale	0.0	0.0–0.3	0.0	0.0–0.3	0.0	0.0–0.1	0.0	0.0–0.1	0.0	0.0–0.1	0.1	0.0–0.8
	Pygmy right whale	0.0	0.0–0.1		–	0.0	0.0–0.1		–		–	0.0	0.0–0.1
	Pygmy sperm whale	0.0	0.0–0.2	0.0	0.0–0.1	0.0	0.0–0.3	0.0	0.0–0.1	0.0	0.0–0.1	0.1	0.0–0.8
	Sei whale	0.1	0.0–0.5	0.0	0.0–0.3	0.0	0.0–0.2	0.0	0.0–0.1	0.0	0.0–0.1	0.1	0.0–0.9
	Southern right whale	0.2	0.0–1.3	0.1	0.0–0.8	0.0	0.0–0.1	0.0	0.0–0.2	0.0	0.0–0.2	0.3	0.0–2.2
	Sperm whale	0.1	0.0–0.5	0.0	0.0–0.3	0.0	0.0–0.1	0.0	0.0–0.1		–	0.1	0.0–0.9

Marine mammal plan:

Development process

Marine mammal plan:
Research Priorities

Research Priority	Priority level*	Species involved
Characterisation of marine mammal bycatch (i.e. interaction/catch rates in all fisheries)	High	All species (prioritising those at greatest risk from fishing)
Population monitoring Project ideas include:	Medium-High	All species (prioritising those at greatest risk from fishing)
• Abundance estimate (every five years)	High	Hector's & Māui dolphins**
• Pup count (Auckland Is/Mainland annually, Campbell Island TBD)	High	New Zealand sea lion***
Population size and structure Project ideas include:	Medium-High	All species (prioritising those at greatest risk from fishing)
• Determination of population size and structure	Medium-High	Hector's & Māui dolphins**
• Bounty Islands population assessment	Medium	New Zealand fur seal
• Cook Strait population assessment	Medium	New Zealand fur seal
Post release survival of marine mammals in fisheries (prioritising fisheries that pose highest risk)	Medium	All species (prioritising those at greatest risk from fishing)
Mitigation studies Project ideas include:	Medium	All species (prioritising those at greatest risk from fishing)
• Mitigation of captures	Medium	New Zealand fur seal
• Mitigation of captures	Medium	Common dolphins
• Mitigation of dolphin captures in the set net fishery	Medium	Common dolphins, Hector's dolphin, dusky dolphins
• SLED efficacy (being undertaken by MPI)	Medium	New Zealand sea lion***
Tracking/distribution studies Project ideas include:	Low-Medium	All species (prioritising those at greatest risk from fishing)
• Quantifying species distribution	Low-Medium	All species (prioritising those at greatest risk from fishing)
• Quantifying species distribution	Low-Medium	Hector's & Māui dolphins**
• Analysis of existing tracking data to quantify fisheries overlap	Low-Medium	New Zealand sea lion***

Conservation Services Programme

Annual Research

Summary

Background

- Stakeholder desire for rationalised and timely reporting
- Better integration with CSP's new strategic direction

Aim

- A single and concise summary of the year's research and outputs
- Integrating the results of observer coverage with other CSP funded
  research
- Updates of the status of multiyear projects
- Ties back to each year's annual plan
- Helps feed into each years planning processes e.g. CSP RAG

Conservation Services Programme

Annual Research

Summary 2018/19

Interaction projects

Observing commercial fisheries
 Status: Ongoing

Identification and storage of cold-water coral bycatch specimens
 Status: Ongoing – 18/19 draft report due 10 Dec

Identification of seabirds captured in New Zealand fisheries
 Status: Complete

Supporting the utility of electronic monitoring to identify protected species interacting with commercial fisheries
 Status: Phase one completed in 2017/18 and remainder returned to industry

Identification of marine mammals, turtles, and protected fish captured in New Zealand fisheries
 Status: In progress – Phase one and two completed in 2018/19, year three in progress

Development of observer photograph protocols and curation
 Status: In progress

Improving the collection of data and samples from bycaught basking sharks
 Status: In progress

Updated analysis of spine-tailed devil ray post-release survival
 Status: Complete

Conservation Services Programme

Annual Research

Summary 2018/19

Interaction projects:

Observing commercial fisheries
Status: Ongoing

Identification and storage of cold-water coral bycatch specimens
Status: Ongoing – 18/19 draft report due 10 Dec

Recommendations refer to implementation of observer protocols around image and data capture

Identification of seabirds captured in New Zealand fisheries
Status: Complete

Recommendations refer to implementation of observer protocols around image and data capture

