CSP Research Advisory Group

3 Dec 2014

Department of Conservation
Te Papa Atawhai

Today's Agenda

CSP Research Advisory Group

- Presentation on CSP progress
- Participant input
- Update on CSP medium term research plans

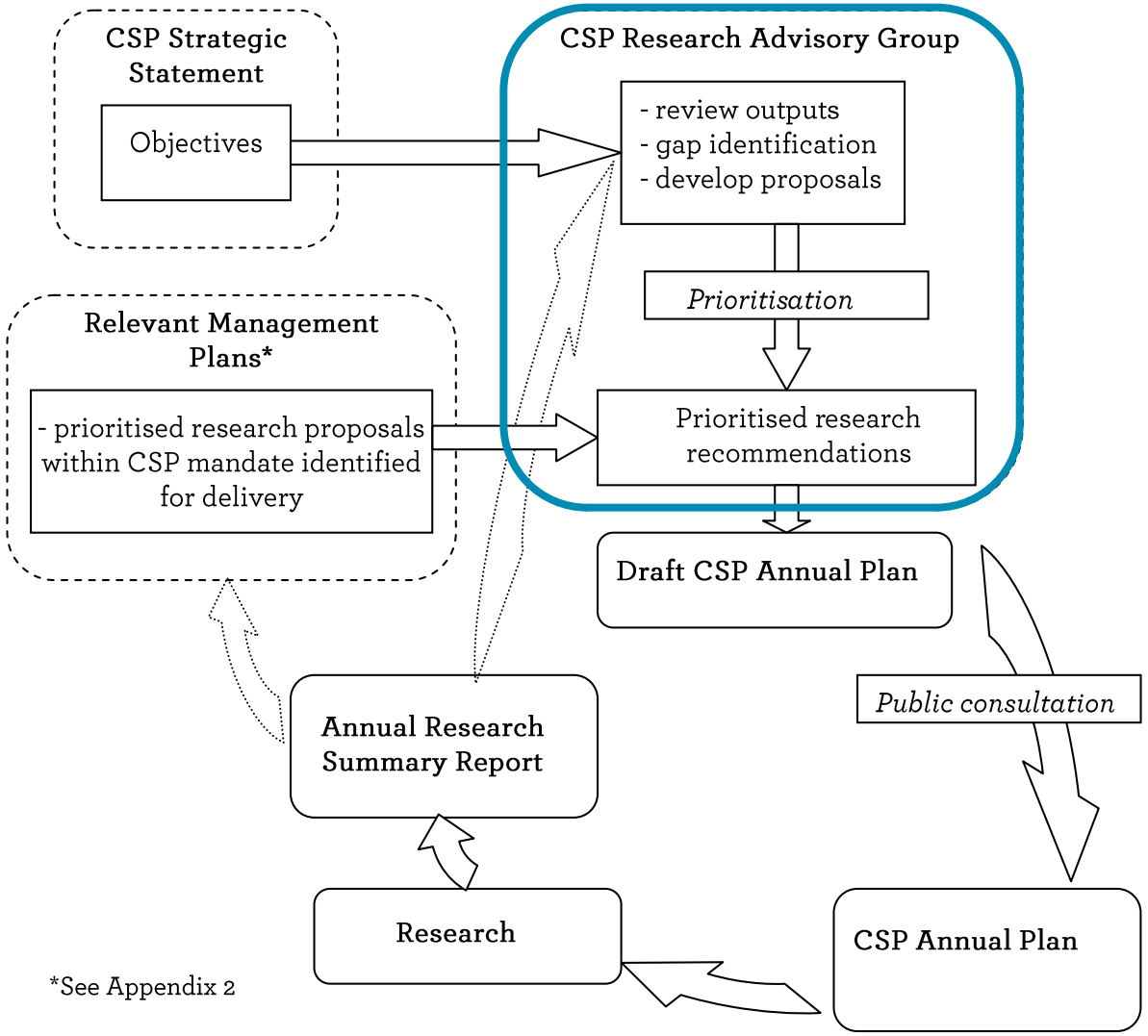
Lunch

MPI Aquatic Environment Research planning meeting

CSP Strategic Statement

- CSP Scope
- CSP Focus
- CSP Objectives
- CSP Research Advisory Group process
- *Prioritisation*
- *Implementation*

Purpose and Scope of this RAG



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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*

Outside the Scope of CSP RAG

- Discussion of policy or strategic direction of CSP or DOC
- Decisions or recommendations regarding the commercial fishery management

CSP Objectives

Objective A: Proven mitigation strategies are in place to avoid or minimise the effects of commercial fishing on protected species across the range of fisheries with known interactions.

Objective B: The nature of direct effects of commercial fishing on protected species is described.

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

CSP Objectives

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

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

Today's CSP RAG Agenda

- Introduction & Objectives
- Presentation on CSP Annual Summary Report
- Seabird Research
  - Participant input
- Sharks Research
  - Participant input
- Marine Mammal Research
  - Participant input
- Coral Research
  - Participant input
- Other relevant research and activities
- Updates on medium research plans and research planning documents

Conservation Services Programme Annual Research Summary

Katie Clemens-Seely and Kris Ramm
Marine Species and Threats

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Conservation Services Programme Annual Research Summary

Background

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

Aim

- A single 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 years annual plan
- Helps feed into future planning processes e.g. CSP RAG

Conservation Services Programme Annual Research Summary

Structure

Introduction

- Outlines background on the CSP
- Details any supporting documents or processes
- Details planning process for that year and any consultation

Conservation Services Programme Annual Research Summary

Structure

Project summary

~2 page summary per project

- Overall and specific objectives
- Rationale
- Project status
- Summary of methods and key findings
- Project logistics summary statement (inc. review milestones)
- Citation
- Weblinks

- Additions/Improvements

Conservation Services Programme Annual Research Summary

Structure

Observer summary
~4 page summary per fishery

- Overall and specific objectives
- Rationale
- Summary of methods and key findings including:
    - Commercial & observer effort
    - Protected species captures
    - Method of interaction
- Narrative of any patterns of trends observed, any anomalies or the cause of key bycatch events
- Consistent with previous observer reports
- Project logistics summary statement
- Citation
- Weblinks

2011-2012 CSP Annual Research Summary Projects

- Interaction projects
  - Observing commercial fisheries
  - Protected species interactions with commercial pot and trap fishing methods in New Zealand
  - Identification of seabirds captured in New Zealand fisheries
- Population projects
  - New Zealand sea lion population project (Auckland Islands)
  - Flesh-footed shearwater – population study trial and at-sea distribution
  - Protected fish – review of interactions and populations
  - Basking Shark bycatch review
  - Identify New Zealand fur seal populations bycaught in commercial fisheries
  - Protected coral distribution and overlap with commercial fishing
  - Pied shag – population review and estimate
  - Yellow-eyed penguin – review of population information
  - Northern royal albatross - analysis of population data from Tairoa head colony
  - King shag – census

