

CSP Initial research proposals 2016/17

CSP RAG 25 February 2016

Purpose

These initial project proposals have been developed to deliver outputs to address research gaps identified by the Conservation Services Programme (CSP) Research Advisory Group (RAG). These gaps have been identified through the development of medium term research plans, or at previous meetings of the RAG. It is intended that these initial proposals, and any other proposals identified by the RAG, will be prioritised at the CSP RAG meeting of 25 February 2016. The prioritised proposals will be used to develop the CSP Annual Plan 2016/17.

These initial research proposals should be considered in light of the following key documents:

- [CSP Strategic Statement 2015](#)
- CSP Seabird medium term research plan 2016
- Draft CSP fish plan 2015
- [CSP Annual Plan 2015/16](#)

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Interaction Projects

INT-2015-2 Identification of marine mammals, turtles and protected fish captured in New Zealand fisheries

This multi year project was consulted on in 2015/16 and is due for completion in June 2017. It is proposed to form part of the CSP Annual Plan 2016/17

Full details are provided in the CSP Annual Plan 2015/16

INT-2015-3 Identification and storage of cold-water coral bycatch specimens

This multi year project was consulted on in 2015/16 and is due for completion in June 2018. It is proposed to form part of the CSP Annual Plan 2016/17

Full details are provided in the CSP Annual Plan 2015/16

INT-1 Observing commercial fisheries

Term: One year.

Guiding Objectives: CSP Objectives A, B, C; National Plan of Action – Seabirds, National Plan of Action – Sharks; Hector’s and Maui’s dolphin Threat Management Plan.

Project Objective: To understand the nature and extent of protected species interactions with New Zealand commercial fishing activities.

Understanding the nature and extent of interactions between commercial fisheries and protected species can identify where the most significant interactions are occurring and can be used to inform development of ways to mitigate those interactions and adverse effects. Such data contribute to assessments of the risks posed to protected species by commercial fishing and whether mitigation strategies employed by fishing fleets are effective at reducing protected species captures.

The CSP Observer Programme will continue to purchase baseline services for “offshore” fisheries from MPI Observer Services, given the scale of their operation, which allows observers to be placed strategically across New Zealand Fisheries. Inshore fisheries observer coverage will also be delivered by MPI Observer Services, according to a joint planning process.

Planning of observer coverage is undertaken jointly by MPI and DOC as part of a separate process and will be consulted on as part of the consultation on the CSP Annual Plan 2015/16.

INT-2 Identification of seabirds captured in New Zealand fisheries

Term: Three years.

Guiding Objective: CSP objectives B and C; CSP Seabird Plan; National Plan of Action Seabirds

Project Objective: To determine, through examination of both photographs and returned seabird specimens, the taxon, sex, and where possible age-class and provenance of seabirds killed in New Zealand fisheries

Birds with significant differences in conservation status can appear morphologically similar. The accurate determination of the taxon of seabirds captured in New Zealand fisheries is vital for examining the potential threat to population viability posed by incidental fisheries captures. Observers on commercial vessels are not always able to identify seabirds at sea with high precision and the assessment of the age-class, sex and provenance of captured individuals requires autopsy in the majority of cases.

Examining the causes of mortality and types of injuries incurred by individual seabirds returned from fisheries is necessary to help reduce future seabird captures in New Zealand fisheries by identifying gear risks. Linking this information to species, age- and sex-class, and breeding status, helps identify if different groups of seabirds are vulnerable to different risks in fishing interactions.

Information gained through this project will link to Ministry for Primary Industries databases, seabird bycatch estimates, and will inform ongoing risk assessment, research and modelling of the effects of fisheries bycatch on seabird populations. Further, the mode of capture and associated information will enable robust analyses to be made of the factors contributing to seabird capture events and inform the development of appropriate mitigation strategies.

Indicative cost: \$80,000 per annum

INT-3 Identification tools for seabirds, marine mammals, turtles and protected fish captured in New Zealand fisheries

Term: Three years.

Guiding Objective: CSP objectives A, B and C; CSP Seabird Plan; CSP Protected Fish Plan; National Plan of Action Seabirds; National Plan of Action Sharks

Project Objective: To develop and produce identification tools targeted at commercial fishermen to improve their understanding of protected species interacting with their fishing operations and the quality of data reported on captures of seabirds, marine mammals, turtles and protected fish.