Supporting the utility of electronic monitoring to identify protected species interacting with commercial fisheries
Status: Phase one completed in 2017/18 and remainder returned to industry

Recommendations from 2017/18:
- Data standards are developed and documented to specify the information that EM analysts are tasked with extracting from imagery
- Quality assurance standards are developed for EM review
- Training materials and programmes are prepared to enable EM analysts to populate data fields and to document their findings
- The development of training materials is initiated where requirements are already understood
- Photos and videos taken by fisheries observers are catalogued and stored for use as part of EM training materials and potentially for machine learning
- NZ remains abreast of the regional development of EM process and data standards
- Practitioners in NZ and internationally are encouraged to make available EM process and data standards, review protocols and training materials.

Conservation Services Programme

Annual Research Summary 2018/19

Interaction projects:

Identification of marine mammals, turtles, and protected fish captured in New Zealand fisheries

Status: In progress – Phase one and two completed in 2018/19, year three in progress

Development of observer photograph protocols and curation

Status: In progress

Improving the collection of data and samples from bycaught basking sharks

Status: In progress

Updated analysis of spine-tailed devil ray post-release survival

Status: Complete

Recommendations within the report focus on guidance for avoiding ray captures and reducing ray mortality. In regards to further research:

• Data from spotter pilots could be analysed to determine (a) whether pilots are routinely recording ray sightings, and (b) to provide more information on the spatial and temporal distribution of rays, particularly in relation to defining the hotspot area in north-eastern North Island.

• Additional fields should be added to the Protected Ray Interactions form such as whether a cargo net is used, whether a ray was brailed early or late in the brailing process and any other details around the ray handling approach.

• An updated analysis of commercial data is recommended as it would provide a larger data set from which to determine whether there have been any changes in the distribution of fishing effort, or ray captures and capture rates, in relation to factors such as month, location and seabed depth.

Conservation Services Programme

Annual Research

Summary 2018/19

Population projects

Indirect effects of fishing on NZ sea lions
Status: Returned to industry

Salvin's albatross Bounty Islands population project
Status: Phase one completed in 2018/19, year two in progress

Seabird population research: Auckland Islands 2017-20
Status: Phase one and two complete, year three in progress

Indirect effects on seabirds in north-east North Island region
Status: Complete

The age and growth of New Zealand protected corals at high risk
Status: Complete

Improved habitat suitability modelling for protected corals in New Zealand waters
Status: In progress

Hoiho population and tracking project
Status: In progress

New Zealand sea lion: Auckland Islands pup count
Status: Phase one completed in 2018/19, year two in progress

Flesh-footed shearwater: Population monitoring
Status: Phase one completed in 2018/19, year two in progress

Population projects continued

Westland petrel population estimate
Status: In progress

Protected coral connectivity in New Zealand
Status: In progress

Conservation Services Programme

Annual Research

Summary 2018/19

Population projects

Indirect effects of fishing on NZ sea lions
Status: Returned to industry

Salvin's albatross Bounty Islands population project
Status: Phase one completed in 2018/19, year two in progress

Seabird population research: Auckland Islands 2017-20
Status: Phase one and two complete, year three in progress

Recommendations:

- White-chinned petrel: four years of recapture data are not sufficient for robust demographic rate estimates. Monitoring should continue for the project to yield useful data for demographic parameter estimates for white-chinned petrels.

- Gibson's albatross: population recovery will remain slow since annual mortality remains a little higher than in the past, the total population is substantially smaller, and there has been more than a decade of low chick production. Gibson's albatross conservation status remains of concern, monitoring the size of the population and its structure and trend on Adams Island should remain a priority.

- White-capped albatross: future visits should focus on re-sighting. A visit of at least five days is recommended to further increase re-sighting rates. To estimate breeding success from nest cameras over the full breeding season, cameras need to be in place over two years, with battery and SD cards replaced at the annual visit.

Conservation Services Programme

Annual Research

Summary 2018/19

Population projects

Indirect effects on seabirds in north-east North Island region
Status: Complete

Recommendations:
- Develop a strategic, long term approach to study marine food webs within the region, focusing on seabirds to highlight interactions, especially where they relate to fisheries and other threats.

- Investigate the dynamics of all fish school types across multiple seasons.

- The research into the diet of target seabird species to be ongoing, linked to high resolution tracking and incorporating innovative approaches such as ecophysiology.

- Develop a strategic, long term approach to determine population trends and breeding success for target species within the wider Hauraki Gulf region.