2011-2012 CSP Annual Research Summary Projects

- Mitigation projects
  - Protected rays – mitigate captures and assess survival of live-released animals
  - Scampi trawl – mitigate seabird captures
  - Inshore bottom longline – develop strategies to increase line sink rates
  - Inshore bottom longline – novel methods to reduce availability of hooks to seabirds
  - Protected species bycatch newsletter
  - Protected species mitigation training for commercial fishing vessel crew
  - Review mandatory seabird scaring devices on offshore commercial trawl fishing vessels

2012-2013 CSP Annual Research Summary Projects

- Interaction projects
  - Observing commercial fisheries
  - Identification of seabirds captured in New Zealand fisheries
- Population projects
  - Flesh-footed shearwater - population study trial and at-sea distribution
  - New Zealand sea lion population project (Auckland Islands)
  - New Zealand sea lions – demographic assessment of the cause of decline at the Auckland Islands
  - Black petrel – at-sea distribution and population estimate
  - Campbell Island and grey-headed albatrosses – population estimate
  - White-capped albatross – population estimate
  - Salvin's albatross – population estimate and at-sea distribution
  - Gibson's albatross – population estimate
  - Pitt Island shags – foraging ecology

2012-2013 CSP Annual Research Summary Projects

- Mitigation projects
  - Inshore bottom longline seabird mitigation - design and analysis
  - Inshore trawl warp-strike mitigation – analysis of effectiveness
  - Review of mitigation techniques in setnet fisheries
  - Surface Longline Seabird Mitigation
  - Protected species bycatch newsletter
  - Protected species mitigation training for commercial fishing vessel crew

2013-2014 CSP Annual Research Summary Projects

- Interaction projects
  - Observing commercial fisheries
  - Identification of seabirds captured in New Zealand fisheries
  - Identification of marine mammals, turtles and protected fish captured in New Zealand fisheries
  - Optimisation of observer data collection protocols
  - Assessment of cryptic seabird mortality on trawl warps and longlines

2013-2014 CSP Annual Research Summary Projects

- Population projects
  - New Zealand sea lions – demographic assessment of the cause of decline at the Auckland Islands
  - Salvin's albatross – population estimate and at-sea distribution
  - New Zealand sea lion population project (Auckland Islands)
  - White-capped albatross population estimate (Auckland Islands)
  - Gibson's albatross population study (Auckland Islands)
  - Black petrel population project
  - Development of coral distribution modelling
  - Update protected fish review: oceanic whitetip shark

2013-2014 CSP Annual Research Summary Projects

- Mitigation projects
  - Sea trials of the Kellian line setter
  - Surface longline mitigation
  - Characterisation of smaller vessel deep water bottom longline operations in relation to risk factors for seabird capture
  - Development of bird baffler design for offshore trawl vessels
  - Protected species bycatch newsletter

Recommendations from 2011-2012 Conservation Services Programme Research Reports

POP2011-03 Protected fish – review of interactions and populations

- Should focus on:
  - Basking shark, white shark, deepwater nurse shark, spinetail devil ray, & spotted black grouper

- Efforts should be made to increase the availability for research of specimens of protected fish species by:
  - making it legal for fishers to land dead specimens;
  - encouraging and educating fishers about the value of specimens for research; and
  - providing the specimens to a research organisation

- Genetic analyses and electronic tagging should also be implemented urgently

POP2011-03 Protected fish – review of interactions and populations

		Stock identification - population unit					Biological information - species productivity					
Species	Proportion of stock in NZ	Genetic stock structure	Movement	World distribution	Habitat	Sum	Growth	Longevity	Maturity	Reproduction	Natural mortality	Sum
Basking shark	High	1	2	3	2	8	1	1	1	1	1	5
White shark	High	3	3	3	3	12	2	1	2	1	1	7
Whale shark	Low	2	2	3	3	10	1	1	1	1	1	5
Deepwater nurse shark	High?	0	0	2	1	3	0	0	1	1	0	2
Spinetail devilray	Moderate	0	1	3	3	7	1	1	2	2	0	6
Manta ray	Low?	1	1	3	2	7	0	1	2	2	0	5
Spotted black grouper	High	1	0	4	3	8	2	2	1	1	2	8
Giant grouper	Low	0	0	3	3	6	0	0	1	0	0	1
Sum		8	9	24	20		7	7	11	9	5	

		Species and fishery distribution - extent of overlap in NZ				Response to exploitation in NZ			
Species	Proportion of stock in NZ	Stock distribution	Fishery distribution	Vulnerable components in commercial fisheries	Sum	Catches and biomass	Size composition	Sum	Information level
Basking shark	High	3	2	> 4 m	5	2	0	2	0 = none
White shark	High	3	2	All	5	0	0	0	1 = poor
Whale shark	Low	3	4	Not vuln.	7	NA	NA		2 = moderate
Deepwater nurse shark	High?	1	1	All	2	0	0	0	3 = good
Spinetail devilray	Moderate	3	3	All	6	0	0	0	4 = excellent
Manta ray	Low?	2	3	Not vuln.	5	NA	NA		NA = not applicable
Spotted black grouper	High	3	3	All	6	0	0	0	
Giant grouper	Low	3	2	Not vuln.	5	NA	NA		
Sum		21	20			2	0		

POP2011-06 Protected coral distribution and overlap with commercial fishing

- Research to better understand the distribution of protected corals
  - Update and maintain the protected coral dataset
  - Increase observer coverage
  - Improve the quality of observer data
  - Improve identification of protected corals

- Research to better understand coral biology
  - Collect information on coral age, growth, size, & form
  - Improve current information gaps on cold water coral reproduction and connectivity
  - Review international literature with regard to biological parameters
  - Species associations

- Additional environmental data layer
  - For modeling the distribution of protected corals

POP2011-08 Yellow-eyed penguin – review of population information

- Increase observer coverage
  - To improve the quality of risk assessment
- Comprehensive analysis of foraging ecology & at sea distribution (& seafloor surveys)
  - To assess the impact of benthic habitat degradation

MIT2011-01 Protected rays - mitigate captures and assess survival of live-released animals

- More detailed information must be collected on manta and devil ray encounters
  - Observers should know correct codes and identification, record data on behaviour, release methods, and condition prior to release

- Spotter planes should record observation of manta and devil rays
  - Valuable information on spatial & temporal patterns of occurrence

Recommendations from 2012-2013 Conservation Services Programme Research Reports

POP2012-08 Pitt Island shags – foraging ecology

- Further studies on the foraging ecology at other breeding areas
  - To determine differences in foraging behaviour & efficiency

- 3-5 year study investigating breeding parameters (i.e. breeding success)

MIT2012-01 (& MIT2011-03) Inshore bottom longline – develop strategies to increase line sink rates

- Increase longline sink rates
  - Modify line-weighing regimes & float usage
- Improve streamer line design & consistently deploy streamer lines
  - Hooks are protected by streamer links up to 10m

Recommendations from 2013-2014 Conservation Services Programme Research Reports

POP2012-02 New Zealand sea lions – demographic assessment of the cause of decline at the Auckland Islands

- Obtain robust estimates of tag loss
  - To properly estimate survival and obtain good fits to pup census observations
- Estimate the rate of breeding site relocations
  - To improve pup census observations
- Determine if estimated demographic parameters reproduce a decline similar to that observed
- Determine how much would survival or pupping rates need to increase for the population size to stabilise

POP2013-04 Black petrel – at-sea distribution and population estimate

- Population monitoring to be continued up to 2024/25 breeding season
  - To allow development of a multi-generational population model
- Study burrows checked for breeding pairs every year
  - More accurate determination of breeding success & sex of adults
- Use of GPS data loggers & TDRs
  - To investigate foraging behaviour, distances, locations, etc

MIT2013-03 Characterisation of smaller vessel deep water bottom longline operations in relation to risk factors for seabird capture

- Testing of mitigation measures (i.e. length of streamer lines & line-weighting regimes) to ensure they are appropriate for reducing seabird bycatch risk

- Assessment of the efficacy of bycatch reduction measures when day-setting longlines.

