

# Conservation Services Programme DRAFT Annual Plan 2024/25

Conservation Services Programme  
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## Statement on Conservation Services

**Conservation services** are defined in section 2 of the Fisheries Act 1996 as follows:

*“Conservation services means outputs produced in relation to the adverse effects of commercial fishing on protected species, as agreed between the Minister responsible for the administration of the Conservation Act 1987 and the Director-General of the Department of Conservation, including–*

- (a) Research relating to those effects on protected species:*
- (b) Research on measures to mitigate the adverse effects of commercial fishing on protected species:*
- (c) The development of population management plans under the Wildlife Act 1953 and the Marine Mammals Protection Act 1978.”*

We agree that the outputs described in the following pages, to be delivered in 2024/25, are “conservation services” in accordance with this definition. Cost recovery principles have been applied in accordance with section 262 of the Fisheries Act 1996.

Hon. Tama Potaka  
*Minister of Conservation*

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Department of Conservation

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# 1. Overview

## 1.1 Introduction

The Conservation Services Programme (CSP) has operated under the administration of DOC since 1996, with the aim of avoiding, remedying, or mitigating the adverse effects of commercial fisheries on protected species. The Conservation Services Programme Annual Plan 2024/25 (Annual Plan) outlines the conservation services to be delivered as the Conservation Services Programme (CSP), and subject to cost recovery from the commercial fishing industry in the 2024/25 financial year. As such, this Annual Plan forms the basis for levying the commercial fishing industry under the Fisheries Act 1996. For a summary of the legal basis of levied work described in this Annual Plan, refer to the Conservation Services Programme Strategic Statement<sup>1</sup> (Strategic Statement).

The CSP vision is that “*commercial fishing is undertaken in a manner that does not compromise the protection and recovery of protected species in New Zealand fisheries waters*”. To meet this vision, the following CSP Objectives, as described in the Strategic Statement, have been identified:

- Objective A: Proven mitigation strategies are in place to avoid or minimise the adverse effects of commercial fishing on protected species across the range of fisheries with known interactions.
- Objective B: The nature of direct adverse effects of commercial fishing on protected species is described.
- Objective C: The extent of known direct adverse effects of commercial fishing on protected species is adequately understood.
- Objective D: The nature and extent of indirect adverse effects of commercial fishing are identified and described for protected species that are at particular risk to such effects.
- Objective E: Adequate information on population level and susceptibility to fisheries effects exists for protected species populations identified as at medium or higher risk from fisheries.

## 1.2 Format

The format used to specify the conservation services in this Annual Plan includes an outline of the objectives and rationale for each project, and the anticipated outputs. Guiding objectives, both CSP Objectives and relevant management plans, are identified for each project. The project specifications also indicate cost recovery information, i.e., indicative project costs (excluding administration costs), relevant provisions within the Fisheries (Cost Recovery) Rules 2001 that determine cost recovery allocation, and relevant fish stocks to which cost recovery is applied. Costs are summarised in the Appendix. All financial amounts appearing in this document are exclusive of GST.

## 1.3 Guiding frameworks, research planning and prioritisation

The Strategic Statement describes the process through which each annual plan of conservation services will be developed and delivered. It provides detail on the wider management context, the research planning and prioritisation processes used by CSP, and the way CSP is implemented by working with others.

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<sup>1</sup> Available to download from <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/resources/raq-resources/csp-strategic-statement-2020.pdf>

The CSP planning considers and works in parallel with other relevant planning and management processes such as the National Plans of Action (NPOAs) for seabirds<sup>2</sup> and sharks<sup>3</sup>, Threat Management Plans (TMPs) for the Hector's and Māui dolphin<sup>4</sup> and the New Zealand sea lion<sup>5</sup>, and Te Kaweka Takohaka mō te Hoiho<sup>6</sup>. The iterative and inclusive planning process ensures that gaps are identified, and research synergies are maximised.

The CSP Research Advisory Group (RAG) was established in 2013 following finalisation of the Strategic Statement and provided guidance for the development of this Annual Plan. Five medium term research plans<sup>7</sup> have also been developed as part of the work of the RAG: the CSP seabird medium term research plan (CSP Seabird Plan), the CSP protected fish medium term research plan (CSP Fish Plan), the CSP marine mammal medium term research plan (CSP Mammal Plan), the CSP sea turtle medium term research plan (CSP Turtle Plan) and the CSP protected coral medium term research plan (CSP Coral Plan). These plans have been used to inform and guide relevant sections of this Annual Plan.

A summary of the planning and prioritisation milestones undertaken in developing the Annual Plan 2024/25, in accordance with the Strategic Statement, can be found in the Consultation section below.

#### 1.4 Observer planning

Observer coverage is planned and prioritised based on specific monitoring objectives for protected species interactions with fisheries and achieving adequate coverage levels for high-risk fisheries to allow detection of changes in bycatch over time. These objectives are balanced with other fisheries management objectives, available resources of the observer programme and feasibility of delivery.

In general, coverage is aimed at reducing uncertainty around the risks to protected species as well as assessing mitigation options for identified interactions. Furthermore, the allocation of observer coverage across fisheries is also guided by several factors including data needs for protected species and fisheries management, compliance, and international obligations, with particular consideration of:

- Independently verifying protected species captures
- Fishing effort
- Past observer coverage<sup>8</sup>
- Monitoring of high value stocks or fisheries where there may be a sustainability risk
- Current level of information, especially for recently protected species
- The status of threatened protected species
- Historic mortality of protected species and risk assessment work which has been undertaken (e.g., Rowe 2010a, Richard & Abraham. 2015, Abraham et al. 2017)
- Requirements under the NPOAs and any relevant TMPs or Strategies
- Planned and ongoing research priorities/projects for DOC and FNZ
- On-board camera rollout<sup>9</sup>
- Ministerial directives

Widescale camera rollout across the New Zealand inshore fishing fleet commenced in August

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<sup>2</sup> [National Plan of Action - Seabirds](#)

<sup>3</sup> [National Plan of Action - Sharks \(under review in 2024\)](#)

<sup>4</sup> [Hector's and Māui Threat Management Plan](#)

<sup>5</sup> [New Zealand sea lion Threat Management Plan \(under review in 2024\)](#)

<sup>6</sup> [Te Kaweka Takohaka mō te Hoiho](#)

<sup>7</sup> These are available to download from <http://www.doc.govt.nz/csp-rag>

<sup>8</sup> [Fisheries observer services](#)

<sup>9</sup> [Timeline for camera rollout](#)

2023 and continued rollout is planned to occur in stages throughout 2024/25. Electronic monitoring is anticipated to increase verification of fisher reported data and improve our understanding of protected species interactions. With 2024/25 being a transitional year as the on-board cameras programme is implemented, the verification approach will be a hybrid model dependant on specific electronic monitoring rollout dates. Inter-agency collaboration has determined in which circumstances observers are to be deployed on vessels with cameras.

Principles have been developed by FNZ and DOC to guide the placement of observers on vessels with on-board cameras. These principles will be applied to observer coverage for each fishery as the rollout of cameras is completed and will be incorporated in the cost recovery planning processes.

Observers can/may still be used:

- as part of a vessel-specific monitoring plan,
- where information cannot be provided by on-board cameras (i.e., where cameras are not suitable and scientific information is required for stock assessments, assessments of the impacts of fisheries, fisheries research, and broader ecosystem research),
- where required to meet international obligations, and
- to support monitoring and evaluation of the efficacy of the on-board programme.

By early 2025, on-board cameras will be placed on up to 300 vessels, primarily on smaller or inshore vessels, which were selected largely based on the risk posed to protected species. The process for determining observer priorities and observer days will change in the coming years to include conversations on the percentage of on-board camera footage to be reviewed. A supplementary process for monitoring and verification planning is being piloted to reflect the reduced observer placement and compensate for at-sea resourcing; more details can be found under INT2024-02 Port-based audit and protected species retention programme.

## 1.5 Consultation

Key stages for stakeholder input, including formal consultation on this plan, are as follows:

29 January 2024	Updated medium term research plans, initial list of research proposals and CSP RAG prioritisation framework circulated to CSP RAG.
1 March 2024	CSP RAG meeting to discuss and prioritise initial research proposals.
15 March 2024	Additional feedback received from CSP RAG on research proposals and their prioritisation.
16 April 2024	Draft CSP Annual Plan 2024/25 released for public consultation.
15 May 2024	Public consultation period closes.
Early-June 2024	Summary of public submissions and response to comments completed.
Mid-June 2024	Deputy Director-General Biodiversity Heritage and Visitors of the Department of Conservation conveys the CSP Annual Plan 2024/25, amended in accordance with public submissions, to the Minister of Conservation for agreement.

## 1.6 Administrative costs

The administrative requirements of each project differ, as does the time required to address these. Currently, administration charges are distributed in a pro-rated fashion across projects, in

accordance with the cost of the project, except for INT2024-01 (Observing commercial fisheries) where the administration cost is fixed at \$110,000. This approach is appropriate, as the highest cost project (INT2024-01) incurs the majority of administration expenses including observer training programmes, training materials, data management, briefing and debriefing, liaising at sea and with other agencies when necessary, and reporting. For other projects, the administration component may be significantly less. Administration also includes charges for the use of Departmental facilities and services.

DOC is continually striving to maximise efficiencies and the administration costs for delivering conservation services, as such the administration costs have remained unchanged at the current level of \$240,000 since 2011/12, For some time, this level has been insufficient to meet the running costs of the programme and it is no longer feasible in light of increasing cost pressures on the programme for CSP to maintain the same cost. Following the guidance of DOC's Chief Financial Officer, in 2024/25 CSP are increasing administration costs by \$60,000, to a total of \$300,000. We welcome stakeholder views on different ways to attribute administration costs across projects.

### **1.7 Iwi engagement**

Relevant iwi, hapū and whānau will be engaged with on a project-by-project basis, where appropriate in accordance with Section 4 on the Conservation Act 1987<sup>10</sup>.

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<sup>10</sup> [Conservation Act 1987 No 65 \(as at 12 April 2022\), Public Act 4 Act to give effect to Treaty of Waitangi – New Zealand Legislation](#)



## 2. Interaction Projects

### 2.1 Observing commercial fisheries

Full details on the observer coverage planned for the financial year 2024/25 are to be finalised shortly and consulted on separately. More detail will be available through the Fisheries New Zealand consultation on fisheries and conservation services levies.

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*NOTE: This multi-year project was consulted on in 2022/23 and is included here for completeness*

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

**Project Code:** INT2022-02

**Start Date:** 1 July 2022

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objectives B, C; National Plan of Action – Seabirds.

### **Project Objective:**

To determine which seabird species are captured in fisheries and the mode of their capture.

### **Specific Objectives:**

1. To determine, through examination of returned seabird specimens, the taxon, sex, and where possible age-class and provenance of seabirds killed in New Zealand fisheries (for returned dead specimens).
2. To detail the injuries, body condition and stomach contents and, where possible, the likely cause of mortality (for returned dead specimens).
3. To report any changes in the protocol used for the necropsy of seabirds (for returned dead specimens).
4. To determine, through examination of photographs, the taxon and, where possible, sex, age-class and provenance of seabirds captured in New Zealand fisheries (for live captures or dead specimens discarded at sea).