The accurate at-sea identification of seabirds, marine mammals, turtles and protected fish captured in New Zealand fisheries can be difficult. In particular, physically similar species can be at markedly different risk from fisheries. Having up-to-date identification tools will improve the ability of fishermen to accurately understand which species are interacting with their fishing operations, so that they can ensure adequate measures are being taken to avoid or minimise bycatch. These tools will also help improve the quality of data reported on captured protected species, thus contributing to a better understanding of the nature and extent of interactions. Such data contributes to risk assessments used in fisheries management, and enables the development of appropriate mitigation options where required.

Indicative cost: \$10,000 per annum

INT-4 Post release survival of white pointer sharks in New Zealand setnet fisheries

Term: Two years.

Guiding Objectives: CSP Objectives A, B and C; CSP Protected Fish Plan; National Plan of Action - Sharks

Project Objectives

1. To estimate post release survival rates for white sharks caught in commercial setnets.
2. To identify the operational and biological factors that affect post-release mortality of white sharks.
3. To identify methods of improving post release survival.

White pointer sharks have been observed caught throughout the New Zealand EEZ and in a wide range of fisheries (Frances & Lyon 2012). As with other shark species there is a general paucity of information on the life history characteristics of white pointer sharks however indications are that they are generally slow growing and late maturing (Francis & Lyon 2012) making them susceptible to fishing impacts at a population level. While those animals caught in deeper water offshore trawls are generally identified as dead, those caught in coastal setnet fisheries, particularly on the South Coast South Island and West Coast North Island are often reported as being released alive. In order to adequately assess fishery impact and develop mitigation solutions to maximise the likelihood of survival it is important to understand the post release survival of these animals. Studies on other elasmobranchs, bycaught in New Zealand fisheries have identified low survival rates of animals which were assessed as alive and in good condition at time of release (Francis 2014). Identifying factors which affect post release survival allows mitigation practices to be developed to reduce fisheries impacts.

Indicative cost: \$40,000 per annum

References

- Frances, M. P., Lyon, W. S 2012: Review of commercial fishery interactions and population information for eight New Zealand protected fish species. Report prepared by NIWA for the New Zealand Department of Conservation, Wellington.
- Frances, M. P. 2014: Survival and depth distribution of spinetail devilrays (*Mobula japonica*) released from purse seine catches. Report prepared by NIWA for the New Zealand Department of Conservation, Wellington.

INT-5 Indirect effects of commercial fishing on yellow-eyed penguins

Term: One year.

Guiding Objectives: CSP Objective D.

Project Objectives:

1. To collate and synthesise existing information relevant to the indirect effect of commercial fishing induced benthic habitat modification on the mainland population of yellow-eyed penguins
2. To provide recommendations for a detailed research plan to complement existing information so as to adequately understand the indirect effect of commercial fishing induced benthic habitat modification on the mainland population of yellow-eyed penguins.

Ellenberg and Mattern (2012; output of CSP project POP2011-08) provide research recommendations to understand the impact of fishing induced benthic habitat modification on yellow-eyed penguins in the Otago and Foveaux Strait regions. The recommendations include data collection on yellow-eyed penguins using GPS devices, and sea floor surveys. This project will assess available information to describe mechanisms for such potential indirect effects of commercial fishing, and provide recommendations to better understand mechanisms identified. A thorough collation and synthesis of existing information will ensure cost effectiveness and synergies with other research programmes are maximised in progressing our understanding in this area.

Indicative cost: \$30,000

INT-6 Indirect effects of commercial fishing on Buller's shearwater and red-billed gulls

Term: One year.

Guiding Objectives: CSP Objective D.

Project Objective: Identify potential indirect effects of commercial fishing on Red billed gulls and Buller's shearwater

Commercial fishing, including purse seine capture methods, may be driving changes in fish populations in the Hauraki Gulf area leading to reduced availability of suitable prey for Buller's shearwater and red-billed gulls in surface waters. As poor divers, Buller's shearwater specialise in foraging in association with fish work-ups. . This may be contributing to reduced breeding success of this species, which breeds only at the Poor Knights Islands. Recent tracking studies have shown that Buller's shearwaters now travel to the eastern South Island to gather food and incubation shift lengths have increased markedly since the 1970's (from 4 days per shift to 14 days). Red-billed gull colonies in the Hauraki Gulf have declined substantially from the 1960s. For example less than 100 pairs nested on Mokohinau Island group in 2015 whereas this colony had >20,000 birds in the early 1960's. Red-billed gulls on the outer island colonies depend on krill and small fish brought to the sea surface by large schools of fish. This project will assess available information on seabird interactions with fish shoals and analyse the fish stock capture data from purse seine fleets in Hauraki Gulf and Bay of Plenty since the 1970s. This will be used to describe mechanisms for potential indirect effects of commercial fishing, and provide recommendations to better understand the mechanisms identified.