Conservation Services Programme 2014-15 Research Projects

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Conservation Services Programme 2014-15 Research Projects

- Interaction projects
  - Observing commercial fisheries
  - Identification of seabirds captured in New Zealand fisheries
  - Identification of marine mammals, turtles and protected fish captured in New Zealand fisheries
- Population projects
  - New Zealand sea lion population project (Auckland Islands)
  - Seabird population research 2014-15
  - Protected fish population research
- Mitigation projects
  - Protected species bycatch newsletter
  - Improvement of tori line performance in small vessel longline fisheries
  - Seabird liaison officer

Seabird population research 2014-15

- *Black petrel*
  - A - Population size (Aotea/Great Barrier Island and Hauturu/Little Barrier Island)
  - B - Key demographic parameters, primarily juvenile and adult survival (Aotea/Great Barrier Island)

- *Salvin's albatross*
  - A - Population estimate (The Snares)
  - B - Adult survival and other demographic parameters (The Snares)

Seabird population research 2014-15

- *White-capped albatross*
  - A - Population estimate (Auckland Islands)
  - B - Ground truth aerial survey methods on Disappointment Island, Auckland Islands
  - C - Investigate logistics of establishing a mark-recapture study to investigate adult survival and other demographic parameters (Disappointment Island, Auckland Islands)

Seabird population research 2014-15

- *Southern Buller's albatross*
  - A - Population estimate (Solander Islands)
  - B - Adult survival and other demographic parameters (The Snares)
- *Gibson's albatross*
  - A - Population estimate (Auckland Islands)
  - B - Adult survival and other demographic parameters (Adams Island, Auckland Islands)

Seabird population research 2014-15

- *White-chinned petrel*
  - A - Investigate logistics of establishing a mark-recapture study to investigate adult survival and other demographic parameters (Auckland Islands)
  - B - Investigate a methodology to estimate the population size on Adams Island, Auckland Islands
  - C - Spatial foraging information (Auckland Islands)
  - D - Taxonomic status across New Zealand populations

- *Burrowing petrels*
  - Review survey methods to describe areas of uncertainty in relation to estimating population sizes

MPI current research 2014-15

Project	Title	2014/15	2015/16	2016/17
PRO2012-02	Assessment of the risk to marine mammal populations from NZ commercial fisheries	→	–	–
PRO2012-07	Cryptic mortality of seabirds in trawl and longline fisheries (review)	→	–	–
PRO2012-10	Level 3 risk assessment for Antipodean albatross	→	→	–
PRO2013/01	Protected species capture estimation	→	→	→
PRO2013/06	Abundance and distribution of WCSI Hector's dolphins	→	→	–
PRO2013/13	Global seabird risk assessment (for New Zealand species)	→	→	–
PRO2013-17	Repeat quantitative modelling of southern Buller's albatross	→	→	–
PRO2014/01	Improving information on the distribution of key protected species	→	→	–
PRO2014/02	Risk assessment modelling for fishing-related mortality of sea lions in support of the TMP	→	→	–
PRO2014/03	Research in response to advice from the Maui's dolphin research advisory group	→	→	–
PRO2014/05	Reducing uncertainty in biological components of the risk assessments for at-risk seabird species	→	→	–
PRO2014/06	Update of level-2 seabird risk assessment	→	→	–
SEA2013-06	Black petrel distribution modelling	→	–	–
SEA2013-14	Re-Run of Level-2 Seabird Risk Assessment 2014	→	–	–
BEN2007-01	Assessing the effects of fishing on soft sediment habitat, fauna, and processes	→	–	–
BEN2012-01	Spatial overlap of mobile bottom fishing methods and coastal benthic habitats	→	–	–
BEN2014/01	Risk assessment for benthic habitats, biodiversity, and production	→	→	–
BEN2014/02	Monitoring recovery of benthic fauna on the Graveyard complex	→	→	–
BEN2014/03	Monitoring recovery of benthic fauna in Spirits Bay	?	→	?
ENV2013-01	Development of model based estimates of fish bycatch	→	–	–
ENV2014/01	NPOA-sharks: comprehensive risk assessment	→	→	–
ENV2014/02	NPOA-sharks: age and growth of selected at-risk species	→	→	–
SEA2013-16	Data collation for shark risk assessments	→	–	–
ENV2014/09	Spatial decision support tools for multi-use and cumulative effects	?	?	?

Seabird Research

Work underway to develop an electronic bibliography and database of metrics relevant to risk assessments for all NZ seabirds

Non-CSP/MPI recent or current relevant research on high priority species:

Black petrel

- Collaborative research report as part of POP2013-04 report

Salvin's albatross

Southern Buller's albatross

- Population study Snares 2014 (NIWA-DWG-DOC-MPI funded)

Flesh-footed shearwater

- Monitoring of small colony (Taylor)

Gibson's albatross

New Zealand white-capped albatross

Chatham Island albatross

Antipodean albatross

- Population study Antipodes Island (Elliott & Walker)

Westland petrel

- Updated population analyses in prep (Waugh et al)

Northern Buller's albatross

Campbell black-browed albatross

- Tracking completed by NIWA

Stewart Island shag

- Paper in prep on 2011/12 census (DOC funded)
- Limited regular counts (Perriman/Lalas)

White-chinned petrel

- Tracking population study Auckland Islands initiated (Rexer-Huber)

Yellow-eyed penguin (mainland)

- Monitoring at various sites (YEP, DOC)

Northern giant petrel

Spotted shag

Northern royal albatross

Chatham petrel

- Monitoring Chatham Islands (DOC)

Chatham Island taiko

- Monitoring Chatham Islands (DOC, Taiko Trust)

Southern royal albatross

- Tracking underway (NIWA-DOC collaboration)

Snares Cape petrel

Grey petrel

Little black shag

Light-mantled sooty albatross

- Trial monitoring Auckland Islands (DOC funded)
- Possible tracking Campbell Island (NIWA-DOC collaboration)

Fiordland crested penguin

Grey-headed albatross

- Tracking completed by NIWA

New Zealand king shag

- Tracking feasibility (DOC funded)
- Limited site counts (Schuckard)

New Zealand storm petrel

- Population investigation LBI – collaboration

Pitt Island shag

Chatham Island shag

- Aerial census 2014 (Bell, partly DOC funded)

Pycroft's petrel

North Island little shearwater

New Zealand white-faced storm petrel

Mitigation

International development of e.g.

- Hook pods
- Warp scarers
- Lasers (including ACAP intersessional group on safety assessment)
- Domestic development (testing?)