### **Rationale:**

Large numbers of seabirds frequent New Zealand waters. 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. Fisheries 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 necropsy in most cases. Historically all dead seabird specimens collected by observers have been returned for necropsy where possible. However, in many cases, the taxon can be confirmed through expert examination of photographs taken by observers, and this can be achieved at a lower cost than returning carcasses and performing necropsy. To maximise cost efficiencies a protocol was developed to determine which specimens are returned for full necropsy. This protocol aims to strike a balance between returning birds for full necropsy (for rarer species and in less observed fisheries) and photographing birds for determination of taxon (for commonly caught species in well observed fisheries).

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 Fisheries NZ 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.

## Research Approach:

### Specific objectives 1-4

Deceased birds returned by Fisheries Observers will be delivered, suitably packaged, and labelled, to the research provider. Observers make note of the circumstances of capture and provide a tentative identification. Seabirds returned will be examined to determine the following:

- Species identification and classification
- Sex
- Moults and brood patch development (as a partial indicator of breeding status)
- Age
- Provenance (origin) (where possible)
- Subcutaneous fat score as an index of body condition
- Stomach and gizzard contents, and
- General body condition including any signs of injury and cause of death (where possible).

The data will be reported on by species and fishery stratum (fishing method, fishery area and target species). The methodologies used in examining the specimens and categorising them into different groups shall be fully described. Differences in research protocols compared to previous necropsy research on New Zealand seabirds returned from fisheries shall be fully detailed and the implications of any differences discussed.

### Specific objective 5

Where Fisheries Observers record an incidental bird capture and no specimen is retained (either live captures or discarded dead birds), all photographs obtained, by specimen, will be delivered to the contractor in electronic format. Details of the date, time, location, and fishery of capture will also be provided. Photographs will be examined to determine the following:

- Identification and classification, to the lowest taxonomic level possible
- Sex (where possible)
- Age (where possible), and
- Provenance (origin) (where possible).

These data will be reported by taxon and fishery stratum (fishing method, fishery area and target species). When a specimen is identified and separated from similar species, the identification features used shall be fully described.

## Outputs:

1. A summary of results will be reported, for circulation to stakeholders, on a quarterly basis.
2. Information requested by CSP will be provided within a reasonable timeframe (usually 10 working days).
3. Annual report(s) of confirmed identification, sex, age, provenance, and all other data collected, of all specimens examined. To the extent possible, the final report will also identify potential interactions between seabirds and fishing gear and identify factors that may have contributed to seabird mortality. Data will be reported by fishery stratum (fishing method, fishery area and where possible target species).
4. Presentation of six monthly and annual reports to the CSP TWG.
5. Provision of all data collected in electronic format, suitable for updating Fisheries NZ databases and/or other relevant databases.

6. Provision of seabird specimens, where requested by iwi for cultural purposes, as stated in section 1.4 of the CSP Strategic Statement.

**Note:** A three-year term is proposed

**Indicative Research Cost:** \$80,000 per annum

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish stocks:** BAR<sub>1, 7</sub>, BIG<sub>1</sub>, BNS<sub>1, 2, 3, 7</sub>, BUT<sub>5, 7</sub>, BWS<sub>1</sub>, ELE<sub>3, 5, 7</sub>, EMA<sub>1, 3, 7</sub>, FLA<sub>1, 2, 3, 7</sub>, GMU<sub>1</sub>, GSH<sub>1, 3, 4, 7, 8, 9</sub>, GSP<sub>1, 7</sub>, GUR<sub>1, 2, 3, 7, 8</sub>, HAK<sub>1, 4, 7</sub>, HOK<sub>1</sub>, HPB<sub>1, 2, 3, 4, 7, 8</sub>, JDO<sub>1, 2, 3, 7</sub>, JMA<sub>1, 3, 7</sub>, KIN<sub>1, 7, 8</sub>, LEA<sub>1, 2, 3</sub>, LIN<sub>1, 2, 3, 4, 5, 6, 7</sub>, MAK<sub>1</sub>, MOK<sub>1, 3, 5</sub>, MOO<sub>1</sub>, ORH<sub>1, 2A, 2B, 3A, 3B</sub>, OEO<sub>1, 3A, 4, 6</sub>, PAR<sub>1, 9</sub>, POR<sub>1</sub>, PIL<sub>1</sub>, POS<sub>1</sub>, RBM<sub>1</sub>, RSN<sub>1, 2</sub>, RIB<sub>1, 2</sub>, RCO<sub>1, 3, 7</sub>, RSK<sub>1, 3, 7, 8</sub>, SBW<sub>6A, 6R, 6I, 6B</sub>, SCH<sub>1, 2, 3, 4, 5, 7</sub>, SCI<sub>1, 2, 4A, 6A, 6B</sub>, SKI<sub>1, 3, 7</sub>, SNA<sub>1, 2, 3, 7, 8</sub>, SPD<sub>1, 3, 4, 5, 7, 8</sub>, SPE<sub>1, 3, 4, 7</sub>, SPO<sub>1, 3, 7, 8</sub>, SQU<sub>1T, 6T</sub>, SSK<sub>1, 3, 7, 8</sub>, STA<sub>1, 3, 4, 5, 7</sub>, STN<sub>1</sub>, SWA<sub>1, 3, 4</sub>, SWO<sub>1</sub>, TAR<sub>1, 2, 3, 4, 5, 7, 8</sub>, TOR<sub>1</sub>, TRE<sub>1, 2, 7</sub>, TRU<sub>3, 4</sub>, WAR<sub>1, 2, 3, 7, 8</sub>, WWA<sub>2, 3, 4, 5B, 7</sub>, YEM<sub>1, 8, 9</sub>.

**NOTE:** Pending the results of the camera rollout occurring in 2024/25, the stocks presently allocated may be revisited in future.

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*NOTE: This multi-year project was consulted on in 2022/23 and is included here for completeness*

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

**Project Code:** INT2022-03

**Start Date:** 1 July 2022

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objectives B, C, E; CSP Coral plan.

#### **Project Objectives:**

1. To confirm or update bycaught coral identifications determined at-sea by Fisheries Observers to the lowest taxonomic level (i.e., to assign codes to coral specimens at the species level wherever possible, or to genus or family level if not possible).
2. To record all identified coral specimens and their metadata (including haplotype/genetic data) and ensure storage of the physical specimens in an appropriate taxonomic collection.
3. To update relevant government coral identification and observer databases.
4. To update and provide input into coral-relevant resources for Fisheries Observers, including reference material and observer training.

#### **Rationale:**

The overarching aim of this ongoing project is to continually improve information on the nature of coral bycatch reported and collected through the Fisheries Observer Programme. The 2010 amendment of Schedule 7A of the Wildlife Act 1953 protects all hard corals, including: black corals (all species in the order Antipatharia); gorgonian corals (all species in the order Alcyonacea); stony corals (all species in the order Scleractinia); and hydrocorals (all species in the family Stylasteridae). Expert verification of coral bycatch that is difficult or inconsistently identified by Fisheries Observers to the finest taxonomic level provides vital baseline information that can help to better inform research and marine protection such as predictive modelling, fisheries characterisations, benthic risk assessments, connectivity studies and management of benthic marine protected species.

#### **Research Approach:**

A catalogue of observer-collected coral samples will be created and maintained. These samples will be verified taxonomically by domestic experts at regular intervals throughout the year. In addition to this (when possible and as needed), international coral experts will refine the taxonomic identification even further. The updated taxonomic identification of the bycatch samples will then be shared with Fisheries New Zealand for them to update this information in the COD database.

In addition to taxonomic verification of returned specimens and photographs, the project will incorporate funding to facilitate genetic analysis of bycatch. Genetic methods can further elucidate the extent of diversity, refine taxonomic resolution, and distinguish cryptic species. Genetic analyses can also be applied to archived specimens for targeted research on specific taxa or target fisheries.

Observer briefings, manuals, and training material will be revised based on outputs of this project to continue to improve the accuracy of at-sea identification, and thus continually provide higher-quality data for downstream usage.

**Outputs:**

1. Records and imagery of previously unidentified cold-water coral bycatch obtained by government funded Fisheries Observers within the New Zealand EEZ.
2. Creation and maintenance of a catalogue of observer collected coral samples.
3. Report(s) detailing confirmed identification, provenance, and all other data collected, for all specimens examined. Data will be reported by fishery stratum (fishing method, fishery area, and, where possible, target species).
4. Updated coral identification guides and other resources for use in training government Fisheries Observers.

**Note:** A three-year term is proposed

**Indicative Research Cost:** \$80,000 per annum

**Cost Recovery:** F(CR) Item 4B (100% Industry)

**Fish stocks:** BAR<sub>1, 4, 5</sub>, BNS<sub>3</sub>, BYX<sub>1, 2, 3</sub>, CDL<sub>1</sub>, HAK<sub>1</sub>, HOK<sub>1</sub>, HPB<sub>5, 7</sub>, JMA<sub>3, 7, 8</sub>, LIN<sub>1, 2, 5, 6, 7</sub>, OEO<sub>1, 3A, 4, 6</sub>, ORH<sub>1, 2A, 2B, 3A, 3B, 7A, 7B</sub>, SBW<sub>6A, 6R, 6I, 6B</sub>, SCH<sub>5</sub>, SCI<sub>2, 3, 4A</sub>, SNA<sub>1</sub>, SPO<sub>3</sub>, SQU<sub>1T, 6T</sub>, SWA<sub>3, 4</sub>, TAR<sub>1, 2</sub>, TRE<sub>1, 7</sub>, WWA<sub>5B</sub>

**NOTE:** Pending the results of the camera rollout occurring in 2024/25, the stocks presently allocated may be revisited in future.

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*NOTE: This multi-year project was consulted on in 2022/23 and is included here for completeness*

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

**Project Code:** INT2022-05

**Start Date:** 1 July 2022

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objectives B, C, and E, CSP Coral Medium Term Research Project

##### **Project Objectives:**

1. Increase understanding of the ecology and impacts of fishing on protected corals in Fiordland, including the black coral *Antipathella fiordensis* and stylasterid (lace) corals.
2. Improve our understanding of the distribution of Fiordland corals inside and outside of protected areas and determine patterns and likely routes of connectivity.
3. Use varied approaches (modelling, surveys, repeat monitoring of field stations) to inform our understanding of black coral resilience to fishing impacts and threats in Fiordland, which can then be applied to these taxa in a wider context.

##### **Rationale:**

This research feeds into a wider Victoria University of Wellington study that aims to increase understanding of the ecology of protected corals in the Fiordland region and to determine how they will respond to environmental impacts, such as fishing, climate change, and changes in land use. The focus of the project will be the black coral species *Antipathella fiordensis*, with additional opportune sampling of stylasterid (lace) corals, both of which are protected and have widespread distribution within the fiords. The shallow distribution (and therefore accessibility) of *A. fiordensis* in Fiordland provides a unique opportunity to study and monitor it regularly in light of these pressures, and the species can then be used as a model to ascertain black coral resilience more widely. The CSP aspect of the project focuses on how they are impacted by fishing activity. Commercial fishing is prohibited in the inner waters of Fiordland, however, rock lobster potting and trawl fishing for blue cod is known to occur in the outer areas of the fiords, where *A. fiordensis* is abundant and there is virtually no Fisheries Observer presence.