Indicative cost: \$20,000

Cryptic mortality of seabirds: The CSP seabird plan identifies considerable uncertainty in risk estimates arises from uncertainty in cryptic mortality (e.g. Salvin's albatross, white-capped albatross, Stewart Island shag and white-chinned petrels). No projects are proposed for 2016/17 as relevant ongoing work is proposed by MPI for 2016/17.

Population Projects

Projects arising from the CSP Seabird medium term research plan 2015

POP-2015-2 Flesh-footed shearwater: Various locations population project

This multi year project was consulted on in 2015/16 and is due for completion in June 2018. It is proposed to form part of the CSP Annual Plan 2016/17

Full details are provided in the CSP Annual Plan 2015/16

POP-1 Grey petrels: Antipodes Island population project

Term: Three years

Guiding Objectives: CSP Objective E; CSP seabird plan; National Plan of Action – Seabirds

Project Objectives

1. To locate grey petrel study areas established in 2009 and 2010 on Antipodes Island and assess grey petrel occupancy rates.
2. To recapture previously banded birds and mark a new sample of birds to estimate key demographic parameters of grey petrels on Antipodes Island.

Grey petrels have been consistently caught in long-line fisheries east of New Zealand but the impact of these catches on the major New Zealand breeding population on Antipodes Island is poorly understood. A population census and burrow survey in 2001 and again in 2009-10 estimated a total breeding population of c.50,000 pairs. Banding studies were initiated on grey petrels over three seasons by marking 220 birds in study nests or on the surface in colonies. There has been no follow up assessment of these marked birds since 2010 and there is no reliable estimate of adult survival rate for this population. This project will attempt to improve the information gap on adult survival rates of this species in New Zealand to inform the Level 2 risk assessment process. Mice on Antipodes Island are planned to be removed by aerial poisoning operations in winter 2016 and there will be follow up trips over the next few years. There is potential for cost savings for the grey petrel population monitoring by sharing logistic costs with this project. Grey petrels nest in autumn/winter when mice numbers would be expected to peak.

Indicative costs: \$120,000 per annum

References

- Sommer, E; Boyle, D; Baer, J, Fraser, M, Palmer, D, Sagar, P (2010) Antipodes Island white-chinned petrel and grey petrel field work report, 2009-10. Final Research Report for Ministry of Fisheries project PRO2006-01, Wellington. 13p. (Unpublished report held by Ministry for Primary Industries, Wellington.)
- Sommer, E; Boyle, D; Fraser, M (2009) Antipodes white-chinned petrel and grey petrel trip report, 2009. Final Research Report for Ministry of Fisheries project PRO2006-01, (Unpublished report held by Ministry for Primary Industries, Wellington.) 19 p.

POP-2 Black petrel: Aotea/Great Barrier Island & Hauturu/Little Barrier Island population project

Term: Three years

Guiding Objectives: CSP Objective E; CSP seabird plan; National Plan of Action – Seabirds

Project Objectives

3. To estimate the population size of black petrel at Great Barrier and Little Barrier Islands.
4. To estimate key demographic parameters of black petrel at Great Barrier Island.

CSP Projects POP2014-02 and POP2015-01 undertook research to better estimate the total population size by targeting survey effort at areas outside the main breeding colony on Great Barrier Island, and at Little Barrier Island. Trials of a mixed method approach using acoustic monitoring and ground searching are commenced in 2014/15 and have been . Objective 1 of this project will build on the recommendations from POP2014-02, and address the outputs of the latest Level 2 Seabird Risk assessment (Richard and Abraham 2015) to conduct adequate field surveys to robustly estimate the total breeding population size of black petrels. Other areas of priority to CSP include refining estimates of key demographic parameters, primarily juvenile survival, which has been demonstrated to be critical to determining the population trajectory (Bell et al 2011). Continuation of the mark-recapture study at Great Barrier Island will be the secondary focus of this project (Objective 2), and opportunities to maximise logistical synergies between the two objectives will be sought.