Interaction relevant research?

CSP Projects- Sharks

- Protected fish population review POP2011-03
  - And update for Oceanic White tip POP2013-06
- Basking shark bycatch and population review POP2011-04
- Basking shark mitigation MIT2013-04 – fed into operational practices
- Spine-tail devilray mitigation techniques in purse seine fisheries MIT2011-01
- Survival and depth distribution of spine-tailed devilrays 2014 (from MIT2011-01)

Non CSP Developments

- Cage diving Code of Practice
  - Reviewing permitting arrangements
  - Data collection from operators
- Expert Input into shark Risk Assessment processes
- Others?

Marine Mammal Research

Current work:

- POP2014-01 New Zealand Sea Lion population project (Auckland Islands)
- INT2014-01 Observing commercial fisheries; projects estimating catch rates and fisheries interactions of Hector's dolphins.

  INT2013-03 Identification of marine mammals, turtles & protected fish captured in New Zealand fisheries
- POP2011-05 Identify New Zealand fur seal populations bycaught in commercial fisheries (This work is underway and due to finish June 2015)
- Maui Dolphin Threat Management Plan
- New Zealand Sea Lion Threat Management Plan 2014

  (Risk Assessment; model results from April 2015)
- Other research/work projects?

Coral Research

Current work:

- OP2013-05, described the distribution of corals in relation to areas where they are at risk of interactions with commercial fishing gear

Planned / Ongoing

- Future Modeling investigating the latest global climate models outputs to determine how the oceans around New Zealand might be affected by chemical and physical climate change

Medium term plans

International agreements

NPOAs

Risk Assessments

CSP Strategic Statement

Medium Term Research Plans

Seabird

Coral

Mammal

Fish

CSP Annual Plan

Seabird population medium term research plan 2015

Katherine Clements, DOC

Department of Conservation
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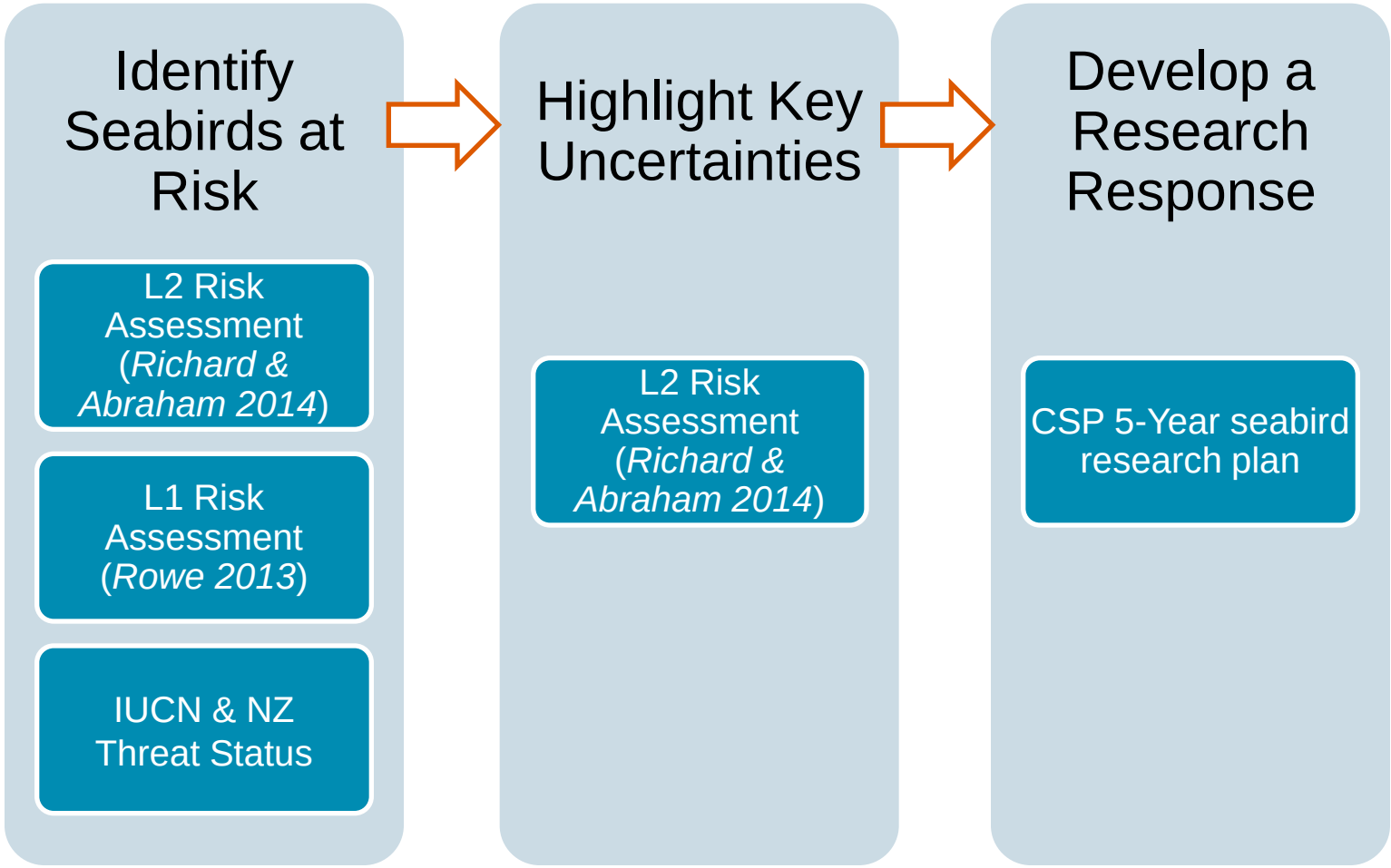
Goals of this Presentation

- Review methodology behind the Seabird medium term research plan
- Receive input regarding this methodology for the February RAG