##### **Research Approach:**

To increase our understanding of *A. fiordensis* and support its management, the project will include fieldwork, lab work and modelling approaches, and employ an ROV to expand sampling capacity beyond the limits of SCUBA. There are four main components to the project:

1. Fisheries impacts – compiling data from fisher surveys, abundance surveys and creation of a database of colony health status/observed fishing impacts.
2. Distribution patterns – based upon SCUBA and ROV surveys, coral size and abundance will be determined at multiple locations in Doubtful, Dusky and Breaksea Sounds, and resulting data combined with environmental correlates to ground truth and develop species distribution models.
3. Long-term monitoring plots will be established and SCUBA and ROV surveys, and 3D photogrammetry, will be used to determine population dynamics, recruitment, recovery from physical damage and growth through time.
4. Connectivity patterns between coral populations will be determined across vertical gradients, and between fished and unfished areas using genetic approaches.

**Outputs:**

1. Annual progress reports and presentation to the CSP Technical Working Group.
2. A final technical report and summary of results will be provided to and reviewed by the CSP Technical Working Group, and made available online.
3. Groomed data and maps in electronic formats.
4. Recommendations on future research and conservation management implications of the research for black corals.

**Note:** A three-year term is proposed

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

**Cost Recovery:** Year 1 and 2 100% Crown funded, year 3 F(CR) Item 4B (100% Industry).

**Fish stocks:** BCO<sub>5</sub>, CRA8

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*NOTE: This multi-year project was consulted on in 2023/24 and is included here for completeness*

**2.5 INT2023-04 Identification of marine mammals, turtles and protected fish captured in New Zealand fisheries**

**Project Code:** INT2023-04

**Start Date:** 1 July 2023

**Completion Date:** 30 June 2026

**Guiding Objectives:** CSP Objectives B, C; National Plan of Action – Sharks; New Zealand sea lion Threat Management Plan.

**Project Objective:**

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).

**Rationale:**

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. This project is a continuation of INT2020-02 and is designed to complement the existing seabird and coral identification projects. Observers routinely collect samples of genetic material from these taxa, and these can be used to resolve uncertain identification determinations from photographs.

**Research Approach:**

Where Fisheries Observers recorded an incidental capture of a marine mammal, turtle, or protected fish generally no specimen is retained. Instead, photographic records and a genetic sample are taken. Live interactions are photographed where possible. All photographs obtained, by specimen, will be delivered to a suitable expert for that taxonomic group in electronic format on a quarterly basis. Details on the date, time, location, and fishery of capture will also be provided. Photographs will be examined to determine the following:

- Identification, to the lowest taxonomic level possible
- Sex (where possible)
- Age (where possible), and
- Provenance (origin) (where possible).

These data will be reported by taxon and fishery stratum (fishing method, fishery area and target species). When a specimen is identified, the identification features used shall be fully described.

Genetic samples of all bycaught marine mammals, turtles and protected fish are routinely collected by Fisheries Observers and where photographic analysis cannot adequately determine taxa, genetic analysis may be undertaken.

**Outputs:**

1. A summary of results will be reported, reviewed by the CSP TWG, and published on an annual basis.
2. Information requested by CSP will be provided within a reasonable timeframe (usually 10 working days).
3. Provision of all data collected in electronic format, suitable for updating Fisheries New Zealand databases and/or other relevant databases.

**Note:** A three-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish stocks:** BAR<sub>1, 7</sub>, BIG<sub>1</sub>, BNS<sub>1, 2, 3, 7</sub>, BUT<sub>5, 7</sub>, BWS<sub>1</sub>, ELE<sub>3, 5, 7</sub>, EMA<sub>1, 3, 7</sub>, FLA<sub>1, 2, 3, 7</sub>, GMU<sub>1</sub>, GSH<sub>1, 3, 4, 7, 8, 9</sub>, GSP<sub>1, 7</sub>, GUR<sub>1, 2, 3, 7, 8</sub>, HAK<sub>1, 4, 7</sub>, HOK<sub>1</sub>, HPB<sub>1, 2, 3, 4, 7, 8</sub>, JDO<sub>1, 2, 3, 7</sub>, JMA<sub>1, 3, 7</sub>, KIN<sub>1, 7, 8</sub>, LEA<sub>1, 2, 3</sub>, LIN<sub>1, 2, 3, 4, 5, 6, 7</sub>, MOK<sub>1, 3, 5</sub>, ORH<sub>1, 2A, 2B, 3A, 3B</sub>, OEO<sub>1, 3A, 4, 6</sub>, PAR<sub>1, 9</sub>, POR<sub>1</sub>, PIL<sub>1</sub>, RBM<sub>1</sub>, RSN<sub>1, 2</sub>, RIB<sub>1, 2</sub>, RCO<sub>1, 3, 7</sub>, RSK<sub>1, 3, 7, 8</sub>, SBW<sub>6A, 6R, 6I, 6B</sub>, SCH<sub>1, 2, 3, 4, 5, 7</sub>, SCI<sub>1, 2, 4A, 6A, 6B</sub>, SKI<sub>1, 3, 7</sub>, SNA<sub>1, 2, 3, 7, 8</sub>, SPD<sub>1, 3, 4, 5, 7, 8</sub>, SPE<sub>1, 3, 4, 7</sub>, SPO<sub>1, 3, 7, 8</sub>, SQU<sub>1T, 6T</sub>, SSK<sub>1, 3, 7, 8</sub>, STA<sub>1, 3, 4, 5, 7</sub>, STN<sub>1</sub>, SWA<sub>1, 3, 4</sub>, SWO<sub>1</sub>, TAR<sub>1, 2, 3, 4, 5, 7, 8</sub>, TOR<sub>1</sub>, TRE<sub>1, 2, 7</sub>, TRU<sub>3, 4</sub>, WAR<sub>1, 2, 3, 7, 8</sub>, WWA<sub>2, 3, 4, 5B, 7</sub>, YEM<sub>1, 8, 9</sub>.

**NOTE:** Pending the results of the camera rollout occurring in 2024/25, the stocks presently allocated may be revisited in future.

*NOTE: This multi-year project was consulted on in 2023/24 and is included here for completeness*

## **2.6 INT2023-06 Investigating the impact of fisheries on endangered hoiho diet, microbiome, and disease susceptibility**

**Project Code:** INT2023-06

**Start Date:** 1 July 2023

**Completion Date:** 30 June 2025

**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.

### **Rationale:**

Hoiho are classified as Nationally Endangered (NZCTS), and could be functionally extinct on the mainland of Aotearoa New Zealand within a few decades (Mattern et. al, 2017). Despite extensive conservation efforts to improve the status of the northern hoiho population (NZ South Island and Rakiura), progress has been impeded in parts by poor animal health. In recent years disease has played a more significant role in the declining numbers of adults and chicks (Seddon et. al, 2013). Recent research has indicated major changes in hoiho diet over the last 30 years; whereas in the 1980s hoiho were feeding largely on small oily fish species such as sprat, immature red cod and āhuru, now blue cod, a fish very low in oil, makes up most of their diet (Young et. al, 2020). The reasons for this change remain unexplained, but fishing practices such as bottom-trawling may have altered hoiho feeding habits. For example, GPS tracking suggests that some hoiho are following furrows carved by bottom trawlers, where the damaged ocean floor could be providing food for scavengers such as blue cod (Young et. al, 2020). Crucially, the loss of important prey species could play a role in the increased disease vulnerability in the Northern population. Moreover, rising sea temperatures can alter the microbiome of threatened species by reducing microbiome diversity and promoting opportunistic pathogenicity in previously benign microbial taxa (West et. al, 2019). Thus, fishing practices may be having a larger impact on hoiho health and survival than previously suspected. The recent changes in hoiho diet due to fishing practices, and exacerbated by climate change, may have led to an imbalance in the hoiho microbiome and, as a result, their susceptibility to disease. This research will determine links between hoiho diet, microbiome health and disease, and will inform conservation management approaches to ensure the continued survival of hoiho across their range.

### **Research Approach:**

Molecular analyses of faecal samples collected from across the northern and southern populations of hoiho (subantarctic islands) over a five-year period (2017-2021) will establish any difference in diet, any changes in hoiho microbiomes, and the cooccurrence of disease challenges over this time frame. Relevant metadata from each of the sites will be obtained from the Department of Conservation's Yellow-Eyed Penguin Database.

**Outputs:**

A written technical report outlining:

- the status of diet in the northern and southern populations of hoiho;
- characterising the hoiho microbiome, and identifying viral illnesses present at breeding sites over the time period 2017 to the present day;
- established similarities or differences in diet, microbiome, and disease between the northern and southern subpopulations of hoiho.

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.

**Note:** A two-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish stocks:** BUT5, ELE3, SCH3, 5, SPO3

**References:**

Mattern T, Meyer S, Ellenberg U, Houston DM, Darby JT, Young M, van Heezik Y, Seddon PJ. 2017. Quantifying climate change impacts emphasises the importance of managing regional threats in the endangered yellow-eyed penguin. *PeerJ* 5:e3272.

Seddon PJ, van Heezik Y, Ellenberg U. 2013. Yellow-eyed penguin (*Megadyptes antipodes*), p 360. In Borboroglu PG, Boersma PD (ed), *Penguins: natural history and conservation*. University of Washington Press, Seattle, WA.

Young MJ, Dutoit L, Robertson F, van Heezik Y. 2020. Species in the faeces: DNA metabarcoding as a method to determine the diet of the endangered yellow-eyed penguin. *Wildl Res* 47(6): 509-522.

West AG, Waite DW, Deines P, Bourne DG, Digby A, McKenzie VJ, Taylor MW. 2019. The microbiome in threatened species conservation. *Biol Conserv* 229:85-98.

## 2.7 INT2024-02 Port-based audit and protected species retention programme

**Project Code:** INT2024-02

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objectives A, B, C; National Plan of Action – Seabirds, Te Kaweka Takohaka mō te Hoiho 2020 and Hector’s and Māui dolphin Threat Management Plan.

### **Project Objectives:**

1. To address data gaps and enhance verification in fisheries where electronic monitoring is used as the sole monitoring and verification tool.
2. To confirm whether a risk-led port-based approach would be an effective ongoing tool for addressing data gaps and enhancing verification on camera vessels in the absence of observers.

### **Rationale:**

The ongoing rollout of onboard cameras is leading to improved monitoring and verification in the inshore fleet. Although electronic monitoring (EM) offers a lot of opportunities, there are still areas where supplemental data collection is required, such as in the mitigation specification and species verification space. Similar looking species, especially in regard to seabirds and corals, require physical sampling to confirm identification down to the species level and specimens are essential to obtain any information about age, sex, body condition, diet, and type of injuries. Additionally, identifying the specifications of mitigation in use is critical for identifying contributing factors to protected species capture events, which can inform our advice towards risk reduction and engagement through the Liaison Programme.

### **Research Approach:**

This pilot programme will aim to coordinate the deployment of responders to areas and times known to be particularly problematic for protected species captures. Responsibilities will include the processing of protected species as well as the auditing of vessel mitigation and Protected Species Risk Management Plans. The success of this project heavily relies on the voluntary support of industry for engagement and protected species retention. Relevant species identification and necropsies will be fulfilled through INT2022-02, INT2022-03 and INT2023-04 projects.

