

# CSP Initial research proposals 2023/24

CSP RAG 28 February 2023

## **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 28 February 2023. The prioritised proposals will be used to develop the CSP Annual Plan 2023/24.

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

- [CSP Strategic Statement](#)
- [CSP Seabird medium term research plan](#)
- [CSP Protected fish medium term research plan](#)
- [CSP Marine mammal medium term research plan](#)
- [CSP Sea turtle medium term research plan](#)
- [CSP Protected coral medium term research plan](#)
- [CSP Annual Plan 2022/23](#)

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# Interaction Projects

## Ongoing projects

### **INT2021-04 Collection and curation of tissue samples from protected fishes and turtles**

This multi-year project was consulted on in 2021/22 and is due for completion in June 2024.

It is proposed to form part of the CSP Annual Plan 2023/24.

Full details are provided in the CSP Annual Plan 2021/22.

### **INT2022-02 Identification of seabirds captured in New Zealand fisheries**

This multi-year project was consulted on in 2022/23 and is due for completion in June 2025.

It is proposed to form part of the CSP Annual Plan 2023/24.

Full details are provided in the CSP Annual Plan 2022/23.

### **INT2022-03 Identification, storage and genetics of cold-water coral bycatch specimens**

This multi-year project was consulted on in 2022/23 and is due for completion in June 2025.

It is proposed to form part of the CSP Annual Plan 2023/24.

Full details are provided in the CSP Annual Plan 2022/23.

### **INT2022-04 Risk assessment for protected corals**

This two-year project was consulted on in 2022/23 and is due for completion in June 2024.

It is proposed to form part of the CSP Annual Plan 2023/24.

Full details are provided in the CSP Annual Plan 2022/23.

### **INT2022-05 Determining the resilience of Fiordland corals to fisheries impacts**

This multi-year project was consulted on in 2022/23 and is due for completion in June 2025.

It is proposed to form part of the CSP Annual Plan 2023/24.

Full details are provided in the CSP Annual Plan 2022/23.

### **INT2022-07 Post-release survival of bycaught spine-tailed devil rays in the New Zealand skipjack tuna purse seine fishery**

This multi-year project was consulted on in 2022/23 and is due for completion in June 2025.

It is proposed to form part of the CSP Annual Plan 2023/24.

Full details are provided in the CSP Annual Plan 2022/23.

## Proposed projects

### **INT-1 Observing commercial fisheries**

**Term:** 1 year

**Guiding Objectives:** CSP Objectives A, B and C; National Plan of Action – Seabirds, National Plan of Action – Sharks; New Zealand sea lion and Hector’s and Māui dolphin Threat Management Plans.

**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 Fisheries New Zealand 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 Fisheries New Zealand Observer Services, per a joint planning process. DOC purchases 50% of inshore observer services.

Planning of observer coverage is undertaken jointly by Fisheries New Zealand and DOC as part of a separate process and will be consulted on as part of the consultation on the CSP Annual Plan 2023/24.

**Indicative cost:** TBD in consultation with FNZ

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

**Term:** 3 years

**Guiding Objectives:** CSP Objectives B and C; National Plan of Action – Seabirds, National Plan of Action – Sharks; New Zealand sea lion and Hector’s and Māui dolphin Threat Management Plans.

#### **Project Objectives:**

To determine, primarily through examination of photographs, the taxon and, where possible, sex, age-class and provenance of marine mammals, turtles and protected fish observed captured in New Zealand fisheries (for live captures and dead specimens discarded at sea).

The accurate determination of the taxon of marine mammals, turtles and protected fish 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 marine mammals, turtles and protected fish at sea with high precision, and the assessment of the age-class may require expert knowledge.

Information gained through this project will link to Fisheries New Zealand databases and will inform ongoing bycatch estimation, risk assessment, research and modelling of the effects of fisheries bycatch on marine mammals, turtles and protected fish populations.

#### **Project Outputs:**

A technical report summarising the confirmed identification, sex, age and provenance and all other data collected, of all specimens examined. Data will be reported by fishery stratum (fishing method, fishery area and where possible target species).

**Indicative Cost:** \$15,000 per annum

### **INT-3 Sub-Antarctic albatross diet: composition of natural prey versus fisheries bait/waste**

**Term:** 1 year

**Guiding Objectives:** CSP Objectives B and E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

#### **Project Objectives:**

1. Identify species level prey from albatross scat and gut samples using DNA techniques.
2. Compare fisheries data on vessel bait/discard species with DNA results to inform discussion on proportions of naturally foraged vs fisheries related prey to species and colony level.
3. Improve our understanding of the relationship between seabirds and fishing vessels as a dietary source in order to make recommendations on future studies that will inform risk assessment, and mitigation efforts to reduce attractiveness of vessels to seabirds.

**Project Outputs:**

1. A technical report incorporating species level DNA analysis of existing scat collected from colonies (1) and stomach samples from fisheries bycatch (2) for albatross species including Antipodean, southern Buller's, white-capped, and Salvin's.
2. Results from bycatch samples will be compared with data extracted from the Centralised Observer Database to compare bait and offal/discard species used in fisheries from naturally foraged prey species.
3. Findings will be used to better understand the composition of naturally foraged prey and fisheries bait/waste to help understand the feeding ecology of seabird species and potential reliance on fishing vessels as a dietary source and in doing so, better understand the nature of direct adverse effects of commercial fishing on protected species.

**Indicative Cost:** \$40,000

**INT-4 Impact of fisheries extractions on pelagic foraging seabird populations in the wider Hauraki Gulf area**

**Term:** 3 years

**Guiding Objectives:** CSP Objective D; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objectives:**

1. Improve understanding of food-web dynamics and the potential impact of fisheries extractions on foraging behaviour in relation to changing seabird populations in north-east New Zealand.
2. Monitor key seabird populations with preference given to gulls, terns, gannets, fluttering shearwaters, prions, Buller's shearwaters.
3. Assess food availability in shoals, including inter-annual variation.