Note: Acoustic detection for black petrels will occur in area for suspected New Zealand storm petrel habitation therefore minor additional analysis will help inform the breeding distribution of both species.

Indicative cost: \$100,000 per annum

Reference

Bell, E.A., Sim, J.L., Scofield, P., Francis, C. 2011: Population parameters of the black petrels (*Procellaria parkinsoni*) on Great Barrier Island (Aotea Island), 2009/10. Report prepared by Wildlife Management International Limited for the New Zealand Department of Conservation, Wellington.

Richard, Y., Abraham, E. R. 2015: Assessment of the risk of commercial fisheries to New Zealand seabirds, 2006–07 to 2012–13, New Zealand Aquatic Environment and Biodiversity Report 162, Available at <http://www.mpi.govt.nz/news-resources/publications.aspx>.

POP-3 Salvin's albatross: Bounty Islands population project

Term: Two years.

Guiding Objectives: CSP Objective E; CSP seabird plan; National Plan of Action - Seabirds

Project Objectives

1. To estimate the population size of Salvin's albatross at the Bounty Islands.
2. To describe the at-sea distribution of Salvin's albatross breeding at the Bounty Islands.

Recent population estimates of Salvin's albatross at the Bounty Islands (part of CSP project POP2012-06) using ground and aerial methods have found contrasting evidence in regards population trend (Amev & Sagar 2013; Baker et al 2014). The at-sea foraging distribution of this population is described from only a small sample size of individuals due to device failure in a recent study (Thompson et al 2014; part of POP2012-06). This project will seek to obtain a representative sample of year-round foraging tracks from breeding birds at the Bounty Islands, conduct a ground-truthed aerial census and make further ground counts comparable to historic

data. Completing all these components in one project will maximise cost-effectiveness at this remote site.

Indicative cost: \$110,000 per annum

References

- Amey, J., Sagar, P. 2013. Salvin's albatross population trend at the Bounty Islands, 1997-2011. Report prepared by the National Institute for Water and Atmosphere for the New Zealand Department of Conservation, Wellington. 31p.
- Baker, G.B., Jenz, K., Sagar, P. 2014. 2013 Aerial survey of Salvin's albatross at the Bounty Islands. Report prepared by Latitude 42 Environmental Consultants Pty Ltd for the New Zealand Department of Conservation, Wellington. 10p.
- Thompson, D., Sagar, P., Torres, L., and Charteris, M. 2014. Salvin's albatrosses at the Bounty Islands: at-sea distribution. Report prepared by NIWA for the New Zealand Department of Conservation, Wellington. 15p.

Note: A similar project was included the MPI Aquatic Environment research plan for 2016/17, and is included here for completeness as priority in the CSP seabird plan. If delivered by MPI this project will be removed from consideration for delivery by CSP.

POP-4 Southern Buller's albatross: Snares/Tini Heke population project

Term: Three years.

Guiding Objectives: CSP Objective E; CSP seabird plan 2015; National Plan of Action - Seabirds

Project Objective: To estimate key demographic parameters of Southern Buller's albatross at the Snares.

An established study site for Southern Buller's albatross, with substantial historic mark-resight effort, exists at the Snares (Sagar 2014), one of the most accessible subantarctic island groups. This project will continue standard mark-recapture monitoring to further improve estimates of key demographic parameters, particularly adult survival. Note that updated quantitative modelling of this population is underway during 2014/15 (commissioned by the Ministry for Primary Industries).

Indicative cost: \$50,000 per annum

Reference

- Sagar, P. 2014. Population studies of Southern Buller's albatrosses on The Snares. Report prepared by NIWA for the New Zealand Department of Conservation, Ministry for Primary Industries and Deepwater Group Ltd.

Note: A similar project was included the MPI Aquatic Environment research plan for 2016/17, and is included here for completeness as priority in the CSP seabird plan. If delivered by MPI this project will be removed from consideration for delivery by CSP.

POP-5 Seabird population research: Chatham Islands 2016-17

Term: One year.