- February – review outputs of this plan and translate into a research response

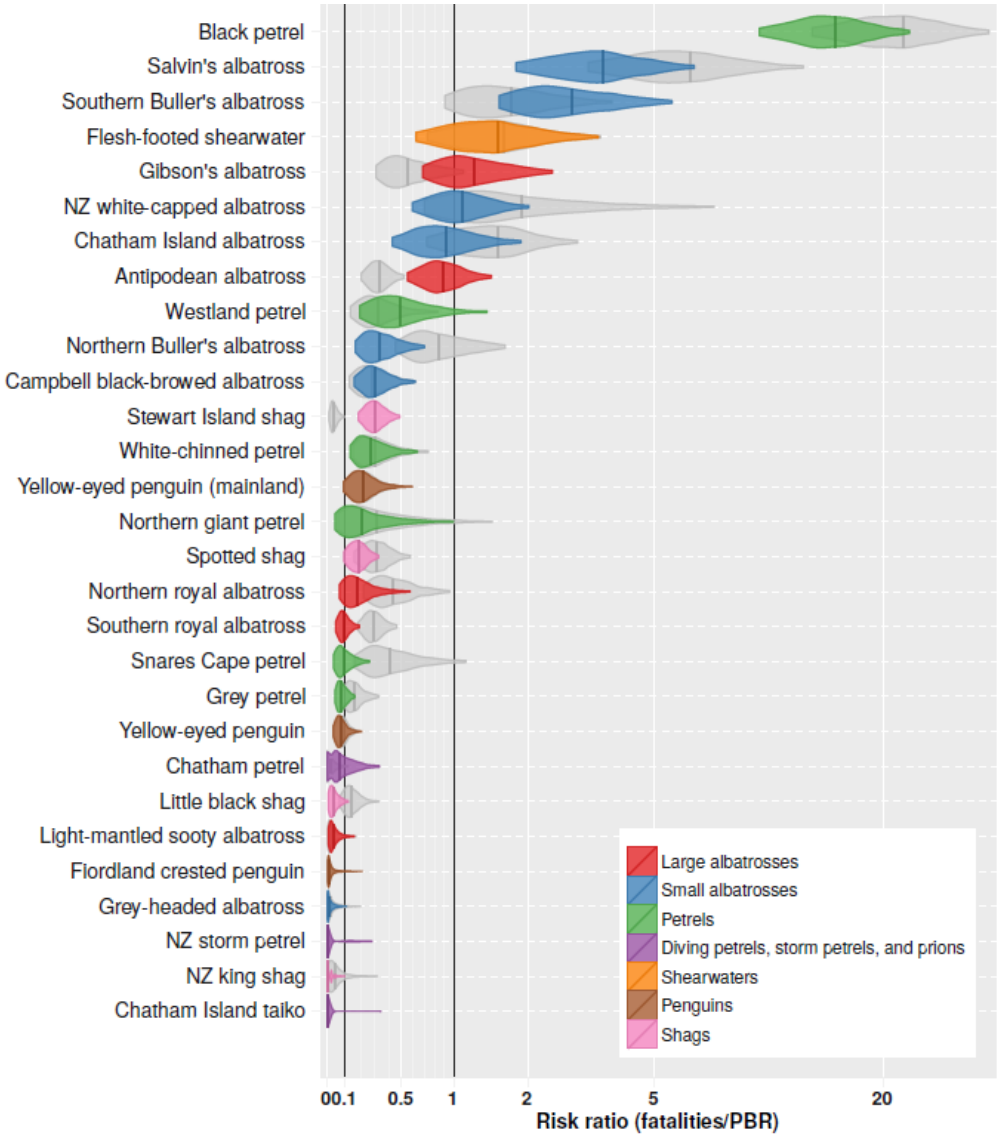
Outline of the Structure:



Identifying Seabirds at Risk

Very High Risk	High Risk	Medium Risk	Low Risk
• Black petrel • Salvin's albatross • Southern Buller's albatross • Flesh-footed shearwater • Gibson's albatross • New Zealand white-capped albatross	• Chatham Island albatross • Antipodean albatross • Westland petrel • Northern Buller's albatross • Campbell black-browed albatross • Stewart Island shag	• White-chinned petrel • Yellow-eyed penguin (mainland) • Northern giant petrel • Spotted shag • Northern royal albatross • Chatham petrel	• Chatham Is. taiko • Southern royal albatross • Snares Cape petrel • Grey petrel • Little black shag • Light-mantled sooty albatross • Fiordland crested penguin • Grey-headed albatross • New Zealand king shag • New Zealand storm petrel
Median RR > 1 or an upper 95% confidence limit > 2	Median RR > 0.3 or an upper 95% confidence limit > 1	Median RR > 0.1 or an upper 95% confidence limit > 0.3	Upper 95% confidence limit > 0.1

Identifying Seabirds at Risk



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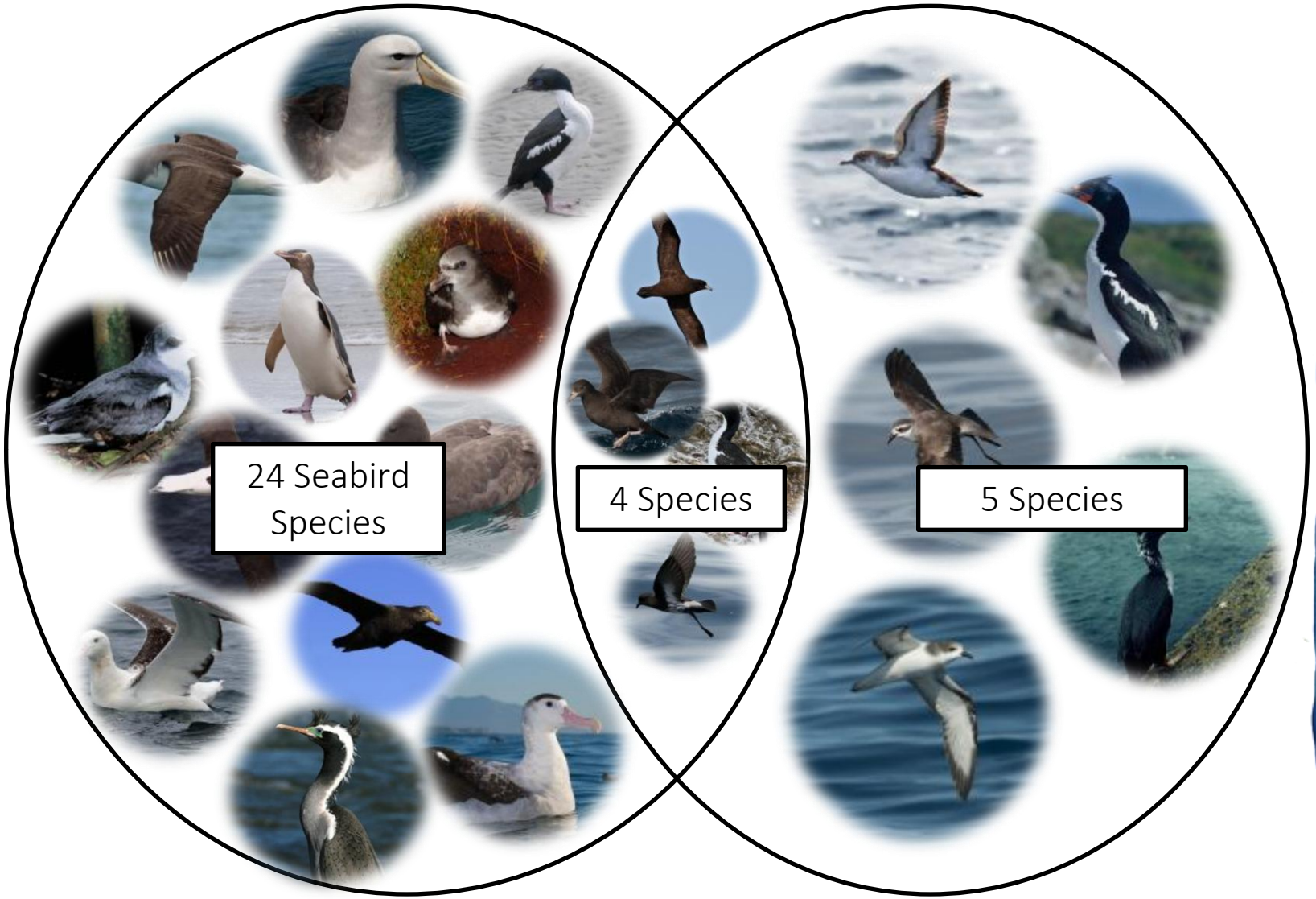
Identifying Other Seabirds at Risk