The age and growth of New Zealand protected corals at high risk
Status: Complete

Recommendations:
- We continue to recommend reliable validation methods such as 14C and lead 210 dating to age corals. Selecting appropriate species to age would be based on the results of studies carried out to date and species that were seen as high risk e.g., black coral species and species of the octocoral Paragorgia.

Improved habitat suitability modelling for protected corals in New Zealand waters
Status: In progress

Hoiho population and tracking project
Status: In progress

Conservation Services Programme

Annual Research

Summary 2018/19

Population projects

New Zealand sea lion: Auckland Islands pup count
Status: Phase one completed in 2018/19, year two in progress

Recommendations:
- A suggested earlier start date/longer field season in order to be present for births and to acquire a complete season count of dead pups (and thus a more accurate pup production estimate). Development of clear goals and guidelines on the areas in which to search for animals in the daily count and in the dead run to allow for consistency over the years.
- Determine and take additional action steps to move forward with *Klebsiella pneumonia* research (i.e. ivermectin controls/ trials, etc.)
- Perform more precise recording on "planks for pups" such as on ramp additions, rescues before and after placement etc.
- Further advancement in the development of the shark/distinct scaring photo ID library if specific shark predation type data is desired to be derived from it.
- Additional time spent on Dundas to allow for effort into resighting there.
- Ensure continued use of the M-R as the estimate method for Dundas.
- Potentially change to different PIT tags for Dundas, and if so, change to one that would have options of a fixed scanner.

Flesh-footed shearwater: Population monitoring
Status: Phase one completed in 2018/19, year two in progress

Westland petrel population estimate
Status: In progress

Protected coral connectivity in New Zealand
Status: In progress

Non CSP population projects

Seabirds

Antipodean albatross: monitoring and tracking planned (DOC/MPI/Albatross Research)

Chatham Island albatross: ongoing translocation (Chatham Islands Taiko Trust)

Northern royal albatross – additional aerial surveys at Chathams (DOC)
      - ongoing management and monitoring at Taiaroa Head (DOC)

Yellow-eyed penguin: breeding counts mainland (DOC/YEPT) distribution/fisheries interaction characterisation (MPI)

Chatham petrel & taiko – ongoing management at Rangatira and Tuku/Sweetwater (DOC/ Chatham Islands Taiko Trust)

New Zealand storm petrel – ongoing monitoring at Little Barrier Island and at-sea (collaborative programme)

King shag – population monitoring (DOC/OSNZ/King Salmon)

Non CSP population projects

Marine mammals

Māui dolphins
- Abundance estimate (genetic sampling & analysis) by Oregon State Uni & Akl Uni – field work due to commence in Feb 2020
- Epigenetic aging to ascertain critical population age structure data
- Boat-based survey work & photo ID – ongoing
- Array of C-PODs being established to examine offshore and alongshore distribution – completed

Hector's dolphins
- Effects of tourism on Porpoise Bay Hector's

Blue whale research
- Oregon State Uni – Ongoing analysis of spatial and temporal distribution and development of predictive summertime distribution models

Tourism compliance, enforcement and research
- E.g. dusky dolphins Kaikoura, bottlenose dolphins Fiordland and Bay of Islands

Southern right whale population monitoring – subantarctic
- Otago Uni - Ongoing
- Auckland Uni – 5-year programme commenced on genetics, abundance and distribution
- NZDF contributing photos collected on monitoring flights to sub-Ants

Non CSP population projects

Marine mammals

Fur seals
- Biennial monitoring of West Coast populations (Cape Foulwind, Wekakura Point, and Open Bay Islands)
- Post-earthquake monitoring in Kaikoura

Sea lions
- Ongoing (population) monitoring work in Otago, Stewart Island & Subants
- Disease research on Enderby Island
- Threat Management Plan implementation
- SLED review – MPI
- Campbell Island monitoring and pup behaviour in relation to holes

Non CSP population projects

Protected fish

- MPI Qualitative risk assessment

- Population connectivity of oceanic manta rays (*Mobula birostris*)
    - collaboration with Conservation International
    - photo-identification and satellite tagging (2019-2021)
    - Wildlife Computers SPLASH10-321 towed satellite tags deployed by divers on free-swimming rays
    - purpose is determine extent of movements of manta rays occurring off north east North Island

- White shark photo-identification and movements
    - photo-id population estimate for Stewart Island aggregation site
    - size and sex composition of Stewart Island and Chatham Islands aggregations
    - use of northern North Island coastal habitats by juveniles and sub-adults

Non CSP population projects
Coral

- Radiocarbon dating and growth rates of three stony branching coral species, *Solenosmilia variabilis, Goniocorella dumosa* and *Madrepora oculata* (NIWA)
  (Data summarised in Tracey, D.M. & Hjorvarsdottir, F. (eds, comps) (2019))