Guiding Objectives: CSP Objective E; CSP seabird plan 2016; National Plan of Action - Seabirds

Project Objective: To collect information on key aspects of the biology of selected at-risk seabird species in order to reduce uncertainty or bias in estimates of risk from commercial fishing.

Objective	Species	Target biological information
1	Chatham Island albatross	A - Population size
2	Northern Buller's albatross	A - Population size B - Investigate the feasibility of collecting data on adult survival and other demographic parameters
3	Northern giant petrel	A - Population size
4	Northern royal albatross	A - Population size
5	Pitt Island shag	A - Population size
6	Chatham Island shag	A - Population size

The Conservation Services Programme Seabird medium term research plan 2016 (CSP seabird plan 2016) outlines a five year research programme to deliver on the seabird population research component of CSP. It is targeted at addressing relevant CSP Objectives (as described in the CSP Strategic Statement) and National Plan of Action – Seabirds Objectives. This proposal delivers priority research components of the CSP seabird plan 2016 involving field work at the Chatham Islands. The proposal has been developed to maximise cost and logistical efficiencies between components. Supporting rationale for all the components is summarised in the CSP seabird plan 2016. It is envisaged that a variety of methods will be used, including ground-based counts, aerial survey, boat-based survey and satellite imagery derived counts. Methods will be developed and tailored to each species and site.

Indicative cost: \$120,000.

POP-6 Seabird population research: Auckland Islands 2016-17

Term: One year.

Guiding Objectives: CSP Objective E; CSP seabird plan 2015; National Plan of Action - Seabirds

Project Objective: To collect information on key aspects of the biology of selected at-risk seabird species in order to reduce uncertainty or bias in estimates of risk from commercial fishing.

This proposal covers prioritised components involving field work at the Auckland Islands, which have been developed to maximise cost and logistical efficiencies between components. Supporting rationale for all the components is summarised in the CSP seabird plan

Objective	Species	Target biological information
1	Gibson's albatross	A - Population size B - Adult survival and other demographic parameters (Adams Island)
2	White-capped albatross	A - Adult survival and other demographic parameters (Disappointment Island) B - Population size
3	White-chinned petrel	A - Adult survival and other demographic parameters (Adams Island)

The Conservation Services Programme Seabird medium term research plan 2016 (CSP seabird plan 2016) outlines a five year research programme to deliver on the seabird population research component of CSP. It is targeted at addressing relevant CSP Objectives (as described in the CSP Strategic Statement) and National Plan of Action – Seabirds Objectives. This proposal delivers priority research components of the CSP seabird plan 2016 involving field work at the Auckland Islands. The proposal has been developed to maximise cost and logistical efficiencies between components and ensure the continuation of priority long term datasets. Supporting rationale for all the components is summarised in the CSP seabird plan 2016. It is envisaged that a variety of methods will be used, including ground-based counts, aerial survey, boat-based survey and satellite imagery derived counts. Methods will be developed and tailored to each species and site.

Indicative cost: \$100,000.

POP-7 Yellow-eyed penguin foraging distribution

Term: Two years.

Guiding Objectives: CSP Objectives D, E

Project Objective:

1. To describe the at-sea foraging distribution of adult and juvenile yellow-eyed penguins breeding in Otago and Southland.

Ellenberg and Mattern (2012; output of CSP project POP2011-08) provide research recommendations to understand the impact of fishing induced benthic habitat modification on yellow-eyed penguins in the Otago and Foveaux Strait regions. The recommendations include data collection on yellow-eyed penguins using GPS devices, and sea floor surveys. This project aims to build on a proposed research programme at Otago University to investigate the diet, dispersal and foraging strategies of yellow-eyed penguins. The CSP objective will be met by extending the research programme to collect foraging data from Otago and Southland breeding sites using retrievable GPS/TDR devices for adults, and GSM non-retrievable devices for fledglings. Such information will form a key component of further investigation of mechanisms of potential indirect effects of commercial fishing on this species.

Indicative cost: \$20,000 per annum

Marine mammal projects

POP-8 New Zealand Sea Lion: Auckland Islands Population Project

Term: Three years.

Guiding Objectives: CSP Objective E.

Option 8.1 (Status quo)

Project Objectives:

1. To estimate New Zealand sea lion pup production at Enderby, Figure of 8 and Dundas Islands.
2. To mark and weigh New Zealand sea lion pups at Enderby and Dundas Islands following established techniques.
3. To conduct a five week period of resighting previously marked animals at Enderby Island.
4. To update the New Zealand sea lion database.