- Include seabirds at risk (moderate – extreme) from other fisheries (Rowe 2013)

Common name	L1 risk	Other fishery
Black petrel	Mod	Hand line
	Mod	Purse seine light
	Mod	Troll
Flesh-footed shearwater	Mod	Hand line
	Mod	Purse seine light
New Zealand king shag	Mod	Trap & Pot
New Zealand storm petrel	Extreme	Purse seine light
Pitt Island shag	High	Trap & Pot
Chatham Island shag	Mod	Trap & Pot
Pycroft's petrel	Mod	Purse seine light
North Island little shearwater	Mod	Purse seine light
New Zealand white-faced storm petrel	Mod	Purse seine light

Identifying Seabirds at Risk



L2 Risk Assessment

L1 Risk Assessment

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Identifying Seabirds at Risk

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

Highlighting Uncertainties:

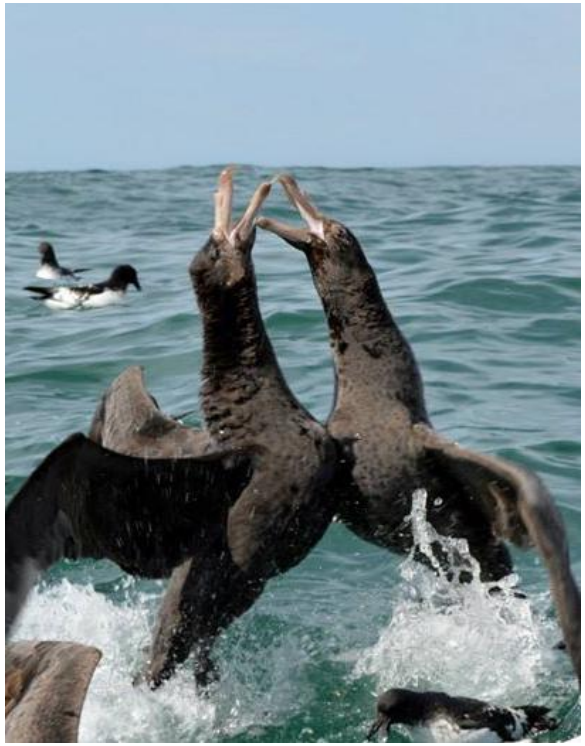
Common name	Risk parameter								
	TWL	BLL	SLL	SN	CM	A	S_A	N_{BP}	P_B
Black petrel	1	19	0	0	7	0	21	7	1
Salvin's albatross	26	1	0	0	17	2	29	1	0
Southern Buller's albatross	12	2	3	0	10	1	47	0	1
Flesh-footed shearwater	4	6	0	0	2	0	50	0	0
Gibson's albatross	1	2	10	0	3	0	46	2	4
New Zealand white-capped albatross	29	0	0	0	23	2	26	2	3
Chatham Island albatross	6	25	0	0	0	0	19	3	0
Antipodean albatross	8	7	16	0	6	0	16	1	5
Westland petrel	13	25	9	0	6	3	21	1	2
Northern Buller's albatross	6	3	17	0	4	0	40	3	2
Campbell black-browed albatross	8	25	7	0	1	0	5	14	0
Stewart Island shag	56	0	0	1	15	2	6	1	4
White-chinned petrel	30	1	1	0	29	1	20	6	0
Yellow-eyed penguin (mainland)	2	32	0	19	0	3	6	0	5
Northern giant petrel	41	2	1	0	4	0	39	1	1
Spotted shag	25	1	0	2	9	21	3	5	0
Northern royal albatross	30	11	2	3	3	1	19	9	2
Chatham petrel	0	57	0	0	1	0	15	0	0
Chatham Island taiko	0	94	0	0	0	0	0	0	0
Southern royal albatross	36	4	4	2	4	1	5	1	1
Snares Cape petrel	3	8	3	9	1	0	37	4	0
Grey petrel	5	14	4	0	2	0	32	2	0
Little black shag	1	3	0	51	0	0	1	5	0
Light-mantled sooty albatross	39	19	1	1	0	0	1	0	1
Fiordland crested penguin	0	84	2	2	0	0	1	2	0
Grey-headed albatross	24	40	5	0	4	0	4	6	1
New Zealand king shag	12	34	0	10	0	0	1	0	0
New Zealand storm petrel	4	0	0	26	0	1	6	16	0
Pitt Island shag	-	-	-	-	0	1	1	3	0
Chatham Island shag	-	-	-	-	2	0	0	0	0
Pycroft's petrel	-	-	-	-	0	0	15	0	0
North Island little shearwater*	-	-	-	-	2	1	6	2	0
New Zealand white-faced storm petrel	-	-	-	-	0	0	2	4	0

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"	

CSP Research Responses

- Mark-recapture study to estimate demographic parameters including adult survival
- Total population estimate
- Routine monitoring of population trend
- Collecting spatial tracking information
- Taxonomic investigation



Mark-recapture study

Common name	Risk parameter								
	TWL	BLL	SLL	SN	CM	A	S_A	N_{BP}	P_B
Black petrel	1	19	0	0	7	0	21	7	1
Salvin's albatross	26	1	0	0	17	2	29	1	0
Southern Buller's albatross	12	2	3	0	10	1	47	0	1
Flesh-footed shearwater	4	6	0	0	2	0	50	0	0
Gibson's albatross	1	2	10	0	3	0	46	2	4
New Zealand white-capped albatross	29	0	0	0	23	2	26	2	3
Chatham Island albatross	6	25	0	0	0	0	19	3	0
Antipodean albatross	8	7	16	0	6	0	16	1	5
Westland petrel	13	25	9	0	6	3	21	1	2
Northern Buller's albatross	6	3	17	0	4	0	40	3	2
Campbell black-browed albatross	8	25	7	0	1	0	5	14	0
Stewart Island shag	56	0	0	1	15	2	6	1	4
White-chinned petrel	30	1	1	0	29	1	20	6	0
Yellow-eyed penguin (mainland)	2	32	0	19	0	3	6	0	5
Northern giant petrel	41	2	1	0	4	0	39	1	1
Spotted shag	25	1	0	2	9	21	3	5	0
Northern royal albatross	30	11	2	3	3	1	19	9	2
Chatham petrel	0	57	0	0	1	0	15	0	0
Chatham Island taiko	0	94	0	0	0	0	0	0	0
Southern royal albatross	36	4	4	2	4	1	5	1	1
Snares Cape petrel	3	8	3	9	1	0	37	4	0
Grey petrel	5	14	4	0	2	0	32	2	0
Little black shag	1	3	0	51	0	0	1	5	0
Light-mantled sooty albatross	39	19	1	1	0	0	1	0	1
Fiordland crested penguin	0	84	2	2	0	0	1	2	0
Grey-headed albatross	24	40	5	0	4	0	4	6	1
New Zealand king shag	12	34	0	10	0	0	1	0	0
New Zealand storm petrel	4	0	0	26	0	1	6	16	0
Pitt Island shag	-	-	-	-	-	1	1	3	0
Chatham Island shag	-	-	-	-	-	0	0	0	0
Pycroft's petrel	-	-	-	-	-	0	15	0	0
North Island little shearwater	-	-	-	-	-	1	6	2	0
New Zealand white-faced storm petrel	-	-	-	-	-	0	2	4	0