**Project Output:**

A technical report that describes the potential impact of fisheries extractions on seabird populations in the Hauraki Gulf region that will inform fisheries management.

**Indicative Cost:** \$30,000 per annum

**INT-5 Understanding the extent and usage of coral rubble reporting codes by fisheries observers**

**Term:** 1 year

**Guiding Objectives:** CSP Objective B; CSP Protected Coral Medium Term Research Plan Theme 1

**Project Objective:**

To improve our understanding of coral rubble reporting by fisheries observers, and to use those findings to inform current understanding of the distribution of and target fisheries involved in bycatch of coral rubble.

The coral rubble reporting codes CBB (coral rubble alive or dead) and CBD (coral rubble dead) account for over half of reported coral bycatch greenweight. However, ascertaining life status from live corals and images is very difficult. This project will examine observer images and quantify the likely proportion of genuine rubble -including how much of 'live or dead' fits each category, if more specific codes could have been used, if images are taken and match reports, and mapping areas/taxa/fisheries for which this code is the most often used.

**Project Outputs:**

A technical report, based upon observer images, that will quantify the likely proportion of genuine rubble - including how much of 'live or dead' fits each category CBB (coral rubble alive or dead) and CBD (coral rubble dead), if more specific codes could have been used, if images are taken and match reports, and mapping areas/taxa/fisheries for which this code is the most often used.

**Indicative Cost:** \$10,000

**INT-6 Understanding coral bycatch - assessing large catches**

**Term:** 1 year

**Guiding Objectives:** CSP Objective B; CSP Protected Coral Medium Term Research Plan Theme 1

**Project Objective:**

To improve our understanding and ground truthing processes for reporting of coral bycatch by fisheries observers, and to assess and map reported large catches (e.g., 500kg - >1tonne/event or trip).

This project would look at historical coral bycatch records, survey subject matter experts, examine COD vs. trip diaries, and examine imagery, to see if large catches (500kg - >1tonne/event or trip) are possible or likely, as we often see such high reports in the bycatch records. For such reports, it is difficult to disentangle what's feasible but unlikely with what's potentially erroneous. Comparisons would be made between maximum research survey coral catches by taxa, and maximum observed and corroborated catches by taxa on commercial vessels. These initial findings could be used to establish data grooming protocols and thresholds by taxa/morphological groups, and in future, a second-phase project could use modelling approaches to validate historical reporting and to map areas/fisheries where high bycatch is possible/likely - e.g., by overlapping results with trawl footprint data and hotspots abundance data in heavily fished and rarely fished areas. These outputs could inform management efforts, and would build a more confident picture of coral bycatch across the EEZ.

**Project Outputs:**

1. A technical report, based upon recent and historical coral bycatch records, surveys of subject matter experts, examination of COD vs. trip diaries and imagery, to see if large catches are feasible and likely.
2. Comparisons would be made between maximum research survey coral catches by taxa, and maximum observed and corroborated catches by taxa on commercial vessels – and mapped accordingly.
3. Drafting of data grooming protocols and thresholds by taxa/morphological groups that could underlie routine flagging and validation of observer (and potentially fisher) reported coral bycatch data.

**Indicative Cost:** \$40,000

**INT-7 Species identification of camera-detected protected species captures in New Zealand fisheries**

**Term:** 1 year

**Guiding Objective:** CSP Objective A; National Plan of Action – Seabirds; National Plan of Action – Sharks; New Zealand sea lion and Hector's and Māui dolphin Threat Management Plans.

**Project Objectives:**

1. To determine, through examination of camera footage clips, the taxon and, where possible, sex, age-class and provenance of protected species captured in New Zealand fisheries (for live captures or dead specimens discarded at sea).
2. Project the anticipated scale of work once cameras are fully deployed.

The accurate determination of the taxon of protected species captured in New Zealand fisheries is vital for examining the potential threat to population viability posed by incidental fisheries captures. With the roll-out of cameras on inshore commercial vessels, experts will be needed to assess records of protected species interactions and identify species to the lowest possible taxonomic level.

**Project Outputs:**

Produce technical report(s) that details a summary of the capture identification results and projected workload for protected species identification following the full deployment of cameras on boats.

Information gained through this project will link to Fisheries New Zealand databases and will inform ongoing bycatch estimation, risk assessment, research, and modelling of the effects of fisheries bycatch on protected species. This project acts as a pilot to assess incoming cameras information as well as project the anticipated scale of work once cameras are fully deployed. Work from this project will identify any barriers to smooth operations and inform how cameras-detected species ID is managed in the future. The project will also recommend any other areas for possible future analysis or investigation.

**Indicative Cost:** \$40,000

**INT-8 Relationship between surface foraging seabirds in the Hauraki Gulf and fish school workups**

**Term:** 1 year

**Guiding Objectives:** CSP Objective D; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objective:**

To consolidate all existing zooplankton, fish and seabird feeding association data from the Hauraki Gulf region into a single large robust dataset and combine with known oceanographic variables to better understand feeding associations.

**Project Outputs:**

A technical report that provides a review of what is currently known about seabird feeding associations with fish schools in the Hauraki Gulf and considers the role that changing oceanography map play in prey species availability.

**Indicative Cost:** \$30,000

**INT-9 Expert identifications of protected corals**

*This project was submitted by NIWA.*

**Term:** 1 year

**Guiding Objectives:** CSP Objectives B and E; CSP Protected Coral Medium Term Research Plan Theme 1

**Project Objective:**

To determine the distribution and taxonomic composition to the lowest level possible of protected coral samples and data currently identified by parataxonomists and held by the NIWA Invertebrate Collection (NIC).