In order to manage the commercial fisheries impacts on New Zealand sea lions at the Auckland Islands it is critical to understand the population level and key demographic factors driving trends in the population. Modelling conducted as part of the development of a Threat Management Plan analysed the population data collected during previous years in order to determine the key demographic factors driving the observed population decline of New Zealand sea lions at the Auckland Islands. This project will extend the time series of population data available for further analyses. Undertaking the full suite of research will continue to provide important information on pup production and population status of New Zealand sea lions required to manage the fisheries impact on the species. Note: other research, and/or management actions, will be progressed as part of the implementation of the TMP and may be delivered alongside the research programme proposed here.

Option 8.2 (Pup count only)

Project Objectives:

1. To estimate New Zealand sea lion pup production at Enderby, Figure of 8 and Dundas Islands.
2. To update the New Zealand sea lion database.

At a minimum annual pup counts are required for current fisheries management purposes in order to monitor against a trigger level related to potential population declines. These pup counts can be conducted over a shorter field season than a full resighting programme and therefore reduce the quantum of cost. However simple pup counts will not collect the range of data required to inform changes in demographic parameters which may be driving population trends.

Indicative cost:

Option 1 (status quo) \$250,000 per annum

Option 2 (Pup count only) \$150,000 per annum

POP-9 Cetacean habitat suitability modelling project

Term: One year.

Guiding Objectives: CSP Objective E.

Project Objective: To provide spatial distribution information for cetacean species to inform fisheries risk assessment.

This proposal is to provide part funding to the NIWA cetacean habitat suitability modelling project. A major component of this project will be to solicit and compile existing cetacean sightings datasets from marine mammal scientists in New Zealand and industry representatives that hold marine mammal observer datasets collected during seismic surveys. These additional data will enhance NIWA models of cetacean habitat use and improve confidence in predicted habitat suitability patterns.

Model results will provide an improved understanding of the environmental drivers of cetacean habitat use and generate reliable predictions of species habitat suitability patterns. All outputs from this research project, including model results, prediction maps, confidence maps, and species sightings data, will be made available to all stakeholders through a web-based portal. This approach will allow end-users to conveniently access the data and maps they need to assess cetacean distribution information within their area of interest. This web portal will enable quick and dynamic access to the best available information on the habitat suitability of various cetacean species in New Zealand.

It is hoped that results from this project will feed in to the longer term Marine Mammal Risk assessment in NZ waters, and to DOCs 5 year marine mammal medium term research plan.

Indicative cost: \$30,000 as part funding to the project

POP-10 NZ fur seal: Bounty Islands population assessment

Term: 1 year.

Guiding Objectives: CSP Objective E.

Project Objectives:

1. To determine the population trend of fur seals at the Bounty Islands, to the extent possible using existing data.
2. To recommend future data collection protocols to better estimate the population size and trend of fur seals at the Bounty Islands.

New Zealand fur seals are captured in the southern blue whiting trawl fishery around the Bounty Islands at one of the highest rates of any trawl fishery, however, information on their population level and trend at this site is poor. Data on fur seals has been collected during a number of surveys of other species at the Islands, notably Salvin's albatross. This data exists as on ground observations and aerial photographs, and may be informative in assessing population trends. This project will assess existing information to determine its suitability for estimating the population trend of fur seals, and make recommendations on future data collection that may allow a better assessment of fur seal population level and trend. In particular, these recommendations will seek to collect data in association with other potential future monitoring (such as for Salvin's albatross) to maximise cost efficiencies.

Indicative cost: \$20,000

Protected fish projects

POP-11 Updated basking shark bycatch review

Term: One year.

Guiding Objectives: CSP Objective B; CSP Protected fish Plan; National Plan of Action – Sharks

Project Objectives:

1. To update the 2012 review of basking shark bycatch with information from the most recent fishing years.
2. To reassess the efficacy of management measures.
3. To update the review of relevant research on basking shark population parameters.
4. To explore potential future work to better understand basking shark populations and biology around New Zealand.