Preparation to get the pilot programme underway will include the development of audit forms, resourcing of materials for specimen retention, and development of any further permission letters necessary to allow for holding protected species under the Wildlife Act 1953. Close collaboration across agencies will be critical to ensure that risk-area information is adequately communicated for effective deployments.

A workshop will be held to prioritise areas and times for deployments, as well as identify expectations for fishers. Workshop participants will provide feedback on audit forms, ensuring that they contain all necessary information for feeding into risk management, before going live.

### **Outputs:**

1. A workshop report describing the considered approach for deployments and protocols.
2. Development of protocols and data collection forms.
3. A report describing the work undertaken, results and recommendations around the effectiveness of a port-based programme.

**Note:** A one-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish stocks:** BAR<sub>1, 5, 7</sub>, BIG<sub>1</sub>, BUT<sub>2, 5, 7</sub>, BNS<sub>1, 2, 3, 7, 8</sub>, ELE<sub>3</sub>, FLA<sub>1, 2, 3, 7</sub>, GMU<sub>1</sub>, GUR<sub>1, 2, 3, 7, 8</sub>, HPB<sub>1, 2, 3, 4, 5, 7, 8</sub>, JDO<sub>1, 7</sub>, KAH<sub>1</sub>, LIN<sub>1, 2</sub>, MOK<sub>1</sub>, RCO<sub>3</sub>, RSK<sub>3</sub>, SNA<sub>1, 7, 8</sub>, SCH<sub>2, 3, 5, 7, 8</sub>, SPO<sub>1, 3, 8</sub>, STA<sub>3, 5, 7</sub>, STN<sub>1</sub>, SWO<sub>1</sub>, TAR<sub>1, 2, 3, 7, 8</sub>, TOR<sub>1</sub>, TRE<sub>1, 7</sub>, YEM<sub>1</sub>

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## 2.8 INT2024-03 Understanding the effects of fishing depth on turtle and seabird bycatch

**Project Code:** INT2024-03

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2026

**Guiding Objectives:** CSP Objectives A and B, CSP Sea Turtle Medium Term Research Plan, CSP Seabird Medium Term Research Plan

### **Project Objectives:**

1. Characterise the effects of gear setting on leatherback turtle and seabird bycatch using TDR data obtained from surface longline vessels.
2. Investigate if target catch species and amount caught is correlated with turtle and seabird bycatch and if so, discuss how changes to set depth may affect target species catch rates.
3. Compare depth profiles of vessel sets with and without protected species captures and identify any apparent patterns operating inside and outside North-East New Zealand bycatch hotspot areas (within the EEZ).
4. Review international research and compare the effects gear setting has on turtle and seabird bycatch in NZ and overseas.
5. Recommend gear configurations to mitigate leatherback turtle and seabird bycatch.

### **Rationale:**

The Conservation Services Programme Sea Turtle and Seabird Medium Term Research Plans outline a five-year research programme to deliver on the turtle and seabird interaction research component of CSP. It is targeted at addressing relevant CSP Objectives (as described in the CSP Strategic Statement) and the NPOA-Seabirds. This project delivers priority research components of the plans involving characterising fisheries interactions, particularly for turtles in NE NZ; an area identified as a hotspot for fisheries bycatch of critically endangered leatherback turtles in the New Zealand surface longline fleet.

### **Research Approach:**

This two-year project will build on current depth-logger deployments planned under project MIT2023-02 (Understanding and mitigating seabird and turtle bycatch during the pelagic longline soak period). The current project aims to broadly characterise hook depth profiles across surface longline fisheries and the depths at which surface longline vessels are fishing when bycatch of leatherback turtles and seabirds occurs. The focus will be on adding additional depth loggers to vessels operating and reporting bycatch in areas of leatherback turtle occurrence and high-risk seabird species. Comparisons will be made with vessels not catching turtles to understand if differences in gear setting have an impact on bycatch rates. Results will also consider target species and amount caught on the set. It is noted that due to low observer coverage, bycatch data may be limited to fisher reported. To help address this we will investigate the potential to use GoPro cameras to capture additional data. Additional data may also be obtained from LO's currently collecting information from vessel operators on turtle bycatch events through the DOC/FNZ turtle working group. The project will also include use of any additional data deemed suitable to inform species distribution modelling e.g. gear type, duration of set, size of animal, type and amount of gear attached to the turtles, sea surface temperature, number of hooks from turtle to nearest float, etc. The project will be informed by other relevant turtle and seabird projects currently ongoing or planned by DOC/FNZ.

**Outputs:**

1. A technical report detailing the research undertaken, results, and recommendations to improve bycatch mitigation.
2. All data will be provided to DOC in electronic format.

**Note:** A two-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish stocks:** BIG1, STN1, SWO1, TOR1

**References:**

Siders et al. 2024 Potential of dynamic ocean management strategy for western Pacific leatherback sea turtle bycatch mitigation in New Zealand.

DOC CSP project POP2023-01 Leatherback aerial survey NE NZ

DOC CSP project MIT2023-02 Understanding and mitigating seabird and turtle bycatch during the pelagic longline soak period

FNZ PRO 2023-15 project post-release survival of leatherback turtles



**2.9 INT2024-04 Exploring impacts and recovery potential of protected deep-sea stony corals, utilising Remotely Operated Vehicle capability on RV Sonne in the New Zealand region**

**Project Code:** INT2024-04

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objectives B and C; CSP Coral Medium Term Research Plan

**Project Objectives:**

1. To assess direct impacts of fishing on corals and to determine their recovery at seamounts and other sites subject to a range of fishing intensity.
2. To survey, assess and collect corals at multiple unexplored sites across the EEZ to improve recent coral distribution /fisheries overlap assessments and to ground truth coral habitat models.

**Rationale:**

Multiple CSP and AEWG Technical Working Groups have identified a gap in understanding coral diversity and distribution through direct observation, and this gap is identified in the CSP Coral Medium Term Research Plan. This project will benefit from a rare and cost-effective opportunity to deploy New Zealand-based coral researchers on a NZ-EEZ wide research voyage aboard the German vessel RV Sonne in January 2025 on the expedition CoralNewZ. Of a team of 35 scientists, there are berths for eight New Zealand scientists. This project has substantial cost leverages on a state-of-the-art vessel with an international team of coral experts, including access to technology not available on the RV Tangaroa (e.g., very precise ROV material collection and targeted footage collection, state-of-the-art aquaria for live colony husbandry) that would substantially improve our understanding of offshore corals and the impacts of commercial fisheries on them.

**Research Approach:**

The scientists will participate in multiple research activities including: revisiting locations monitored for long-term coral seamount recovery on the Graveyard Knolls (Chatham Rise), exploring new sites in the region that are both unfished and potentially impacted by fisheries (Puysegur Bank, off Fiordland, and Colville Ridge), re-examination of fished vs. unfished seamounts to gauge feature-specific impacts and recovery, determination of the functional role of fish and fisheries in coral ecosystems, ground-truthing predictive habitat models, and collecting samples and live specimens for further experiments and genetics from areas previously examined via biodiversity trawl surveys, alongside novel areas lacking in current sampling and understanding (as identified through CSP projects POP2021-02 'hotspots' and POP2022-05 'coral cataloguing' - both of which have informed the voyage plan). There is additionally scope to retrieve settlement plates, and tag colonies for growth and photogrammetry work - plus additional coral research TBD.

**Outputs:**

1. A voyage report detailing research undertaken aboard the voyage and data inventory.
2. A technical report including (for example) updated maps of coral distribution and diversity, updated analysis of coral recovery at seamount sites, description of live colony experiments and recommendations for further research.
3. Data to be provided to DOC in an electronic format.

**Note:** A one-year term is proposed

**Indicative Research Cost:** \$140,000

**Cost Recovery:** F(CR) Item 4B (100% Industry)

**Fish stocks:** BAR<sub>1, 4, 5</sub>, BNS<sub>3</sub>, BYX<sub>1, 2, 3</sub>, CDL<sub>1</sub>, HAK<sub>1</sub>, HOK<sub>1</sub>, HPB<sub>5, 7</sub>, JMA<sub>3, 7, 8</sub>, LIN<sub>1, 2, 5, 6, 7</sub>, OEO<sub>1, 3A, 4, 6</sub>, ORH<sub>1, 2A, 2B, 3A, 3B, 7A, 7B</sub>, SBW<sub>6A, 6R, 6I, 6B</sub>, SCH<sub>5</sub>, SCI<sub>2, 3, 4A</sub>, SNA<sub>1</sub>, SPO<sub>3</sub>, SQU<sub>1T, 6T</sub>, SWA<sub>3, 4</sub>, TAR<sub>1, 2</sub>, TRE<sub>1, 7</sub>, WWA<sub>5B</sub>

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## 2.10 INT2024-05 Testing bycatch mitigation scenarios for protected corals in New Zealand using best available information

**Project Code:** INT2024-05

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objectives B and C, CSP Coral Medium Term Research Plan

### **Project Objectives:**

1. To update our understanding of coral overlap with commercial fishing, based upon new coral abundance and diversity data at multiple taxonomic levels, and up-to-date and historical fishing effort.
2. To engage with experienced subject matter experts to draft multiple options for ways to reduce coral bycatch.
3. To assess how hypothetical scenarios suggested through Objective 2 could mitigate and reduce bycatch of corals at multiple taxonomic levels of diversity and varied abundance.

### **Rationale:**

Building on results and recommendations stemming from CSP projects INT2022-04 (coral risk assessment), POP2021-02 (coral hotspots), and POP2022-04 (coral cataloguing), this project seeks to map new distribution and abundance results for protected corals and to test them against multiple coral bycatch reduction scenarios at the species to morphotype to (sub) class level (i.e. the four protected coral groups) across the EEZ. The project offers the opportunity to ensure best available information from recent CSP projects is considered in future coral bycatch reduction initiatives and it will facilitate ongoing inter-agency and stakeholder agreement regarding coral bycatch mitigation.

### **Research Approach:**

Firstly, the most current information on coral distribution (including presence-based data) and abundance (including hotspots project data) will be mapped against recent and historical fishing effort for multiple fishing methods to update understanding of areas of overlap based upon new coral diversity and effort data. Secondly, as defined via stakeholder working groups and workshops, multiple hypothetical scenarios to mitigate and reduce bycatch will be tested to assess best options to manage fishing impacts on corals at multiple scales, including, for example, those at highest risk (from INT2022-04), in areas of high diversity/and or abundance (from POP2021-02), or other rare / limited taxa (POP2022-04). Hypothetical scenarios could consider effects on recovery rates and diversity of coral bycatch from, for example, spatial closures, relevant national and international guidelines, fishery input / output control settings, or consideration of species-specific measures or encounter thresholds; including methods such as management strategy evaluations or structured decision making - these approaches will be refined and discussed at project initiation and agreed with the supplier and stakeholder working group as the project progresses in line with any relevant or comparable policy.

### **Outputs:**

1. A technical report detailing EEZ-wide overlap between coral distribution and fishing effort, and including assessment of potential performance of scenarios intended to reduce coral bycatch at multiple taxonomic (diversity) and abundance levels.
2. All data will be provided to DOC in electronic format.