This project seeks funds to extend and add value to the outputs of the POP2022-04 'Cataloguing decades of undocumented protected coral specimens' project by bringing international taxonomic experts to New Zealand to confirm and or revise identification of protected coral specimens in the NIC in Wellington. The project relates to protected deep-sea and shallow-water coral species in the orders Alcyonacea (specifically the gorgonian octocoral groups), and Scleractinia (stony corals), and the intention is to invite three experts to New Zealand in 2023/24 to confirm protected coral identifications to species level for stony corals and paramuriceid / plexaurid / acanthogorgiid octocorals. The need for identifications across these taxonomic groups highlights a real gap in knowledge in our region. All provide ecosystem services in the deep sea and constitute frequent components of trawl bycatch.

**Project Outputs:**

A technical report with a list of verified coral taxa and their geographic locations. Experts to work on New Zealand region Memoirs of their protected coral group.

**Indicative Cost:** \$30,000

**INT-10 High-resolution estimation of species diversity for a protected coral family commonly occurring as trawl bycatch**

*This project was submitted by NIWA.*

**Term:** 1 year

**Guiding Objectives:** CSP Objectives B and E; CSP Protected Coral Medium Term Research Plan Theme 1

**Project Objectives:**

To use high resolution genomic data to determine the first assessment of the number of species of Paramuriceidae (sea fans) in areas impacted by deep sea trawling.

This project will use recently-tested genetic markers to examine deep-sea gorgonian corals (Anthozoa: Octocorallia: Alcyonacea) of the sea-fan family Paramuriceidae, which is known to constitute at least 15 genera within the NZ EEZ. However, there are currently only two NZ records of described species from this group (Specify *niwainvert* extract January 2023) – the remainder constitute undescribed or unidentified species.

Outputs of this project would supplement recent examinations of species-level diversity for another gorgonian family, the Primnoidae, which was previously conducted for the Chatham Rise (BCBC2020-26) and would provide a crucial framework for review and revision by international taxonomic experts (see additional NIWA CSP proposal "Expert identifications of protected corals"). The identifications and associated distributional data would also contribute to ongoing CSP projects INT2022-03 (bycatch identification) and POP2022-04 (uncatalogued corals).

**Project Outputs:**

A technical report (and associated data), detailing high-resolution species inventory for the Chatham Rise and Campbell Plateau FMA regions for the Paramuriceidae (formerly referred to as the Plexauridae [PLE], or 'plexaurid' sea-fans).

**Indicative Cost:** \$58,000

### **INT-11 Characterising surface longline fishing fleet behaviour for sea turtle bycatch**

*This project was submitted by NIWA.*

**Term:** 1 year

**Guiding Objectives:** CSP Objective A; CSP Sea Turtle Medium Term Research Plan

**Project Objective:**

To characterise and understand the behaviour of the commercial surface longline fishing fleet operating off the eastern North Island so that spatial mitigation strategies for turtles can be evaluated.

**Project Outputs:**

A technical report describing:

- characterisation of SLL fishing off the east coast North island, using 'fishing units' including catch composition, location, time, and environmental conditions such as currents, sea temperatures, primary productivity, ocean mixing, proximity to ocean fronts;
- known turtle interactions within each fishery unit; and
- evaluation of the potential costs (to catch, by weight) and benefits (to avoidance of turtle capture) that would have been incurred from removing fishing effort in alternative fishery units.

**Indicative Cost:** \$50,000

### **INT-12 Investigating the impact of fisheries on endangered hoiho diet, microbiome and disease susceptibility**

*This project was submitted by University of Otago.*

**Term:** 2 years

**Guiding Objectives:** CSP Objectives D and E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objective:**

The main research objective is to investigate the relationship between hoiho microbiome and susceptibility to illness and changing diet, as a result of bottom trawling fishing practices.

**Project Outputs:**

The expected outputs from this proposed project will include written technical reports, peer-reviewed scientific publications, graphics, and collected and analysed data outlining the status of northern and southern hoiho populations' diet, characterising their microbiome, and identifying viral illnesses present at breeding sites over the time period 2017 to the present day. This information, in combination with other studies into the feeding zones and health of hoiho, will deliver a clearer picture of the impact of fishing practices, such as bottom trawling, on the species. Importantly, any differences between northern and southern populations will be identified and highlighted. These reports and publications will be disseminated for review by interested parties, including the CSP.

**Indicative Cost:** \$50,000 per annum

# Population Projects

## Ongoing projects

### **POP2021-04 Flesh-footed shearwater population monitoring**

This multi-year project was consulted on in 2021/22 and is due for completion in June 2024. It is proposed to form part of the CSP Annual Plan 2023/24, with a budget increase from \$60,000 to \$70,000 per annum. Full details are provided in the CSP Annual Plan 2021/22.

### **POP2022-01 Black petrel population monitoring**

This multi-year project was consulted on in 2022/23 and is due for completion in June 2025. It is proposed to form part of the CSP Annual Plan 2023/24, with a budget increase from \$70,000 to \$100,000 per annum. Full details are provided in the CSP Annual Plan 2022/23.

### **POP2022-02 Flesh-footed shearwater juvenile survival and dispersal**

This multi-year project was consulted on in 2022/23 and is due for completion in June 2024. It is proposed to form part of the CSP Annual Plan 2023/24. Full details are provided in the CSP Annual Plan 2022/23.

### **POP2022-03 Deep-sea protected coral reproduction**

This multi-year project was consulted on in 2022/23 and is due for completion in June 2024. It is proposed to form part of the CSP Annual Plan 2023/24. Full details are provided in the CSP Annual Plan 2022/23.

### **POP2022-08 Auckland Islands seabird research: Gibson's and white-capped albatross**

This multi-year project was consulted on in 2022/23 and is due for completion in June 2025. It is proposed to form part of the CSP Annual Plan 2023/24. Full details are provided in the CSP Annual Plan 2022/23.

### **POP2022-10 Antipodes Island seabird research: Antipodean albatross + white chinned petrel**

This multi-year project was consulted on in 2022/23 and is due for completion in June 2025. It is proposed to form part of the CSP Annual Plan 2023/24. Full details are provided in the CSP Annual Plan 2022/23.