Since the review of Francis & Sutton (2012; output of CSP POP2011-04) a series of bycatch events and industry management interventions have occurred. The National Plan of Action-Sharks has also been developed which has specific objectives related to increasing understanding and improving management of shark populations. Advances have also been made in the understanding of basking shark biology. It is therefore timely to update the review of Francis & Sutton (2012), to ensure the most recent available information is readily available to inform management of fisheries bycatch of this species.

Indicative cost: \$15,000

References

Francis, M., Sutton, P. 2012. Basking Shark Bycatch Review. Report prepared by National Institute of Water and Atmospheric Research for the New Zealand Department of Conservation, Wellington, 38p.

Coral projects

POP-12 The age and growth of New Zealand protected corals at high risk

Term: One year.

Guiding Objectives: CSP Objective E.

Project Objective: Determine the age and growth characteristics of key high risk New Zealand cold-water coral species.

Clark et al (2014; part of CSP project POP2013-05) predicted the distribution of deep sea corals in relation to areas where they are at risk of interactions with commercial trawl gear targeting orange roughy and oreo species on the Chatham Rise. One component of this work was the development of a pilot ecological risk assessment (ERA) for protected corals in New Zealand. Risk assessments such as these are key tools for management in that they inform potential management approaches by providing a better understanding of various aspects and characteristics of coral species and the fishery that contribute to risk determination. The key limitation of this pilot ERA was data paucity on coral productivity. This relates directly to the “recoverability” of corals from disturbance which is a key factor in further developing an ERA for protected corals in New Zealand waters. There is currently a paucity of information surrounding deep sea coral regeneration times following trawling disturbances or other damage. A key priority in filling this information gap is research that will allow estimation of the age and growth characteristics of key New Zealand cold-water coral species such as the black corals (*Bathypathes* spp) as well as select gorgonian groups highlighted by the pilot ERA as high risk, such as the primnoid seafans and the genus *Paragorgia*.

Indicative cost: \$50,000

Reference

Clark, M; Tracey, D; Anderson, O; Parker, S (2014). Pilot ecological risk assessment for protected corals. Report prepared by NIWA for the New Zealand Department of Conservation, Wellington.

POP-13 Cold-water coral connectivity in New Zealand

Term: One year.

Guiding Objectives: CSP Objective E.

Project Objectives:

1. Review coral connectivity information in New Zealand (based on existing genetics work, and knowledge from overseas of reproductive potential).
2. Undertake a genetic study of key deep sea coral species highlighted by the pilot ecological risk assessment (ERA) as high risk (e.g., black corals (*Bathypathes* spp) as well as select gorgonian octocoral groups. The initial study will focus on primnoid seafans where little information is available, and if time allows on the genus *Paragorgia*).

The recolonisation potential of protected cold-water coral species is largely unknown and remains a key information gap to inform an ERA for protected corals in New Zealand. This study would review connectivity information on cold water corals in New Zealand, based on existing genetics work and knowledge from overseas on reproductive potential, that would help identify key at risk species of which a mode of recolonisation is not yet known. Following this information review, a genetic study investigating previously identified at risk coral species would be undertaken. The initial study will focus on primnoid seafans (most likely *Primnoa* sp.)

where little information is available. Paragorgia could also be investigated although this species has been well studied in our region by our Colombian colleagues. The Chatham Rise offers an ideal study site, where future sampling is likely, thereby improving the amount of material required to undertake such an investigation.

Indicative cost: \$50,000

Mitigation Projects

MIT-2015-1 Seabird bycatch reduction (small vessel longline fisheries)

This multi year project was consulted on in 2015/16 and is due for completion in June 2017. It is proposed to form part of the CSP Annual Plan 2016/17

Full details are provided in the CSP Annual Plan 2015/16

MIT-2015-2 Small vessel surface longline: seabird mitigation

This multi year project was consulted on in 2015/16 and is due for completion in June 2017. It is proposed to form part of the CSP Annual Plan 2016/17

Full details are provided in the CSP Annual Plan 2015/16

MIT-1 Protected species bycatch newsletter

Term: Two years.

Guiding Objectives: CSP Objective A; CSP seabird plan 2015; National Plan of Action - Seabirds

Project Objective: To produce a newsletter to communicate protected species-related information to trawl and longline fishermen.