**Note:** A one-year term is proposed

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

**Cost Recovery:** F(CR) Item 4B (100% Industry)

**Fish stocks:** BAR<sub>1, 4, 5</sub>, BNS<sub>3</sub>, BYX<sub>1, 2, 3</sub>, CDL<sub>1</sub>, HAK<sub>1</sub>, HOK<sub>1</sub>, HPB<sub>5, 7</sub>, JMA<sub>3, 7, 8</sub>, LIN<sub>1, 2, 5, 6, 7</sub>, OEO<sub>1, 3A, 4, 6</sub>, ORH<sub>1, 2A, 2B, 3A, 3B, 7A, 7B</sub>, SBW<sub>6A, 6R, 6I, 6B</sub>, SCH<sub>5</sub>, SCI<sub>2, 3, 4A</sub>, SNA<sub>1</sub>, SPO<sub>3</sub>, SQU<sub>1T, 6T</sub>, SWA<sub>3, 4</sub>, TAR<sub>1, 2</sub>, TRE<sub>1, 7</sub>, WWA<sub>5B</sub>

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## 2.11 INT2024-06 Interaction of spotted shags with northern North Island set net fisheries

**Project Code:** INT2024-06

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2025

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

### **Project Objectives:**

To describe key fine-scale areas where the northern North Island population of spotted shag are at risk of bycatch in commercial fisheries.

### **Rationale:**

The northern North Island population of spotted shags are genetically distinct and recognised as a taxon of concern under the NPOA Seabirds 2020. This population has suffered alarming population declines. Specifically, of the 13 known colonies extant in the 1990s, only two remain, which jointly contain ~300 breeding pairs only (Rawlence et al. 2019). Shags are known to be susceptible to bycatch in set nets and the coastal foraging range of these birds overlaps with set net effort, suggesting that the observed decline is, at least in part, caused by fisheries related mortalities.

A collaborative research programme by Auckland Museum and Oregon State University has conducted a comprehensive tracking and diving behaviour study on this vulnerable population. During this tracking programme a number of tracked birds are likely, or known, to have been caught in set nets. The observed level of bycatch in set nets in this research programme is consistent with the documented decline of this population. However, the research programme is primarily aimed at understanding shag spatial ecology, not bycatch risk, and as such, additional work is required to quantify this.

### **Research Approach:**

This project will analyse the data collected by the collaborative research programme of Auckland Museum and Oregon State University in the context of commercial set net fishing effort. The analyses will develop robust distributional data layers suitable for input to existing tools such as Risk Atlas and further risk assessment iterations. The data will also be assessed in relation to set net fishing effort to immediately inform urgent fisheries management actions. In particular, the analyses will identify areas and times where fisher outreach and seabird bycatch mitigation uptake should be targeted to minimise the impact of these fisheries on this population.

### **Outputs:**

1. A report describing the existing data, methods used, results and areas/times for focus or urgent fisheries management actions.
2. Spatial data on distribution suitable for inclusion in existing tools such as Risk Atlas and future updates to fisheries risk assessments.
3. All data will be provided to DOC in electronic format.

**Note:** A one-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish stocks:** FLA1, GMU1, GUR1, KAH1, SNA1, SPO1, TRE1

## 2.12 INT2024-07 Collection and curation of tissue samples from protected fishes and turtles

**Project Code:** INT2024-07

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2027

**Guiding Objectives:** CSP Objectives B, C and E; CSP Protected Fish Medium Term Research Plan; National Plan of Action- Sharks.

### **Project Objectives:**

1. To provide co-ordinated storage and curation of tissue samples collected from protected marine fishes and sea turtles by researchers, Fisheries Observers and fishers.
2. To ensure all relevant meta-data is associated with each sample, that samples are accessible to bona-fide researchers, appropriate cultural controls on the use of samples are in place, and that the use of samples and publications arising from their use are tracked.

### **Rationale:**

Biological sampling or retention of carcasses of protected species taken as incidental bycatch in commercial fisheries can be difficult particularly for large pelagic species such as basking sharks, great white sharks, devil rays and leatherback turtles. In addition to operational constraints, health and safety considerations can make examination or necropsy of dead animals difficult or impossible. However, genetic and stable isotope analyses that use small tissue samples can provide valuable information on population structure, connectivity and size, and habitat preferences and feeding ecology, respectively.

### **Research Approach:**

This project represents a continuation and extension of INT2018-04. Tissue sample collection will be extended to all protected fish and sea turtle species taken as bycatch in commercial fisheries. Sampling kits and sampling instructions will be provided to interested commercial fishers and Fisheries Observers deployed in fisheries likely to catch protected species. Costs of returning samples and unused kits will be met by the project. Legal authority to collect and retain samples from protected species will be provided to participating fishers. Sample storage and curation will be consistent with accepted international standards and data standards and tracking will be interoperable with national and international initiatives such as IraMoana, Genomics Aotearoa and GEOME.

Access to archived samples will be moderated by the Marine Bycatch and Threats Manager, Department of Conservation.

### **Outputs:**

1. Archived tissue collection and associated electronic metadata.
2. Annual report on tissues housed in the archive, the use or fate of archived samples, and any publications arising from their use.
3. Final report describing the structure of the database, including use of Traditional Knowledge and Biocultural Labels and Notices.
4. All data will be provided to DOC in electronic format.

**Note:** A three-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish stocks:** BIG 1, BUT5, EMA1, GUR1, HAK1, HOK1, JMA7, LIN5, SBW6I, SKJ1, SNA1, SQU1T, SQU6T, STN1, SWA3, SWO1

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### 2.13 INT2024-08 Westland petrel overlap with commercial fishing effort

**Project Code:** INT2024-08

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2025

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

#### **Project Objectives:**

To describe fine scale spatiotemporal overlap of Westland petrels with commercial fisheries.

#### **Rationale:**

Westland petrels are classified as the fifth most at-risk species in the updated SEFRA (Edwards et al 2023), with an estimated ~143 annual domestic fisheries related mortalities. Westland petrels are at risk from bycatch in a range of different fisheries, including surface longline (~27% of annual mortalities), bottom longline (~25%), trawl (~46%), and set net (~1%). However, this breakdown of risk among different fisheries is based on limited and dated tracking data.

To better evaluate which fisheries pose the highest risk to Westland petrels in which areas and at what times, this project will leverage the considerable GLS and GPS tracking data generated by POP2021-08 and POP2022-07 as well as ongoing research collaborations with tertiary research institutions, and fill tracking gaps within the annual cycle where needed. Consequently, this project has the potential to accurately identify high risk fleets, areas, and times, to this species, and ultimately will assist the implementation of adequate seabird bycatch mitigation.

#### **Research Approach:**

Over the course of POP2021-08 and POP2022-07, a range of tracking devices have been deployed on Westland petrels. Specifically, >150 year-round GLS tracks have been generated over the course of three years. Additionally, >20 GPS tracks during the breeding season will have been obtained by the end of the 2023/24 financial year. These deployments have provided a range of insights on the movements of these birds already and this dataset has attracted the attention of overseas tertiary research institutions, seeking academic collaborations. However, these data have yet to be analysed in respect to overlap with different domestic fisheries that pose risks to Westland petrels.

This project aims to fill this knowledge gap. Specifically, we will partner with overseas tertiary research institutions to analyse the existing GLS and GPS tracking datasets to assess fine-scale overlap at a monthly resolution with the different domestic fisheries through a cost-saving research synergy.

This project will also provide the opportunity to identify and fill any remaining gaps in the tracking data during the annual cycle of Westland petrels (e.g., GPS tracking during the pre-laying exodus). Through this approach, this project will provide a high-detail, year-round insight into the bycatch risk of Westland petrels from a variety of domestic fleets.

#### **Outputs:**

1. A report describing the existing data, methods used and results.
2. Spatial data on distribution suitable for inclusion in future updates to fisheries risk assessments.
3. All data will be provided to DOC in electronic format.



**Note:** A one-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish stocks:** BAR7, FLA7, GUR7, HOK1, LIN7, ORH7A, SNA7, STN1, STA7, SWO1, TAR7

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3. Population Projects

*NOTE: This multi-year project was consulted on in 2022/23 and is included here for completeness.*

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

**Project code:** POP2022-01

**Start Date:** 1 July 2022

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objectives B and E; CSP Seabird plan; National Plan of Action – Seabirds.

**Project Objectives:**

1. To continue monitoring the key demographic parameters at the breeding colony of this threatened seabird to reduce uncertainty or bias in estimates of risk from commercial fishing.
2. To continue at-sea capture-recapture of black petrels to determine proportions of banded birds and identify if the current low juvenile survival rates are affected by any non-philopatric behaviour at the study colony.
3. To update model estimates of key population demographic estimates and population size based on results from at-sea mark-recapture.
4. To satellite track juvenile black petrels for at least the full first year post-fledging.

**Rationale:**

The CSP Seabird medium term research plan (CSP seabird plan) 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. Black petrels are the species at highest risk from commercial fisheries in northern New Zealand. The project builds on previous CSP project POP2021-01. Continuing research on this species is necessary to provide current estimates of adult survival, juvenile survival, recruitment, breeding probability, and breeding success. Continued at-sea captures are necessary to generate sufficient sample sizes for the independent estimation of population size and juvenile survival. New light-weight tracking tags allow for the tracking of juvenile dispersal and migration, a poorly understood cohort.

**Research Approach:**

The capture and banding of breeding and non-breeding birds will continue at the main study sites on Aotea/Great Barrier Island. This work will be focussed on the incubation period to band and recapture adults (for estimates of annual breeding probability, adult survival, juvenile survival, and recruitment) and the fledgling period to band surviving chicks (to estimate breeding success).

Live capture of black petrels at-sea off northern New Zealand will also continue to increase sample sizes of recaptures of banded birds attracted to the research vessel. At-sea capture-recapture work aims to use ratios of banded to un-banded birds for independent modelling of the current population size of this species away from the main study colony. In addition, the bands of captured birds will be matched against banding histories from the study colony to assess survival rates for returning immatures that may have dispersed out of the study colony. To achieve these two objectives, large numbers (i.e., hundreds of birds) will need to be safely live-captured at sea and checked for metal bands and any unmarked birds will be banded. As such, the at-sea capture-recapture work of POP2021-01 will continue over the next three years.

Depending on availability of resources and products, new lightweight solar-powered tags will be used to track age classes of black petrels where we have limited information on their movements. In particular tracking tags provide an opportunity to improve our understanding of the at-sea movements of juvenile black petrels. Improving insights into the distribution of this poorly understood cohort of birds is crucial. This research will be done in one of the three study seasons.

**Outputs:**

1. A technical report providing methods used and results of the black petrel demographic research, and at-sea capture-recapture of black petrels.
2. Data collected during the project to be made available in electronic format.

**Note:** A three-year term is proposed

**Indicative Research Cost:** \$70,000 year 1, \$100,000 year 2 and 3.

**Cost Recovery:** F(CR) Item 3 (50% Industry, 50% Crown)

**Fish Stocks:** BIG1, BNS1, RSN9, SCH4, SCI1, SNA1, SWO1, TAR1, TRE1

DRAFT

*NOTE: This multi-year project was consulted on in 2022/23 and is included here for completeness.*

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

**Project code:** POP2022-08

**Start Date:** 1 July 2022

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objectives B and E; CSP Seabird plan; National Plan of Action – Seabirds.