## Proposed Projects

### **POP-1 Auckland Islands New Zealand sea lions**

**Term:** 3 years

**Guiding Objectives:** CSP Objective E; New Zealand sea lion Threat Management Plan; CSP Marine Mammal Medium Term Research Plan

**Project Objectives:**

1. To undertake pup counts on Enderby Island, Dundas Island and Figure of 8.
2. To collect re-sighting data at all locations to provide survivorship data for the demographic model.

**Project Outputs:**

1. A technical report providing methods used and results of the New Zealand sea lion population assessments.
2. Data to be made available in electronic format suitable for upload into the New Zealand sea lion database.

**Indicative Cost:** \$150,000 per annum

**POP-2 Spotted shag: South Island population review**

**Term:** 2 years

**Guiding Objectives:** CSP Objective E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objectives:**

1. Track individual bird movements to and from key colonies to characterise foraging distribution.
2. Compare overlap in foraging distribution and fishing effort.

**Project Outputs:**

A technical report that maps foraging distribution patterns of Otago and Foveaux shags using tracking data, describes the relationship with fisheries effort, and discusses potential implications for fisheries management.

**Indicative Cost:** \$45,000 per annum

**POP-3 Otago and Foveaux shag: foraging distribution and fisheries overlap**

**Term:** 3 years

**Guiding Objectives:** CSP Objective E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objective:**

To describe the foraging distribution, and overlap with fishing effort, for key colonies by tracking individual movement patterns.

**Project Outputs:**

1. A technical report that maps the distribution patterns of Otago and Foveaux shags away from colonies and describe the overlap of tracking data with fisheries.
2. Tracking data for individuals.

**Indicative Cost:** \$20,000 per annum

**POP-4 Snares: Southern Buller's population study**

**Term:** 3 years

**Guiding Objectives:** CSP Objective E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objectives:**

1. To monitor key demographic parameters of Southern Buller's Albatross (adult survival, juvenile survival, breeding probability, breeding success, and population size) at traditional study sites on the Snares Islands to reduce uncertainty in estimates of risk from commercial fishing and measure the success of management interventions.
2. To provide updated, high-resolution insights into the at-sea distribution of adult Southern Buller's Albatrosses from Snares Islands and Solander Island.
3. To provide an updated population estimate from Solander Island using an aerial survey.
4. To describe the diving behaviour of Southern Buller's Albatrosses from Snares islands using TDRs.

**Project Outputs:**

Annual technical report(s) on the work undertaken and results found, including updated estimates of key demographic parameters, population size, at-sea distribution, and diving behaviour.

**Indicative Cost:** \$150,000 per annum

**POP-5 Seabird breeding biology: Southern Buller's and Foveaux/Otago shag**

**Term:** 1 year

**Guiding Objectives:** CSP Objective E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objectives:**

1. Investigate breeding biology of seabird species by analysing existing trail camera images collected at various seabird colonies, including Southern Buller's, and Foveaux and Otago shags.
2. Describe breeding cycle and population dynamics from nest-building to fledging, as well as temporal changes in colony attendance both during and outside of the breeding season.

**Project Outputs:**

A technical report that details the breeding biology of species previously studied through the CSP programme but for which funds did not permit the analysis of camera footage.

**Indicative Cost:** \$20,000

**POP-6 Snares Buller's albatross: modelling of return and recruitment rates**

**Term:** 1 year

**Guiding Objectives:** CSP Objective E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objectives:**

1. To provide updated estimates of key demographic parameters (e.g., population size, adult survival, juvenile survival, age at first return, age at first breeding, breeding probability, breeding success, and ultimately, population growth rate), including explicit statements of parameter uncertainty, through integrated population modelling of long-term data.
2. To develop an online, open-access scenario modelling tool based on the integrated population modelling results.

**Project Outputs:**

1. A technical report(s) on the work undertaken, including updated estimates of key demographic parameters, population size and structure, and population growth rates.
2. An online open-access scenario modelling tool

**Indicative Cost:** \$60,000

**POP-7 Salvin's albatross population study at Bounty Islands**

**Term:** 2 years

**Guiding Objectives:** CSP Objectives C and E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objectives:**

1. Tracking juvenile Salvin's Albatrosses using satellite tracking devices.
2. Collecting nest survival data through remote cameras.
3. Counting and mapping nests using drone surveys to update population estimates.
4. Collecting CMR data from known marked individuals, and potentially, marking of new individuals within traditional study areas, for future survival studies.

**Project Outputs:**

1. Tracking data of juvenile Salvin's Albatross suitable for future fisheries overlap studies.
2. Updated estimates of population parameters relevant to seabird bycatch risks assessments for Salvin's Albatross (population size, trend, nest survival, and adult survival).

**Indicative Cost:** \$140,000 per annum

**POP-8 Westland petrel annual movements and colony activity patterns**

**Term:** 1 year

**Guiding Objectives:** CSP Objective E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objective:**

To analyse the Westland petrel tracking datasets collected during 2022-23 and assess onshore activity patterns collected in project POP2021-08), to help improve estimates of the overall breeding population and to better understand the risks from NZ commercial fishing.

**Project Outputs:**

A technical report(s) on the work undertaken and results found, including analysis of the GLS tracking datasets for at-sea year-round movement and activity, and investigating colony behaviour to better understand effective breeding population size

**Indicative Cost:** \$20,000

**POP-9 Campbell Island seabird research**

**Term:** 2 years

**Guiding Objectives:** CSP Objectives C and E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

## **Project Objectives:**

### *Southern Royal Albatross:*

- Counting and mapping nests, potentially using drone surveys to update population estimates from several traditional study areas (e.g., Cole, Moubray, and Mt Honey).
- Collecting nest survival data through remote cameras.
- Collecting CMR data from known marked individuals, and potentially, marking of new individuals within traditional study areas, for future survival studies.
- Providing a platform to further tracking studies (subject to other projects).