Population Estimate

Common name	Risk parameter								
	TWL	BLL	SLL	SN	CM	A	S_A	N_{BP}	P_B
Black petrel	1	19	0	0	7	0	21	7	1
Salvin's albatross	26	1	0	0	17	2	29	1	0
Southern Buller's albatross	12	2	3	0	10	1	47	0	1
Flesh-footed shearwater	4	6	0	0	2	0	50	0	0
Gibson's albatross	1	2	10	0	3	0	46	2	4
New Zealand white-capped albatross	29	0	0	0	23	2	26	2	3
Chatham Island albatross	6	25	0	0	0	0	19	3	0
Antipodean albatross	8	7	16	0	6	0	16	1	5
Westland petrel	13	25	9	0	6	3	21	1	2
Northern Buller's albatross	6	3	17	0	4	0	40	3	2
Campbell black-browed albatross	8	25	7	0	1	0	5	14	0
Stewart Island shag	56	0	0	1	15	2	6	1	4
White-chinned petrel	30	1	1	0	29	1	20	6	0
Yellow-eyed penguin (mainland)	2	32	0	19	0	3	6	0	5
Northern giant petrel	41	2	1	0	4	0	39	1	1
Spotted shag	25	1	0	2	9	21	3	5	0
Northern royal albatross	30	11	2	3	3	1	19	9	2
Chatham petrel	0	57	0	0	1	0	15	0	0
Chatham Island taiko	0	94	0	0	0	0	0	0	0
Southern royal albatross	36	4	4	2	4	1	5	1	1
Snares Cape petrel	3	8	3	9	1	0	37	4	0
Grey petrel	5	14	4	0	2	0	32	2	0
Little black shag	1	3	0	51	0	0	1	5	0
Light-mantled sooty albatross	39	19	1	1	0	0	1	0	1
Fiordland crested penguin	0	84	2	2	0	0	1	2	0
Grey-headed albatross	24	40	5	0	4	0	4	6	1
New Zealand king shag	12	34	0	10	0	0	1	0	0
New Zealand storm petrel	4	0	0	26	0	1	6	16	0
Pitt Island shag	-	-	-	-	-	1	1	3	0
Chatham Island shag	-	-	-	-	-	0	0	0	0
Pycroft's petrel	-	-	-	-	-	0	15	0	0
North Island little shearwater	-	-	-	-	-	1	6	2	0
New Zealand white-faced storm petrel	-	-	-	-	-	0	2	4	0

Monitoring Population Trend

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

Taxonomy & Tracking Studies

- Taxonomic investigation to clarify species taxonomy and understand which breeding sites represent distinct populations
- 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

CSP Research Response:

Common name	CSP research response				
	M-R	Pop Est	Monitor	Track	Taxonomy
Black petrel	Y		Y	Y	
Salvin's albatross	P		Y	Y	
Southern Buller's albatross	Y		Y		
Flesh-footed shearwater	Y		Y	Y	
Gibson's albatross	Y		Y		
New Zealand white-capped albatross	P		Y		
Chatham Island albatross			Y		
Antipodean albatross	P		Y	Y	
Westland petrel	Y		Y		
Northern Buller's albatross	I		Y		Y
Campbell black-browed albatross		Y	Y		
Stewart Island shag			Y		
White-chinned petrel	Y		Y	Y	Y
Yellow-eyed penguin (mainland)			Y		Y
Northern giant petrel	I		Y		
Spotted shag			Y		Y
Northern royal albatross			Y		
Chatham petrel			Y		
Chatham Island taiko					
Southern royal albatross					
Snares Cape petrel	I			Y	
Grey petrel	I				
Little black shag					
Light-mantled sooty albatross				Y	
Fiordland crested penguin				Y	
Grey-headed albatross					
New Zealand king shag			Y	Y	
New Zealand storm petrel		Y	Y	Y	
Pitt Island shag			Y	Y	
Chatham Island shag			Y	Y	
Pycroft's petrel					
North Island little shearwater					
New Zealand white-faced storm petrel					

Common name	2015/16	2016/17	2017/18	2018/19	2019/20
Black petrel	M-R study GBI Pop est GBI, LBI	Review		Pop est GBI, LBI	
Salvin's albatross	Pop est & Track Bounty, Review M-R feasibility	Review		Pop est Bounty	
Southern Buller's albatross	M-R study	M-R study Pop est Snares	M-R study	M-R study	Pop est Snares
Flesh-footed shearwater	M-R study & track Pop est various	M-R study	M-R study	Pop est various, M-R study review	
Gibson's albatross	M-R study	M-R study	Review M-R study Pop est		
New Zealand white-capped albatross	Pop est Auck Is, Review M-R feasibility			Pop est Auck Is	
Chatham Island albatross	Pop est Chat			Pop est Chat	
Antipodean albatross	M-R study* & track, Pop est Antip	M-R study*	M-R study*	Review M-R study* Pop est Antip	
Westland petrel	M-R study	M-R study , Pop est mainland	M-R study	Review M-R study	Pop est mainland
Northern Buller's albatross	Pop est & Invest M-R study Chat, Review taxonomy			Pop est Chat	
Campbell black-browed albatross		Pop est Campbell			Pop est Campbell
Stewart Island shag			Pop est mainland		
White-chinned petrel	Pop est & track Auck Is, Review M-R feasibility, Review taxonomy	Pop est Campbell	Pop est Antip	Pop est Auck Is	Pop est Campbell
Yellow-eyed penguin - mainland		Pop est mainland Review taxonomy			Pop est mainland
Northern giant petrel	Investigate M-R study, Pop est Chat, Pop est Auck Is	Pop est Campbell	Pop est Antip	Pop est Chat Pop est Auck Is	Pop est Campbell
Spotted shag		Pop est review year 1 Review taxonomy	Pop est review year 2	Review	
Northern royal albatross	Pop est Chat			Pop est Chat	
Chatham petrel	Pop est Chat			Pop est Chat	
Snares Cape petrel		Pop est Snares, Investigate M-R study			Pop est Snares
Grey petrel	Investigate M-R study				
Light-mantled sooty albatross	Trial tracking Campbell	Trial tracking Campbell			
Fiordland crested penguin			Tracking mainland		
New Zealand king shag	Review tracking feasibility	Pop est mainland			Pop est mainland
New Zealand storm petrel	Population 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	