#### **Project Objectives:**

1. To monitor the key demographic parameters of Gibson's albatross and white-capped albatross to reduce uncertainty or bias in estimates of risk from commercial fishing.
2. To estimate the population size of Gibson's albatross.
3. To describe at-sea distribution of Gibson's albatross and white-capped albatross.

#### **Rationale:**

This proposal delivers key components of the CSP Seabird Plan involving field work on Gibson's albatross and white-capped albatross. A long-term study site for Gibson's albatross at the Auckland Islands has enabled trends in population size and demographic parameters to be assessed (Francis et al. 2012; Elliott et al. 2018). The largest population of white-capped albatross occurs on Disappointment Island in the Auckland Islands group. Population trend data for this site has been gathered through use of aerial photography in 2006 to 2017. Since 2015 ground-based monitoring of a marked study colony on Disappointment Island has started to obtain data to allow for improved survival estimates for this species. Tracking of adults has also been undertaken using GLS tags since 2018. The white-capped albatross population study has primarily been an add on to the research programme on Gibson's wandering albatross, which has constrained the project in terms of limited days spent on white-capped albatross data collection.

#### **Research Approach:**

The project will collect data to improve estimates of key demographic parameters of Gibson's albatross via continued mark-recapture monitoring. This will follow established methods (Walker & Elliott 1999) to estimate survival, productivity, and recruitment, and estimate the size and trend of the population. This suite of data allows more precise assessment of population trends than from simple nest counts. Drone-based aerial survey methods will be used to conduct wider population counts beyond the study plots. GLS and satellite tags will be used to improve our knowledge of at-sea distribution and overlap with fisheries posing bycatch risk.

The research component for white-capped albatross will include surveys of the Disappointment Island study colony to help interpret past aerial photography data sets, deploy trail cameras to monitor breeding activity and timing of nest failures, collect band recovery data from study colony birds, continue to mark a sample of breeding birds to build up robust datasets for adult survival analysis and deploy and collect GLS tags from a sample of birds to look at the extent of movements of birds in relation to annual variability in foraging conditions. Opportunities to investigate the use of drones to estimate total population size more accurately may also be progressed as feasible.

This project will also provide recommendations for a long-term monitoring strategy that can most efficiently and effectively provide the data required to understand the drivers behind population change and monitor the outcome of fisheries bycatch reduction management.

**Outputs:**

1. Annual technical report(s) on the work undertaken and results found, including update estimates of key demographic parameters and population estimates.
2. Annual summary of results will be presented to, and reviewed by, the CSP Technical Working Group, and made available online.
3. Recommendations for an efficient and effective long-term monitoring strategy.
4. Data collected during the project to be made available annually in electronic format.

**Note:** A three-year term is proposed

**Indicative Research Cost:** \$160,000 per annum

**Cost Recovery:** F(CR) Item 3 (50% Industry, 50% Crown)

**Fish Stocks:** BAR 1, 5, BIG1, BNS3, HOK1, HPB3, JMA3, LIN3, 5, 6, 7, ORH7A, SCH3, 5, SCI6A, SPO3, SQU1T, 6T, STN1, SWA3, 4, SWO1, TAR2, 3, TRE7, WAR3, WWA5B

DRAFT

*NOTE: This multi-year project was consulted on in 2022/23 and is included here for completeness.*

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

**Project code:** POP2022-10

**Start Date:** 1 July 2022

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objective E; CSP Seabird plan; National Plan of Action – Seabirds.

#### **Project Objectives:**

1. To monitor the key demographic parameters at the Antipodean albatross study site and reduce uncertainty or bias in estimates of risk from commercial fishing and measure the success of management interventions.
2. To estimate the total population size of the Antipodean albatross on Antipodes Island.
3. To describe the diet of the Antipodean albatross and assess signatures of nutritional stress.
4. To monitor the key demographic parameters of white-chinned petrels and reduce uncertainty or bias in estimates of risk from commercial fishing and measure the success of management interventions.
5. To estimate the total population size of white-chinned petrels on Antipodes Island.

#### **Rationale:**

This project delivers on priority monitoring and data gaps as identified in the CSP Seabird Plan. Due to logistical costs involved in getting to Antipodes Island, the Antipodean Albatross and white-chinned petrel projects have been combined into one Antipodean Island seabird research project. Antipodean albatross is extremely vulnerable to bycatch and continues to decline at 5% per annum, with fisheries bycatch, both within and beyond the New Zealand EEZ, being the greatest known threat. The project would continue the demographic monitoring of Antipodean albatross conducted in previous years. In addition, this project will involve a (multi-year) population wide census, based on methods to be trialed in 2021/22. An Antipodean albatross population estimate is a major data gap, as the only previous independent estimate was conducted in 1994-1996. This project also aims to provide insights into the diet and potential nutritional stress in Antipodean albatross; currently a poorly known aspect of the ecology of this species. In addition to the Antipodean albatross work, this project also aims to estimate key vital rates and population size for white-chinned petrels on Antipodes Island, another seabird species vulnerable to bycatch.

#### **Research Approach:**

The monitoring of key Antipodean albatross demographic parameters (adult survival, juvenile survival, recruitment, breeding probability, and breeding success) will take place during the austral summer. As this is a bi-annual breeder whose chicks take close to a year to fledge, both returning adults starting to breed, and chicks close to fledging can be monitored during the same trip allowing for a full assessment of all key vital rates. Monitoring will take place using protocols standardised over the last 20 years. However, an independent population estimate is out of date and a major data gap. Methods developed during 2021/22 will be employed to provide this key demographic parameter. Both streams of Antipodean albatross work involve close handling of birds and as such, feather sampling for stable isotope analyses and stress analyses (i.e., CORT) will be a simple addition to this work plan. The diet and stress analyses across multiple years and cohorts will provide much needed insights into the potential effects climate change has on this

rapidly declining species. This project will also provide recommendations for a long-term monitoring strategy that can most efficiently and effectively provide the data required to understand the drivers behind population change and monitor the outcome of fisheries bycatch reduction management.

White-chinned petrels breed at a similar time as Antipodean albatrosses and as such this species can be monitored at the same time. Key vital rates for this species are needed and as such a capture-mark-recapture study will be set up to facilitate the estimation of adult survival, juvenile survival, recruitment, and breeding probability). Additionally, while population estimates exist for both Auckland Islands (POP2017-04) and Campbell Island (BCBC2019-03), population estimates for Antipodes Island, another stronghold for the species, are lacking. As such, a population estimate employing methods developed on Auckland and Campbell Island will be conducted. Combined, these two work streams will provide updated parameters for one of the most bycaught species in New Zealand.

**Outputs:**

1. Annual technical report(s) on the work undertaken and results found, including update estimates of key demographic parameters and population estimates.
2. Annual summary of results will be presented to, and reviewed by, the CSP Technical Working Group, and made available online.
3. Recommendations for an efficient and effective long-term monitoring strategy.
4. Data collected during the project to annually be made available in electronic format.

**Note:** A three-year term is proposed

**Indicative Research Cost:** \$160,000 per annum

**Cost Recovery:** F(CR) Item 3 (50% Industry, 50% Crown)

**Fish Stocks:** BAR 1, 5, BIG1, BNS3, HOK1, HPB3, JMA3, LIN3, 5, 6, 7, ORH7A, SCH3, 5, SCI6A, SPO3, SQU1T, 6T, STN1, SWA3, 4, SWO1, TAR2, 3, TRE7, WAR3, WWA5B

*NOTE: This multi-year project was consulted on in 2023/24 and is included here for completeness.*

### **3.4 POP2023-01 Aerial survey of leatherback turtles off Northeast North Island**

**Project code:** POP2023-01

**Start Date:** 1 July 2023

**Completion Date:** 30 June 2026

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

#### **Project Objectives:**

1. Assess feasibility of using aerial surveys to monitor leatherback turtles in New Zealand waters.
2. To collect fishery independent information on the distribution, relative abundance and size of leatherback turtles in New Zealand waters.
3. To collect data on pelagic species associated with leatherback turtles in New Zealand waters.

#### **Rationale:**

Western Pacific leatherback turtles are Critically Endangered due to a variety of anthropogenic impacts, including bycatch in commercial fisheries throughout their range.

Leatherbacks are the sea turtle most regularly interacting with commercial fisheries in New Zealand waters, with the greatest number being caught on surface longlines targeting swordfish and bigeye tuna off the Northeast North Island (FMA 1, FMA 2) during summer and autumn. Interactions with surface longlines are also reported from FMA 7, FMA 8 and FMA 9. Fishery independent data on leatherback distribution and abundance are required to determine overlap with commercial fisheries, inform national and regional risk assessments for this species and identify potential environmental indicators that could be used to avoid or reduce fishery interactions. Identification of hot spots for the species would also assist the development of satellite tagging studies of free-swimming leatherbacks on their foraging grounds. Such studies would provide information on diving behaviour and long-distance movements and could potentially identify critical habitat in NZ waters and confirm source populations of leatherbacks interacting with New Zealand fisheries.

#### **Research Approach:**

The project will design and trial a statistically robust aerial line transect survey covering part or all the area off eastern Bay of Plenty and East Cape where interactions with surface longliners are most frequent. It is expected the methodology will involve the use of overhead fixed wing aircraft, onboard observers and/or digital video technology to record the transects. The first year of the project would involve contracting and survey design phases. The second year would involve preparation and conduction of survey flights between December and April inclusive. Survey flights will be replicated to improve estimation of statistical power, the influence of environmental variables and probability of detection. The final year of the project will involve data analysis, development of recommendations and delivery of final outputs.

#### **Outputs:**

1. A technical report describing the proposed survey methodology, capture of relevant environmental variables, statistical analyses and data storage, reviewed by the CSP Technical Working Group.



2. A final report describing the survey results and providing recommendations on potential improvements to the methodology, long-term data storage needs and other potential uses of the data.
3. Provision of all data and video files collected in electronic format.

**Note:** A three-year term is proposed

**Indicative Research Cost:** \$50,000 year 1, \$100,000 year 2, \$50,000 year 3

**Cost Recovery:** F(CR) Item 3 (50% Industry, 50% Crown)

**Fish Stocks:** BIG1, STN1, SWO1, TOR1

DRAFT

*NOTE: This multi-year project was consulted on in 2023/24 and is included here for completeness.*

### 3.5 POP2023-02 Southern Buller's population study

**Project code:** POP2023-02

**Start Date:** 1 July 2023

**Completion Date:** 30 June 2026

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

#### **Project Objectives:**

1. Monitor key demographic parameters of southern Buller's albatross (*Thalassarche bulleri bulleri*) (adult survival, breeding probability, breeding success, and population size) on the Snares Islands to reduce uncertainty in risk estimates from commercial fishing and to measure the success of management interventions.
2. Provide updated, high-resolution insights into the at-sea distribution of adult southern Buller's albatrosses from the Snares and Solander Islands.
3. Provide an updated population estimate from Solander Island using an aerial survey.
4. Describe the diving behaviour of southern Buller's Albatrosses from the Snares Islands using time depth recorders (TDRs).