### *Grey-headed Albatross:*

- Using the traditional photo points at the Bull Rock colony to update existing population estimates.
- Collecting nest survival data through remote cameras.
- Collecting CMR data from known marked individuals, and potentially, marking of new individuals within traditional study areas, for future survival studies.
- Providing a platform to further tracking studies (subject to other projects).

### *White-chinned Petrel:*

- Map any newly detected burrows to document the recolonisation of Campbell Island of this species.

### *Northern Giant Petrel:*

- Counting and mapping nests, potentially using drone surveys to update population estimates from several potential study areas (e.g., Cole, Moubray, and Mt Honey).
- Collecting nest survival data through remote cameras.

## **Project Outputs:**

1. Updated estimates of population parameters relevant to seabird bycatch risks assessments for
  - a. Southern Royal Albatross (population size, trend, nest survival, and potentially adult survival).
  - b. Grey-headed Albatross (population size, trend, nest survival, and potentially, adult survival).
  - c. White-chinned Petrel (population size).
  - d. Northern Giant Petrel (population size and nest survival).
2. Tracking data of Southern Royal Albatross and Grey-headed Albatross suitable for future fisheries overlap studies (subject to the confirmation of other projects).

**Indicative Cost:** \$90,000 per annum

## **POP-10 Updated population estimate and marine habitat utilisation of yellow-eyed penguins/hoiho breeding on Campbell Island**

**Term:** 2 years

**Guiding Objectives:** CSP Objectives C, D and E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

## **Project Objectives:**

1. To obtain an up-to-date estimate of abundance for Campbell Island hoiho (which may include mark-recapture methods and nest searches for breeding pairs).
2. To monitor the health status of Hoiho on Campbell Island.

3. To collect data on the marine habitat utilisation and diet of hoiho for data deficient breeding and non-breeding periods as well as for different life history stages (adults, juveniles).

**Project Outputs:**

1. A technical report (and associated data layers) detailing:
  - a) A population estimate for Campbell Island hoiho including methodology; and
  - b) The spatio-temporal distribution of Campbell Island hoiho.
2. Population data collected under this project are critical for assessing the species wide risk from bycatch in setnets and can inform species wide multi-threat risk assessments. Furthermore, foraging distribution data for the southern population are important as they can inform assessments of any direct or indirect effects of trawling on hoiho.

**Indicative Cost:** \$100,000 per annum

**POP-11 Aerial survey of leatherback turtles off Northeast North Island**

**Term:** 1 year

**Guiding Objectives:** CSP Objectives B and E; CSP Sea Turtle Medium Term Research Plan

**Project Objectives:**

1. Identify species distribution and size of leatherback turtles in New Zealand waters.
2. Determine distribution overlap with commercial fisheries and the size-age structure of animals affected.
3. Develop a methodology for future work to capture and satellite tag leatherbacks at sea to assess diving behaviour and long-distance movements and aggregation sites/critical habitat in NZ waters (collaboration with Australian and US leatherback researchers).

**Project Outputs:**

A technical report that details species distribution of leatherback turtles in New Zealand waters to help inform risk assessment and fisheries management of this critically endangered species. The report will also make recommendations on a methodology for future work to investigate critical habitat and diving/migration behaviour.

**Indicative Cost:** \$200,000

**POP-12 Grey Petrel Campbell Island survey**

**Term:** 1 year

**Guiding Objectives:** CSP Objectives E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objective:**

Combining burrow transects and burrow-scoping to provide an updated population estimate, while accounting for detection and occupancy.

**Project Outputs:**

Updated estimates of population parameters relevant to seabird bycatch risks assessments for Grey Petrel (population size).

**Indicative Cost:** \$90,000

### **POP-13 White-capped albatross population estimate**

*This project was submitted by Fisheries New Zealand.*

**Term:** 1 year

**Guiding Objectives:** CSP Objectives E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objective:**

Providing extended time on Disappointment to complete a full island population estimate, using a combination of drone and ground truthing methods.

**Project Outputs:**

Updated estimates of population parameters relevant to seabird bycatch risks assessments for White-capped Albatross (population size).

**Indicative Cost:** \$60,000

### **POP-14 Inshore seabird colony mapping, populations, behaviour**

*This project was submitted by Fisheries New Zealand.*

**Term:** 2 years

**Guiding Objectives:** CSP Objectives D and E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objective:**

To characterise inshore seabird distributions for key species including gannets, fluttering and Buller's shearwaters, red-billed gulls, fairy prions, white-fronted terns, flesh-footed shearwater, black petrel, little penguin, and northern diving petrel.

**Project Outputs:**

Provide a technical report that that will inform improved estimates of the spatial overlap of these species with commercial and recreational fishing to feed into risk assessments and ecosystem-based modelling. The report will also consider the gap between the modelled impact of these fisheries and actual seabird population trends which could then be used to assess the indirect impacts of fishing.

**Indicative Cost:** \$150,000 per annum

### **POP-15 Fur seal population estimate**

*This project was submitted by Fisheries New Zealand.*

**Term:** 1 year

**Guiding Objectives:** CSP Objectives B and E; CSP Marine Mammal Medium Term Research Plan

**Project Objective:**

Characterisation of fur seal distributions to inform improved estimates of the spatial overlap of fur seal with fishing. Breeding colonies occur as far north as the Coromandel peninsula and as far south as the subantarctic islands. With populations increasing and new colonies being established on the New Zealand

mainland it is important to estimate their current distribution to get ahead of any increasing risk that fisheries are placing on these populations.