Prioritizing Observer Coverage

L2 Risk Assessment 2013

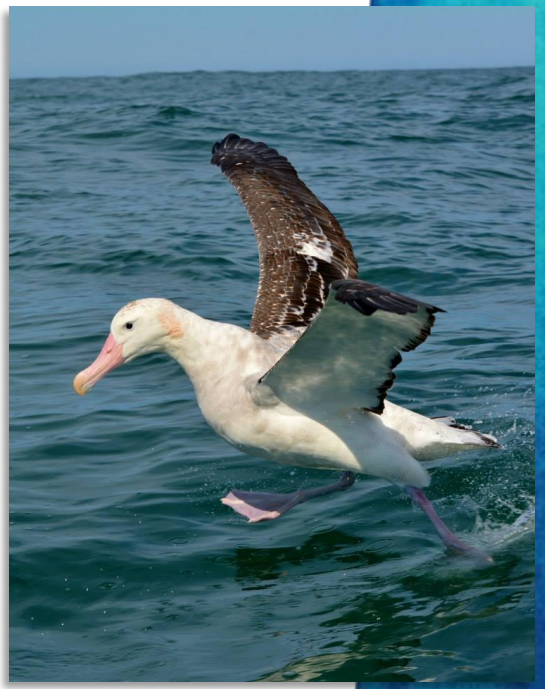
	TWL	BLL	SLL	SN
Black petrel	1	19	0	0
Salvin's albatross	26	1	0	0
Southern Buller's albatross	12	2	3	0
Flesh-footed shearwater	4	6	0	0
Gibson's albatross	1	2	10	0
New Zealand white-capped albatross	29	0	0	0

L2 Risk Assessment 2014

Species	Small inshore trawl	Flatfish trawl	Bluenose BLL	Small inshore BLL	SNA BLL	Large BLL	Large SLL (foreign)	Small SLL (domestic)	Large processor trawl	Large meal trawl	Large fresher trawl	SBW trawl	SCI trawl	Mackerel trawl	SQU trawl	Deepwater trawl	Setnet
Black petrel	0.29	0.01	7.30	4.85	5.88	0.01	0.00	1.00	0.00	0.00	0.00	0.00	0.06	0.01	0.00	0.00	0.02
Salvin's albatross	1.15	0.13	0.01	0.41	0.00	0.01	0.00	0.02	0.35	0.17	0.00	0.01	0.39	0.00	0.04	0.05	0.00
Southern Buller's albatross	0.05	0.09	0.04	0.01	0.00	0.01	0.15	0.06	0.18	0.37	0.00	0.00	0.02	0.01	0.29	0.00	0.00
Flesh-footed shearwater	0.12	0.00	0.03	0.12	0.73	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00
Gibson's albatross	0.01	0.01	0.02	0.00	0.00	0.00	0.01	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
New Zealand white-capped albatross	0.27	0.02	0.00	0.00	0.00	0.00	0.01	0.04	0.06	0.03	0.00	0.00	0.04	0.00	0.23	0.01	0.00
Chatham Island albatross	0.01	0.02	0.06	0.90	0.01	0.03	0.00	0.01	0.02	0.02	0.00	0.00	0.03	0.00	0.00	0.18	0.00
Antipodean albatross	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Westland petrel	0.02	0.03	0.00	0.01	0.00	0.00	0.00	0.09	0.02	0.04	0.00	0.00	0.01	0.01	0.00	0.00	0.03
Northern Buller's albatross	0.02	0.00	0.09	0.01	0.00	0.00	0.01	0.39	0.05	0.05	0.00	0.00	0.03	0.00	0.00	0.01	0.00
Campbell black-browed albatross	0.00	0.00	0.05	0.04	0.00	0.00	0.00	0.05	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.00
Stewart Island shag	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
White-chinned petrel	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.02	0.01	0.00	0.00	0.06	0.00	0.07	0.00	0.00
Northern giant petrel	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.06	0.00	0.01	0.02	0.00
Spotted shag	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Northern royal albatross	0.01	0.01	0.03	0.01	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01
Chatham petrel	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yellow-eyed penguin (mainland)	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
Southern royal albatross	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Chatham Island taiko	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Snares Cape petrel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grey petrel	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Little black shag	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Light-mantled sooty albatross	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Fiordland crested penguin	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Grey-headed albatross	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
New Zealand king shag	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
New Zealand storm petrel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Observer Coverage Priorities (*example*)

Black petrel	BLL		
	Bluenose BLL	SNA BLL	Small inshore BLL
Salvin's albatross	TWL		
	Small inshore trawl	SCI trawl	Large processor trawl
Southern Buller's albatross	TWL		
	Large meal trawl	Squid Trawl	
Flesh-footed shearwater	BLL		
	SNA BLL	Small inshore BLL	
Gibson's albatross	SLL		
	Small SLL (domes-tic)		
New Zealand white-capped albatross	TWL		
	Small inshore trawl	SQU trawl	



Cryptic Mortality Research - species with highest CM uncertainty

Common name	CM
Black petrel	7
Salvin's albatross	17
Southern Buller's albatross	10
New Zealand white-capped albatross	23
Antipodean albatross	6
Westland petrel	6
Stewart Island shag	15
White-chinned petrel	29
Spotted shag	9

Questions and/or Comments?

Thank You!

Special thanks to Igor Debski, Katie Clemens-Seely,
& the DOC MST Team

Department of Conservation
Te Papa Atawhai

Protected fish
Medium-term Research Update

Department of
Conservation
Te Papa Atawhai

Scope

7 Protected sharks White pointer

- Oceanic white tip
- Deepwater nurse
- Basking
- Whale
- Spine tailed devil ray
- Manta ray

2 Protected teleosts

- Giant grouper
- Spotted black grouper

Interaction, Population and Mitigation

Guidance

Goals NPOA-Sharks

•Biodiversity and long-term viability of shark populations
•Domestic engagement and partnerships
•International engagement
•Research and information

CSP Guiding Objectives

•Proven mitigation strategies are in place.
•The nature of direct effects of commercial fishing on protected species is described.
•The extent of known direct effects of commercial fishing on protected species is adequately understood.
•The nature and extent of indirect effects of commercial fishing.
•Adequate information on population level and susceptibility to fisheries effects exists.

Risk-Based Prioritisation

- Informed by Francis and Lyon ‘Review of commercial fisheries interactions and population information for protected fish species’ (2012)
  - Informs key knowledge gaps
  - Identifies key areas of interaction
  - Indicates species of key priority

- Refined by outputs of level 1 and 2 risk assessments

Risk-Based Prioritisation

- Refined based on relative rankings in the Level 1 Risk Assessment
  - Prioritise Species
  - Not used as an absolute measure

- Identification of knowledge gaps
  - Information generally sparse
  - Little knowledge of abundance indexes or population size

		Year				
Species	Research	2014/15	2015/16	2016/17	2017/18	2018/19
Basking shark	L1RA L2RA MIT SURV LIVE TRACK BIO GEN					
Deepwater nurse shark	L1RA L2RA MIT SURV LIVE TRACK BIO GEN					
Oceanic whitetip shark	L1RA L2RA MIT SURV LIVE TRACK BIO GEN					
Whale shark	L1RA L2RA MIT SURV LIVE TRACK BIO GEN					
White pointer shark	L1RA L2RA MIT SURV LIVE TRACK BIO GEN					
Manta ray	L1RA L2RA MIT SURV LIVE TRACK BIO GEN					
Spinetail devil ray	L1RA L2RA MIT SURV LIVE TRACK BIO GEN					
Giant grouper	L1RA L2RA MIT SURV LIVE TRACK BIO GEN					
Spotted black grouper	L1RA L2RA MIT SURV LIVE TRACK BIO GEN					