#### **Rationale:**

The Conservation Services Programme Seabird Medium Term Research Plan (CSP Seabird Plan) 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 project delivers priority research components of the CSP Seabird Plan involving the estimation of key demographic parameters of southern Buller's albatross at the Snares and Solander islands and investigates at-sea distribution and diving behaviour. Three established study sites exist at the Snares, with substantial historic mark-resight effort (Sagar 2014), and demographic data having been collected annually at these sites annually since 1992, excluding 2018 and 2021.

#### **Research Approach:**

This three-year project is split across two field locations: the Snares and Solander Islands. At the Snares, work will continue with previously established mark-recapture monitoring methodology to further improve estimates of key demographic parameters. Particularly, estimates of annual survival of birds banded as breeders, which have showed continued decline in the most recent data assessment from CSP project POP2019-04 (2022). TDR's and GLS tags will also be fitted to breeding birds at the Snares to investigate diving behaviour and distribution patterns. The Solander field work will also entail fitting GPS tags to assess at-sea distribution patterns and work will also include an aerial and ground based census to update population estimates.

#### **Outputs:**

1. 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.
2. All data will be provided to DOC in electronic format.

**Note:** A three-year term is proposed

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

**Cost Recovery:** F(CR) Item 3 (50% Industry, 50% Crown)

**Fish Stocks:** BAR 4, 5, HOK1, LIN5, 6, ORH3B, SCI4, 6A, SQU1T, 6T, STN1, SWA4, SWO1

DRAFT

*NOTE: This multi-year project was consulted on in 2023/24 and is included here for completeness.*

### 3.6 POP2023-03 Updated population estimate and marine habitat utilisation of yellow-eyed penguins/hoiho breeding on Campbell Island

**Project code:** POP2023-03

**Start Date:** 1 July 2023

**Completion Date:** 30 June 2025

**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).

#### **Rationale:**

The nationally endangered yellow-eyed penguin/hoiho has experienced a more than 70% decline across its New Zealand mainland range over the past decade. This is likely due to a variety of threats including but not limited to disease, predation, climate change and fishing interactions. However, little information exists about the status of the southern population of hoiho breeding on the Auckland and Campbell Islands.

While a coarse recent population estimate exists for the Auckland Island archipelago (577 breeding pairs; Muller et al. 2020), the last population estimate for Campbell Island dates back over three decades (350-460 breeding pairs; Moore 1992). Importantly, an up-to-date population estimate for the southern population is critical for assessing the species wide risk (i.e., combined northern and southern populations) from fisheries, particularly set netting, which constitutes a high risk for hoiho (Rowe 2013). Preliminary tracking of hoiho on Campbell Island indicates that birds forage as far as 100 kilometres away from the colony, highlighting the importance of collecting habitat use, diet and foraging distribution data for the southern population to inform any assessments of direct or indirect effects of trawling activities on hoiho.

This project supports Te Kaweka Takohaka mō te Hoiho/the strategy for hoiho and Te Mahere Rima Tau/five-year action plan; specifically actions 5c (provide knowledge about status and health of southern population), 6f (update SEFRA with new info), and 6h (assess the risk of bycatch from trawl fisheries).

#### **Research Approach:**

This two-year project will be split across two field seasons. In the first year, a distribution survey across Campbell Island will be performed, checking all previously known and unknown landing sites. In the second year, counts of the larger identified breeding areas will be undertaken to generate a population estimate. Tracking (GPS-dive loggers, satellite transmitters) of hoiho will occur in both years.

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. This project will utilise maximum synergies and cost sharing with POP2023-04.

**Outputs:**

A technical report (and associated data layers) detailing:

1. A population estimate for Campbell Island hoiho including methodology; and
2. The spatio-temporal distribution, activity and dive patterns of Campbell Island hoiho, and assessing potential overlap of hoiho foraging with fishing activities.

**Note:** A two-year term is proposed

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

**Cost Recovery:** F(CR) Item 3 (50% Industry, 50% Crown)

**Fish Stocks:** BUT5, ELE3, SCH3, 5, SPO3

DRAFT

*NOTE: This multi-year project was consulted on in 2023/24 and is included here for completeness.*

### **3.7 POP2023-04 Campbell Island seabird research**

**Project code:** POP2023-04

**Start Date:** 1 July 2023

**Completion Date:** 30 June 2025

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

#### **Project Objectives:**

1. To provide updated counts of Southern Royal Albatross nests in representative study and index sites.
2. To monitor the key demographic parameters of Southern Royal Albatross and reduce uncertainty or bias in estimates of risk from commercial fishing and measure the success of management interventions.
3. To describe the at-sea distribution of Southern Royal Albatross to inform overlap with and risk from commercial fishing.
4. To provide updated population estimates through traditional photo point counts of Grey-headed Albatross.
5. To monitor the key demographic parameters of Grey-headed Albatross at study and index sites and reduce uncertainty or bias in estimates of risk from commercial fishing and measure the success of management interventions.
6. To map any Northern Giant Petrel nests located opportunistically during surveys of other priority species.

#### **Rationale:**

This project delivers on priority monitoring and data gaps as identified in the CSP Seabird Plan. Due to logistical costs involved in getting to Campbell Island, research on Southern Royal Albatross has been combined with research on other priority species, such as Grey-headed Albatross, into one Campbell Island seabird research project.

Population counts conducted during time-constrained visits in 2019 (BCBC2019-03) and 2023 (POP2022-11) indicate that the Southern Royal Albatross population on Campbell Island has decreased over the last 20 years at a similar rate as the Antipodean Albatross, a species highly vulnerable to bycatch. Counts at Enderby Island mirror these trends. Therefore, dedicated and prolonged counts of Southern Royal Albatross nests on Campbell Island are needed to provide clarity on the species' decline.

Demographic parameters (adult survival and productivity) should also be monitored to provide further insights into the drivers of Southern Royal Albatross trends. Similarly, the at-sea distribution of Southern Royal Albatross should be described to gain further information on fisheries risks. Additionally, this project also aims to provide updated estimates of population size and key vital rates (survival and reproduction) for Grey-headed Albatross, another seabird species vulnerable to bycatch.

This project may also provide a platform for additional research on other seabird species as risk from bycatch (e.g., Northern Giant Petrel, Antipodean Albatross, Campbell Albatross, and White-chinned Petrels), but this a lower priority than the research on the species mentioned above and dependent on logistics.

**Research Approach:**

To confirm the potential severe population decline of Southern Royal Albatross, nest counts will be conducted at the two traditional study areas as well as at three traditional index areas. Marked individuals will be resighted and new individuals will be marked in the Col study area. Here, 12 remote cameras have been placed in 2023 (POP2023-11) to monitor productivity, and these efforts will be continued through this project as well. Finally, GLS tags were also deployed on breeding Southern Royal Albatrosses in 2023 and these efforts will be repeated to ensure that both breeding cohorts of this bi-annual species are tracked. If provided through other means, satellite transmitters will also be deployed on Southern Royal Albatrosses. Combined, these research avenues will provide the data required to understand the drivers behind population trends. This project will also provide recommendations for a long-term strategy that can most efficiently and effectively assess population change and monitor the outcome of fisheries bycatch reduction management.

Grey-headed albatross breed at a similar time as Southern Royal Albatross and thus this species can be monitored at a similar time, particularly if colonies are visited early in the Austral summer. Specifically, nest counts using traditional photo-points will provide updated insights into population size and trends, resights of marked individuals will extend the existing demographic dataset, and installation of remote cameras will allow for monitoring of breeding success (which has not been monitored for almost 30 years). Similarly, chicks of Northern Giant Petrels will be counted and mapped where observed during fieldwork on the two albatross species. Finally, key information (e.g., nest locations and/or counts) of other species, including Antipodean Albatross, Campbell Island Albatross, and White-chinned Petrel, should also be recorded while conducting monitoring of the focal species. Combined, this project will provide updated parameters for a range of seabird species vulnerable to bycatch in a highly-efficient way. This project will utilise maximum synergies and cost sharing with POP2023-03.

**Outputs:**

1. Annual technical report(s) on the work undertaken and results found, including updated estimates of key demographic parameters and population estimates.
2. Annual summary of results will be presented to, and reviewed by, the CSP Technical Working Group, and made available online.
3. Recommendations for an efficient and effective long-term monitoring strategy.
4. Data collected during the project to annually be made available in electronic format.

**Note:** A two-year term is proposed

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

**Cost Recovery:** F(CR) Item 3 (50% Industry 50% Crown)

**Fish Stocks:** BAR<sub>1, 4, 5</sub>, BIG<sub>1</sub>, HAK<sub>1</sub>, HOK<sub>1</sub>, JMA<sub>3, 7</sub>, LIN<sub>3, 4, 5, 6,7</sub>, ORH<sub>3B, 7A</sub>, RCO<sub>3</sub>, SBW<sub>6I</sub>, SQU<sub>1T, 6T</sub>, STN<sub>1</sub>, SWO<sub>1</sub>, TAR<sub>3</sub>

*NOTE: This multi-year project was consulted on in 2023/24 and is included here for completeness.*

### 3.8 POP2023-05 Auckland Islands New Zealand sea lions

**Project code:** POP2023-05

**Start Date:** 1 July 2023

**Completion Date:** 30 June 2026

**Guiding Objectives:** CSP Objective E; New Zealand sea lion Threat Management Plan.

#### **Project Objectives:**

1. To estimate annual New Zealand sea lion pup production on Enderby Island, Dundas Island and Figure of Eight Island.
2. To mark a subset of pups following established protocol.
3. To collect tag resights at all locations to provide survivorship data for the demographic model.

#### **Rationale:**

The New Zealand sea lion (*Phocarctos hookeri*), one of the world's rarest sea lions, is currently classed as Nationally Vulnerable, with a total population estimate of 10,000 individuals breeding mostly on the subantarctic Auckland Islands (Baker et al. 2019, Roberts & Edwards, unpublished research). New Zealand sea lions are incidentally bycaught in southern commercial trawl fishing operations targeting species including squid, scampi, and southern blue whiting. The foraging areas of New Zealand sea lions at the Auckland Islands have been shown to overlap with commercial trawl fishing activity, particularly SQU6T and SCI6A areas (Chilvers et al. 2005, Johnston & Childerhouse 2022). Approximately 70% of New Zealand sea lions breed at the Auckland Islands, where population data have been collected since the mid-1990s, including estimates of pup production and resighting of marked animals.

Since 2001 there has been a considerable decline in pup production at the Auckland Islands (Campbell et al. 2006; Chilvers et al. 2007). The New Zealand sea lion Threat Management Plan, first implemented in 2017, established a range of research and management actions to address the threats to the recovery of this species. A literature review to identify potential indirect effects of commercial fishing on the Auckland Islands population as part of CSP project POP2010-01 (Bowen 2012) highlighted several key information gaps that prevent a full understanding of any such potential indirect effects, including time series data of population dynamics as collected in this project. CSP project POP2012-02 analysed population data to determine the key demographic factors driving the observed decline of New Zealand sea lions at the Auckland Islands. This project found that low pupping rates, a declining trend in cohort survival to age 2 and low adult survival may explain declining pup counts in one studied population (Roberts et al. 2014). Demographic data from the Auckland Islands New Zealand sea lion population is vital to the ongoing assessment of direct and indirect risks to the species from commercial fisheries, as described in fisheries operational plans, and to determine the overall size and vulnerability of the population (Bowen 2012).