**Project Outputs:**

1. Update the current distribution of fur seals including location and extent of breeding and non-breeding populations likely using aerial methods
2. Estimates of number of pups at selected representative sites to compare with aerial estimates
3. Estimation of total population from aerial imagery

**Indicative Cost:** \$500,000

**POP-16 Comprehensive aerial survey for SI Hector's - population estimates NCSI**

*This project was submitted by Fisheries New Zealand.*

**Term:** 1 year

**Guiding Objectives:** CSP Objectives C and E; Hector's and Māui dolphin Threat Management Plan; CSP Marine Mammal Medium Term Research Plan

**Project Objective:**

To collect data that will allow for more accurate estimates of abundance and distribution of the NCSI population of Hector's dolphins to enable assessments of population status, trends, and the effects of anthropogenic-related mortality on this population. If possible, this should be undertaken using a drone to reduce costs.

**Project Outputs:**

A technical report that details species distribution of Hector's across NCSI to help inform risk assessment and fisheries management of this critically endangered species.

**Indicative Cost:** \$500,000

**POP-17 Deep-sea protected coral reproduction - next steps: Specimen collection and method development**

*This project was submitted by NIWA.*

**Term:** 2 years

**Guiding Objectives:** CSP Objective E; CSP Protected Coral Medium Term Research Plan Theme 2

**Project Objective:**

To facilitate collection of coral specimens for histological analyses by fisheries Observers and to develop methods for histological analysis on collected samples.

This project will build upon POP2022-03 Deep-sea protected coral distribution and will utilise additional archival and observer-collected coral material collected at multiple time points to develop histological methods to determine coral reproductive modes for black corals and stlyasterid corals.

**Project Outputs:**

A technical report with summaries of available samples and progress on method development to address knowledge gaps in the reproductive strategy for protected corals in the New Zealand region.

**Indicative Cost:** \$25,000 per annum

# Mitigation Projects

## Ongoing projects

### MIT2021-01 Protected Species Liaison Programme

This multi-year project was consulted on in 2021/22 and is due for completion in June 2024.

It is proposed to form part of the CSP Annual Plan 2023/24.

Full details are provided in the CSP Annual Plan 2021/22.

### MIT-2022-01 Longline hauling mitigation devices

This multi-year project was consulted on in 2022/23 and is due for completion in June 2024.

It is proposed to form part of the CSP Annual Plan 2023/24.

Full details are provided in the CSP Annual Plan 2022/23.

## Proposed projects

### MIT-1 Understanding the relationship between fish-hook size and bait type with seabird and turtle captures

**Term:** 1 year

**Guiding Objectives:** CSP Objectives A, B and C; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objectives:**

1. Review the effect of hook size and bait type on seabird and turtle bycatch rates across different target fisheries using existing data.
2. Review international literature on the impact of hook size on bycatch.

Seabirds are caught on fishing hooks either by swallowing baited hooks, or by being hooked in the body by a bare hook. Research shows that the risk of seabird bycatch is reduced with the use of circle hooks instead of 'J' hooks, however little is known about the effect of hook size and bait type on bycatch rates for various seabird species. By comparison, research shows that the risk of turtle bycatch is also reduced with the use of circle hooks, as well as large hooks and fish bait instead of squid bait. This project is a pilot study aimed at using data collected through the CSP necropsy programme (and other sources) to investigate the effect of hook size and bait type on seabird bycatch rates across different target fisheries. Results will enable us to provide consistent messaging on mitigation recommendations for reducing the risk of both seabird and turtle bycatch.

**Project Outputs:**

A technical report that details the impact of hook size on bycatch rates to provide consistent messaging on mitigation recommendations for reducing the risk of both seabird and turtle bycatch, and to inform and future review of fisheries regulations.

**Indicative Cost:** \$50,000

### MIT-2 Underwater line setting devices for bottom longline vessels

**Term:** 2 years

**Guiding Objectives:** CSP Objectives A; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objective:**

To further develop and test one or more underwater line setting seabird bycatch mitigation device(s) (being the “underwater setter” and “line depressor”) to widen their potential application across small vessel bottom longline fisheries.

Subject to progress made through CSP project MIT2021-01 and building on work undertaken by DOC project BCBC2020-11b, this project will aim to continue operational refinement of the one or both devices currently in development. Further, the project would support the longer-term use of the device(s) under commercial fishing operations through technical assistance and data collection to adequately assess the effectiveness as a seabird bycatch mitigation device. These devices represent a novel new approach to mitigating seabird bycatch in longline fisheries.

**Project Outputs:**

1. One or more underwater line setting device(s) further developed to be practical option for use on a range of fishing vessels.
2. A longer-term assessment of the effectiveness of developed device(s) as a seabird bycatch mitigation device.

**Indicative Cost:** \$75,000 per annum

**MIT-3 Synthetic trawl warps to mitigate seabird warp strikes**

**Term:** 1 year

**Guiding Objectives:** CSP Objective A; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objective:**

To assess whether synthetic trawl warps reduce warp strike rates by assessing bird behaviour around the different warp materials and by building on findings from the at-sea component of MIT2022-07 (Inshore trawl warp mitigation).

Bright coloured Dyneema warps are used by some inshore trawlers in place of traditional steel cables. The characteristics of such material may influence the likelihood of warp strikes, for example by making the warps more visible to seabirds. To maximise cost saving synergies this project will be implemented alongside the at-sea testing component of MIT2022-07 (postponed to 2023/24) to assess bird behaviour around synthetic vs steel cable warps to determine whether such material is likely to reduce warp strike rates.

**Project Outputs:**

A technical report that details the research undertaken, results, and further recommendations to improve the effectiveness of warp-strike mitigation.

**Indicative Cost:** \$60,000

**MIT-4 Enabling uptake of best practice seabird bycatch mitigation in the surface longline fishery**

**Term:** 1 year

**Guiding Objectives:** CSP Objective B; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objectives:**

1. Assess which surface longline vessels are not currently aligned with the Mitigation Standards and identify vessel-specific barriers. This is to utilise knowledge from Liaison Officers and the social research report on drivers for fisher uptake of seabird bycatch mitigation in the surface longline fishery (BCBC2020-11d).
2. Source mitigation gear (e.g. Hook-shielding devices, novel line weighting options, hauling mitigation).
3. Coordinate, promote and supply mitigation gear suitable for vessel-specific operations and closely support its implementation.