- Marsden grant 2016: Corals, currents, and phytoplankton: Reconstructing 3000 years of circulation and marine productivity in the world's largest ocean gyre (NIWA/VUW)
  (Black corals results to date summarised in Hitt et al. 2018; 2019)

- Smart Ideas 2018: Reconstructing baseline ocean dynamics around NZ (NIWA/VUW)
  (Black coral and bamboo coral analyses project on-going)

- Diversity and taxonomic status of plexaurid (Family Plexauridae) octocorals (NIWA)
  (Bilewitch 2018)

- High Seas (SPRFMO), NZ EEZ regions Habitat Suitability Modelling (HSM) for Vulnerable Marine Ecosystem (VME) taxa including protected corals (FNZ/ SPRFMO)
  (Anderson et al . 2018; Georgian et al. 2019)

- Mapping benthic biodiversity and including image data to build predicted models)
  (Bowden et al. 2015; in press)

- Black coral mapping, Fiordland (NIWA)

- ROBES Sedimentation Impacts project *G. dumosa*
  (Clark et al. See https://www.niwa.co.nz/coasts-and-oceans/research-projects/resilience-of-deep-sea-benthic-fauna-to-sedimentation-from-seabed-mining)

Marine protected areas research

Contact – Debbie Freeman, DOC Marine Ecosystems Team

An MPA Science Advisory Group has been established, comprising science staff from Department of Conservation, Fisheries NZ and Ministry for the Environment

Role is to provide collective advice to agency policy teams and undertake and procure science to support MPA policy and implementation.

MSAG members: Debbie Freeman (chair)[1], Rich Ford[2], Greig Funnell[1], Shane Geange[1], Jade Maggs[2], Constance Nutsford[3], Tim Riding[3], Ben Sharp[2], Pierre Tellier[3], Karen Lisa Tunley[2]

1. Department of Conservation; 2. Fisheries New Zealand; 3. Ministry for the Environment

MPA Research

MPA Science
Advisory Group

Completed work:

▶ Advice on MPA monitoring and reporting

▶ Development of SeaSketch project

▶ Guidance on MPA network design

▶ MPA gaps analysis

▶ Review of habitat classification systems (NIWA)

▶ Collation of data sets, including to identify "key ecological areas" (NIWA)

MPA research: Next steps

▶ Release of reports; science communication

▶ Three new projects now underway (NIWA contracts): habitat classification, key ecological areas, identifying optimal areas for biodiversity protection

▶ Currently scoping the future work programme using DOC Biodiversity 2018 funding

Conservation Services Programme

Annual Research

Summary 2018/19

Mitigation projects

Protected species liaison project
Status: Phase two was completed in 2018/19 and phase three in progress.

Recommendations:
- It is recommended that efforts to ensure consistency among the work of liaison officers continue as this programme develops further in future years. Confirming the Programme objectives (and ensuring fit with policy drivers) ahead of the 2019/20 year is also recommended, especially given the review of the National Plan of Action – Seabirds in 2019. Confirming the purpose of PSRMPs and (if appropriate to purpose) ensuring that measures included in these plans are auditable, will improve the collective understanding of operational practices at sea and ways to further reduce bycatch risks.
- The efficacy of the liaison programme depends on fishers and liaison officers connecting, and the implementation of bycatch mitigation practices being monitored at sea. Both of these components are essential for the programme to deliver the best return on investment, that is, reducing the risk of protected species bycatch at sea.

Characterisation and development of offal management for small vessels
Status: Phase one completed in 2017/18, remainder of budget returned to industry

Protected species engagement project
Status: In progress

Haul mitigation for small longline vessels
Status: In progress

Setting mitigation for small longline vessels
Status: In progress

Options for temporal and spatial management of key fisheries to reduce risk of interactions with protected species
Status: On hold

Non CSP mitigation projects

Underwater Bait Setter for surface longline vessels

Collaborative project with DOC, FNZ, FINZ and SSST (through the Auckland Zoo Charitable Trust) to trial a bait setter device aimed at reducing seabird captures during setting by deploying the hooks at depth.

Status: In progress

Liaison Program expansion

Expansion into additional fishing fleets and development of integrated database. Mitigation materials purchased and distributed including Tori line materials, Time depth recorders and Hook pods.

Status: In progress

Recreational Fishing

Database assessment of recreational fishing bycatch of all marine protected species and review of reporting tools. Investigate use of existing vs development of smart phone app. Planning for stakeholder engagement in assessing rec fishing bycatch

Status: In progress