Reducing the impacts of commercial fishing on protected species relies on individual fishermen actively applying best practice mitigation methods to their fishing activity. Applying and developing mitigation methods in specific circumstances requires an understanding of the protected species that may be impacted, and the nature with which they interact with fishing activity. A range of relevant information exists, often the result of research projects, and the newsletter will serve as a vehicle for communication to fishermen, fishing companies, and other interested parties. An evaluation of previous examples of this work by Pierre (2012) indicates that this format shows promise in reaching a broad sector of the fishing community and wider stake holders, and provides recommendations for further development.

Indicative cost: \$20,000 per annum

MIT-2 Inshore small vessel trawl: seabird mitigation

Term: Two years.

Guiding Objectives: CSP Objective A; CSP seabird plan 2015; National Plan of Action - Seabirds

Project Objective: Develop and/or test the feasibility and effectiveness of one, or more, novel seabird mitigation strategies not currently in widespread use in the small vessel trawl fishery.

The inshore small vessel trawl fishery contributes the greatest proportion of risk to Salvin's and New Zealand white-capped albatrosses (see Table 7 of the CSP seabird plan 2016). There is currently no mandatory seabird mitigation requirement for trawlers under 28 m in length. This project aims to ensure that mitigation options are available that are both effective and practical in this fishery.

Indicative cost: \$100,000 per annum

MIT-3 Entanglement of whales in pot/trap lines and setnets and a review of potential mitigation methods

Term: One year.

Guiding Objectives: CSP Objectives A and B

Project Objectives:

1. To assess the level of entanglement of whale species in pot/trap lines and setnets in New Zealand and make recommendations on whether or not the current levels of risk warrant mitigation, and
2. To identify and assess the current mitigation techniques for cetacean capture in the pot/trap lines and setnets both domestically and internationally and make recommendations as to their applicability in the New Zealand market.

Whales (primarily humpbacks, though also southern right whales and orca) can become entangled fish pot/trap lines or setnets (including down-lines). Within New Zealand this is most common in Kaikoura, during winter, where the humpback whale northern migration comes close to shore and overlaps with the rock lobster fishing activity. In recent years there have also been increasing reports on the North Island, including Orca. The occasional Southern right whale has also been reported as entangled.

The Department of Conservation holds data on the occurrence of these entanglement events. DOC also has a response team which will attempt a release a whale if conditions allow. The number of reported incidents annually is low in New Zealand in comparison with other countries, however, in recent years there has been a notable increase in occurrence outside of Kaikoura, and including other species. The frequency of humpback whale entanglements will also be related to the status of the humpback whale population as the risk of entanglement will increase with increasing numbers of whales passing through the inshore waters of the East Coast of the South Island. DOC coordinates an annual survey of the humpback whale migration each winter, and the most recent season (2015) observed the highest count of whales coming through the Cook Strait (137) since the survey commenced in 2004.

It would be timely to assess the level of risk posed to whales from commercial pot/trap and setnet fishing activity, and determine whether or not the current level of risk warrants increased mitigation measures.

In other countries where there is considerable risk to whales from pot line entanglement, a range of mitigation methods have been employed, including seasonal closures and gear modifications, some of which may or may not be applicable in the New Zealand scenario. An assessment of the current mitigation options available and their relevance to the New Zealand scenario would be beneficial if the risk to whales was deemed significant.

Indicative cost: \$30,000

MIT-4 Review of mitigation techniques in pelagic trawl fisheries: marine mammal mitigation

Term: One year.

Guiding Objectives: CSP Objective A

Project Objectives:

1. To undertake a review of historic and current mitigation techniques used in pelagic trawl fisheries around the world that are similar to the New Zealand jack mackerel fishery.
2. To produce a catalogue of these techniques defining their nature, strengths and shortcomings, and possible applicability to the New Zealand jack mackerel fishery.
3. To provide any relevant recommendations for testing within New Zealand fisheries.

The jack mackerel trawl fishery captures more cetaceans (typically common dolphins) annually than any other New Zealand fishery. A number of techniques for mitigation against interactions in this fishery have been developed, including acoustic deterrents, alterations to fishing practice and avoiding hauls at certain times of day. No validation has been performed to test whether these measures are effective, nor whether other mitigation techniques have been developed overseas which might be more effective.

Given the level of bycatch events in this fishery, it is timely and relevant to produce a review of international bycatch mitigation techniques and determine their applicability to New Zealand's fishery, in order to inform potential future management actions in the fishery.

Indicative cost: \$40,000