Monitoring the uptake and implementation of best practice seabird bycatch mitigation, as described in the Mitigation Standards under the NPOA-Seabirds 2020, has highlighted limited progress in the surface longline fleet. This is especially apparent in a lack of alignment to the recommended 3/3 mitigation (tori line, night-setting, and line weighting to ACAP standards) or use of hook-shielding devices on 100% of hooks. This project will build on existing CSP Liaison Programme capacity and will provide further gear and support that goes beyond the current scope and scale of the Liaison Programme project.

Operators will be identified by need, as advised by industry feedback to Liaison Officers and through the assessment of Protected Species Risk Management Plans against Mitigation Standards. Support could include the coordination, provision, and assistance in the use of hook-shielding devices and novel line weighting options. It could also include further testing and refinement of tori lines and hauling mitigation.

This project will produce recommendations that indicate whether the Liaison Programme project should increase in scope and scale to further accommodate and sustain increased mitigation support in the surface longline fleet.

**Project Outputs:**

1. Increased update of best practice seabird bycatch mitigation measures in the surface longline fishery.
2. A technical report that details where there has been improvement in the alignment to Mitigation Standards over the course of this project, and a summary of any barriers that could not be overcome.

**Indicative Cost:** \$100,000

**MIT-5 Novel seabird bycatch mitigation for floated demersal longline fisheries**

**Term:** 1 year

**Guiding Objectives:** CSP Objective B; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objectives:**

1. To identify potential novel options (i.e. devices or practices not currently used by relevant New Zealand operators, e.g. Hookpods) to mitigate seabird bycatch in floated demersal longline fishing gear.
2. To test one or more novel bycatch mitigation option(s) identified for floated demersal longline operations and assess the feasibility and practicality of commercial implementation.

There are significant challenges for some floated demersal longline fisheries in achieving desired sink rates of gear to meet regulatory requirements and best practice seabird bycatch mitigation standards. In particular, the slow setting speeds typical in bluenose target fisheries limit the extent of aerial protection that tori lines can provide. This project will test the effectiveness and practicality of one or more novel bycatch methods in this fishery.

The project will consider testing any relevant novel options identified during current social science research underway in the fishery, as well as the potential use of Hookpods, and the use of underwater line setting devices developed for other bottom longline target fisheries. The chosen device(s) will be tested for the mitigation effectiveness, practicality, and any effect on fish catch. This project will be further refined through input from industry.

**Project Outputs:**

A technical report that details the research trials undertaken, results, and further recommendations to improve bycatch mitigation in floated demersal longline gear.

**Indicative Cost:** \$120,000

**MIT-6 Understanding and mitigating seabird and turtle bycatch during the pelagic longline soak period**

**Term:** 1 year

**Guiding Objectives:** CSP Objectives A and B; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan; CSP Sea Turtle Medium Term Research Plan

**Project Objectives:**

1. Characterise surface longline hook depth profiles throughout the fishing period via the deployment of TDRs.
2. Assess risk of captures during the soak period by identifying incidents of exposed hooks at the surface during the ‘soak period’.
3. Compare depth profiles of sets with and without protected species captures and identify any apparent patterns.
4. Review international research and consider the effectiveness of existing mitigation practices on hook exposure during the soak period.

Seabird bycatch mitigation development in pelagic longline fisheries has focussed primarily on the risk during setting and more recently on the haul period. However, it is known that pelagic longlines can also be brought up to the surface during the soak, e.g., by hooked sharks, where exposed baited hooks can pose bycatch risk to seabirds. The extent of this risk is currently unknown as it is difficult to determine the point at which birds are caught during a fishing operation. Similarly, there is little information on the depth and time for which turtles are caught during the fishing period.

This project will build on initial work undertaken by DOC using existing TDR data to characterise the depth profile of hooks during the entire fishing period to further refine the findings, collect more at-sea data, assess against bycatch records and review any international research.

The project will consider the effectiveness of existing practices (i.e., line weighting) on mitigating the availability of hooks during the soak and will recommend any other mitigation options for possible future testing.

**Project Outputs:**

A technical report that details the research trials undertaken, results, and further recommendations to improve bycatch mitigation during pelagic soak periods.

**Indicative Cost:** \$80,000

**MIT-7 Describing the marine habitat utilisation and diet of hoiho to analyse the effectiveness of mitigation tools at a major breeding colony on Rakiura/Stewart Island**

**Term:** 1 year

**Guiding Objectives:** CSP Objectives A and E; National Plan of Action – Seabirds; CSP Seabirds Medium Term Research Plan

**Project Objective:**

To study the habitat utilisation (GPS-dive loggers) and diet of hoiho (bird-borne cameras/molecular diet analysis) breeding at two sites during different breeding stages (guard, post-guard and pre-moult) to quantify the spatial overlap of hoiho with local fishing activities and fisheries target species (dietary overlap) and whether this can explain differences in breeding success between the two main breeding sites of the Neck area on Stewart Island/Rakiura. Importantly, this project will provide an opportunity to analyse the effectiveness of recently established voluntary set net closures adjacent to the Neck area.

Fisheries activities can pose direct and indirect threats to seabirds. Direct effects include incidental captures in fishing nets and benthic disturbance, whereas indirect effects include resource competition when fisheries and seabirds target the same prey, potentially affecting seabird breeding success. The wider Neck area on Stewart Island/Rakiura harbours ~20% of the current breeding population of the nationally endangered yellow-eyed penguin/hoiho on Rakiura making this an important breeding colony. Breeding areas on the Neck are concentrated at two main sites: Little Glory Bay, which lies on the Paterson Inlet side of the Neck and Steep Head, which lies on the seaward side. Based on previous tracking studies of hoiho breeding on islands in Paterson Inlet (POP2018-02, POP2020-05) it is assumed that hoiho breeding at Little Glory Bay will also forage in Paterson Inlet, whereas hoiho breeding at Steep Head are more likely to feed out at sea. Importantly, hoiho at Steep Head may face a higher risk from incidental capture in setnets compared to hoiho breeding at Little Glory Bay, Paterson Inlet and other sites (e.g., voluntary exclusion zones) where no set netting activity takes place. Furthermore, hoiho breeding at Steep Head have shown reduced breeding success in recent years compared to birds from Little Glory Bay, possibly due to less favourable foraging conditions.

**Project Outputs:**

A technical report and associated data layers showing:

- a. the spatio-temporal distribution of hoiho from the Neck, Rakiura in relation to setnet fisheries with an assessment of potential direct or indirect effects on hoiho foraging; and
- b. evaluating the potential effectiveness of the voluntary setnet exclusion zone adjacent to the Neck, Rakiura and information needed to review it if needed.

**Indicative Cost:** \$40,000

## Priority Projects to be considered in 2024/25

### INT- Impact of fishing on the ecosystem services provided by deep-sea corals in the New Zealand region

*This project proposal was submitted by NIWA however it will not be considered this year due to the necessary clarifications required around the scope of this project.*

**Term:** 1 year

**Guiding Objectives:** CSP Objectives B, D and E; Theme 4 CSP Protected Coral Medium Term Research Plan

#### **Project Objective:**

To determine the relationship between the abundance/biomass of protected corals and the ecosystem services they provide, and compare the provision of these services in unfished, fished and closed areas.

The aim of this project is to determine the relationship between abundance/biomass of deepsea corals, and the ecosystem services they provide, and compare provision of them in unfished, fished and closed areas. Coral ecosystem services have never been estimated in New Zealand waters. To do this, the project will examine varied data sources including trawling distribution data, abundance-based species distribution model outputs (e.g., POP2021-02), and existing video and still imagery data to determine various ecosystem services measures relating to supporting, provisioning and regulation services (e.g., habitat provision for diverse associated invertebrates, habitat and nursery grounds for commercially exploited fish, and carbon cycling and storage). The project will establish the relationship between the abundance of four stony coral species (*Solenosmilia variabilis*, *Goniocorella dumosa*, *Madrepora oculata* and *Enllopsammia rostrata*) and the abundance and diversity of associated invertebrates and fish, information which can then be used to establish coral density thresholds at which high biodiversity is supported, and to determine whether stony corals are a potential nursery ground for juvenile fish. Initially, the project will focus on seamount complexes and other areas on the Chatham Rise, examining areas subject to differing fishing pressures, subsequent mapping of this information EEZ-wide could feed into consideration of spatial management and mitigation approaches.

#### **Project Outputs:**

A technical report and maps of ecosystem services in relation to fishing effort. Data and GIS files and products will also be provided for subsequent use by DOC and others for conservation and management planning.

**Indicative Cost:** \$100,000

### INT - Mapping the spatial and bathymetric ranges and diversity of stylasterid corals in Fiordland

*This project was proposed by DOC but will not be progressed until reporting is available from INT2022-05.*

**Term:** 2 years

**Guiding Objectives:** CSP Objectives B, E; CSP Coral Medium Term Research Plan Themes 1, 3 and 6

#### **Project Objectives:**

This project will describe the diversity and distribution of stylasterid corals in Fiordland and will measure their overlap with commercial fisheries.

Building upon INT2022-05: Determining the resilience of Fiordland corals to fishing impacts, this project will focus on using SCUBA and ROV surveys for detailed mapping of stylasterid corals in protected, fished,

and unfished areas of Fiordland. The project would use image analysis, mapping, and biological samples for potential genetics and diversity assessment. Stylasterid diversity, distribution and ecology is poorly understood in Fiordland and most knowledge derives from sub-Antarctic research trawls. The project will provide oversight of the overlap of these corals with fishing activity and upcoming field trips during INT2022-05 will give preliminary insight into extent of stylasterid distribution at sub-SCUBA depths. Outputs from this project, and INT2022-05, will provide baseline data and could form the basis of an ongoing monitoring programme.

**Project Outputs:**

A technical report and associated data layers that can be used for baseline information, and future coral mapping and spatial management.

**Indicative Cost:** \$60,000

## Unprioritised projects

### MIT- Identifying protected species in trawl fisheries using AI species recognition software and net camera technology

*This project was proposed by DOC but will not be progressed as it is alternatively being considered for progression through the FNZ EM Innovation Fund.*

**Term:** 1 year

**Guiding Objectives:** CSP Objectives A and B; National Plan of Action – Seabirds, National Plan of Action – Sharks; New Zealand sea lion and Hector’s and Māui dolphin Threat Management Plans.

**Project Objectives:**

1. Investigate the potential for mitigation to include release of protected marine mammals immediately after entering a trawl net (before haul) by using cameras and AI technology.
2. Gather opportunistic footage of dolphins and seals around trawl nets from cameras attached to trawl nets in the Cook Straight hoki fishery.
3. Use images to further train an existing AI model for protected species recognition.

**Indicative Cost:** \$80,000

### MIT - Gear configurations to improve sink rates in bottom longline fisheries

*This project was proposed by DOC but will not be considered this year as the work is able to be progressed this financial year under MIT2021-03.*

**Term:** 1 year

**Guiding Objectives:** A

**Project Objectives:**

To further improve advice on gear configurations that achieve sink rates effective in mitigating seabird bycatch across a range of bottom longline fisheries.

**Project Outputs:**

1. Research report on trials undertaken.
2. Advice materials for fishing operators on gear configuration to achieve the most effective sink rates to mitigate seabird bycatch

**Project Objectives:**

An industry led technical report that details species free-swimming around a trawl net and use the images to train an AI model for protected species recognition which will help to progress mitigation recommendations related to the development of new technologies for live-release of protected species bycatch.

**Indicative Cost:** \$100,000