#### **Research Approach:**

Auckland Islands New Zealand sea lion pup production has historically been estimated using a range of methods including aerial and ground-based direct counts and mark-recapture (Baker et al. 2012, Chilvers 2012; Childerhouse 2013). This project will undertake ground-based pup counts at Enderby Island, Dundas Island and Figure of Eight Island. Researchers will mark a subset of pups following established protocols and collect high quality resight data from previously



marked animals (Chilvers 2012; Childerhouse 2012). It is expected this work will take approximately five weeks.

In the interest of cost-savings, this project may be undertaken in conjunction with wider NZ sea lion Threat Management Plan research and management actions on the Auckland Islands.

**Outputs:**

1. A technical report detailing methods used and results of the New Zealand sea lion pup production estimates.
2. Data collected during the project to be error-checked, formatted, and uploaded to the New Zealand sea lion demographic database.

**Note:** A three-year term is proposed

**Indicative Research Cost:** \$150,000

**Cost Recovery:** F(CR) Item 2 (90% Industry, 10% Crown)

**Fish Stocks:** SQU6T

**References:**

Baker B, Jenz K & Chilvers L (2012) Aerial survey of New Zealand sea lions – Auckland Islands 2011/12. Report prepared for Ministry of Agriculture & Forestry, DeepWater Group Limited & Department of Conservation, Wellington, New Zealand. 12p.

Baker CS, Boren L, Childerhouse S, Constantine R, van Helden A, Lundquist D, Rayment W & Rolfe JR (2019) Conservation status of New Zealand marine mammals. Department of Conservation, Wellington, New Zealand. 22 p.

Bowen WD (2012) A review of evidence for indirect effects of commercial fishing on New Zealand sea lions (*Phocarctos hookeri*) breeding on the Auckland Islands. Report prepared for the Conservation Services Programme, Department of Conservation, Wellington, New Zealand. 41p.

Campbell RA, Chilvers BL, Childerhouse S & Gales NJ (2006). Conservation management issues and status of the New Zealand (*Phocarctos hookeri*) and Australian (*Neophoca cinerea*) sea lions. In: Trites AW, Atkinson S, DeMaster DP, Fritz LW, Gelatt LD, Rea LD, Wynne KM eds. Sea lions of the world. Alaska Sea Grant Alaska College Prog

Childerhouse SJ (2012) Methodology for CSP Project 4426 New Zealand sea lion ground component 2012/13. Report prepared for the Conservation Services Programme, Department of Conservation, Wellington, New Zealand. 8p.

Chilvers BL (2012) Research to assess the demographic parameters of New Zealand sea lions, Auckland Islands 2011/12. Report prepared for the Conservation Services Programme, Department of Conservation, Wellington, New Zealand. 11p.

Chilvers BL, Wilkinson IS & Childerhouse S (2007). New Zealand sea lion, *Phocarctos hookeri*, pup production—1995 to 2006. New Zealand Journal of Marine and Freshwater Research, 41:2, 205-213.

Chilvers BL, Wilkinson IS, Duignan PJ & Gemmell NJ (2005) Summer foraging areas for lactating New Zealand sea lions *Phocarctos hookeri*. Marine Ecology Progress Series vol. 304: 235-247.

Johnston O, Childerhouse S. 2022. INT2020-02: Identification of marine mammals captured in New Zealand fisheries 2020-21. Report prepared for the Conservation Services Programme, Department of Conservation, Wellington, New Zealand. Cawthron Report No. 3772. 18 p.

Roberts J, Fu D, Doonan I & Francis C (2014) NZ sea lion: demographic assessment of the causes of decline at the Auckland Islands. Demographic model options: demographic assessment.

Report prepared by NIWA for the Conservation Services Programme, Department of Conservation, Wellington, New Zealand. 142p.

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### 3.9 POP2024-01 Flesh-footed Shearwater population monitoring

**Project code:** POP2024-01

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2025

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

#### **Project Objectives:**

1. To collect key demographic parameters of flesh-footed shearwater at Lady Alice Island/Mauimua and/or Ohinau Islands, especially juvenile survival and recruitment.

#### **Rationale:**

This is a continuation of POP2021-04, which aimed to collect data to make improved estimates of flesh-footed shearwater juvenile survival and recruitment, in addition to monitoring study nests to collect adult survival data. Recruitment of juvenile flesh-footed shearwaters has been slower than anticipated or survival rates in recent years has been poor. As such, the investment made through POP2021-04 has not paid off yet. We are proposing a reduced additional season to the project to continue the mark-recapture monitoring effort allowing us to estimate this key population parameter.

#### **Research Approach:**

Capturing of flesh-footed shearwaters in the study colonies at Lady Alice and/or Ohinau Islands will continue in January 2025. To capitalise on the huge banding effort since 2016 (including thousands of marked chicks), we have the opportunity now to collect detailed information about the age of first return and first breeding in this species, plus estimate juvenile survival rates from fledgling to first return over multiple cohorts. Birds will be recaptured at study burrows, from newly dug burrows in study plots, and on the surface at night, allowing for demographic studies on survival rates. All captured birds will have band numbers recorded and unmarked birds will be banded. Capture sessions pre-dawn have proven to be the most effective capture period for this species. Depending on logistic costs and availability of trained personnel and DOC staff, capture trips of about 10-14 days will take place at these long-term study sites in northern New Zealand.

#### **Outputs:**

1. A technical report providing methods used and results of the flesh-footed shearwater population assessments, including tables collating birds banded as adults and as chicks recaptured on the field trips.
2. All raw data will be provided to DOC in electronic format and uploaded into the Falcon banding database.

**Note:** A one-year term is proposed

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

**Cost Recovery:** F(CR) Item 3 (50% Industry 50% Crown)

**Fish Stocks:** BIG 1, GUR1, 2, JDO1, RSN9, SCI1, 2, SNA1, 2, SWO1, TAR1, TRE1

**3.10 POP2024-02 Improving knowledge on coral life history traits: assessing reproductive capacity to infer productivity, vulnerability and resilience of protected deep-sea corals in the New Zealand region.**

**Project code:** POP2024-02

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2026

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

**Project Objectives:**

1. To continue to improve and refine our understanding of coral reproductive behaviour for several stony corals in the New Zealand region using live material and specimens collected *in vivo*.
2. To use coral reproductive behaviours to inform the productivity and vulnerability values of coral species to fishing impacts and their ability to recover for risk assessments and spatial management scenarios.

**Rationale:**

This project benefits from the opportunity to collect live, protected deep-sea coral specimens collected on the RV Sonne voyage (proposed project INT2024-04) and will maintain them long-term in-aquaria, with the aim of observing and conducting experiments on reproductive and larval biology. Such data contribute to our understanding of the productivity and vulnerability of different coral species to fishing impacts and their ability to recover from these disturbances; such information is used to parameterise risk assessments and spatial management scenarios.

**Research Approach:**

Intact and targeted corals will be collected via targeted ROV sampling during the RV Sonne voyage in February 2025 and will be maintained in-aquaria during the voyage, after which they will be transferred to NIWA's Marine Environment Manipulation Facility. The project will employ histological approaches to determine reproductive traits and the corals will undergo periodic histological sampling on a seasonal basis; this will give an indication of potential environmental reproductive cues and can infer connectivity potential based upon reproductive timing. Focal species include the stony branching corals *Solenosmilia variabilis*, *Enallopsammia rostrata*, *Madrepora oculata*, and *Goniocorella dumosa* and potentially stony cup corals, i.e. fragile morphotypes subject to direct impacts of bottom trawling that constitute a large portion of coral bycatch in New Zealand. NIWA have expertise maintaining live corals in aquaria and have previously established unexpected spawning behaviour in stony corals (e.g., DOC project BCBC2020-01). This project builds upon previous CSP projects (BCBC2020-01 and POP2022-03) and profits from international collaboration and expertise on deep-sea coral reproduction established in those projects.

**Outputs:**

1. A technical report detailing the research undertaken, results, recommendations and discussion of results framed within agreed approaches to apply them to coral fisheries assessments.
2. All data will be provided to DOC in electronic format.

**Note:** A two-year term is proposed

**Indicative Research Cost:** \$65,000 per annum

**Cost Recovery:** F(CR) Item 4B (100% Industry)

**Fish Stocks:** BAR<sub>1, 4, 5</sub>, BNS<sub>3</sub>, BYX<sub>1, 2, 3</sub>, CDL<sub>1</sub>, HAK<sub>1</sub>, HOK<sub>1</sub>, HPB<sub>5, 7</sub>, JMA<sub>3, 7, 8</sub>, LIN<sub>1, 2, 5, 6, 7</sub>, OEO<sub>1, 3A, 4, 6</sub>, ORH<sub>1, 2A, 2B, 3A, 3B, 7A, 7B</sub>, SBW<sub>6A, 6R, 6I, 6B</sub>, SCH<sub>5</sub>, SCI<sub>2, 3, 4A</sub>, SNA<sub>1</sub>, SPO<sub>3</sub>, SQU<sub>1T, 6T</sub>, SWA<sub>3, 4</sub>, TAR<sub>1, 2</sub>, TRE<sub>1, 7</sub>, WWA<sub>5B</sub>

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## 4. Mitigation Projects

*NOTE: This multi-year project was consulted on in 2023/24 and is included here for completeness.*

### 4.1 MIT2023-06 Underwater line setting devices for bottom longline vessels

**Project code:** MIT2023-06

**Start Date:** 1 July 2023

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objective 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) to widen their potential application across small vessel bottom longline fisheries.

#### **Rationale:**

The Mitigation Standards to reduce the incidental captures of seabirds in bottom longline fisheries set a requirement that hooks set during high-risk periods are protected by the aerial extent of the tori line until the hooks have reached a depth of 10 m, or 5 m outside of high-risk periods. Underwater setting has the potential to increase sink rates and reduce risk to birds. It is particularly relevant to meeting the Mitigation Standards, whilst maintaining flexibility of gear configuration for fishers. It also has the potential to effectively mitigate bycatch during higher risk periods. Previous projects, most recently that reported by Goad et al (2022), and further work currently underway as part of CSP project MIT2021-03, have focussed on two devices. The first was initially conceived by Dave Kellian and is described as the ‘underwater setter’. It is towed behind the vessel at depth and the longline passes under a guide. The second device was conceived by Nigel Hollands and uses a roller held under the surface by a pole fixed to the vessel, with the longline passing under the roller. It is described as the ‘line depressor’. These devices represent a novel new approach to mitigating seabird bycatch in longline fisheries.

#### **Research Approach:**

This project will build on the previous research undertaken to develop these devices and will focus on further development to achieve a design that can readily be adopted commercially across relevant fleets. Specifically, the project will:

- continue trials of the underwater setter, during commercial fishing operations, focussing on comparing the use of tougher baits through the setter and gear set with more typical 50:50 squid and pilchard mixes and/or straight pilchard; and
- continue trials of the line depressor focussing on building a second prototype, setting baited hooks at depth, deploying intermediate floats, and making turns. Working camera mounts into the second prototype may provide for assessment of bait loss via video footage review.

A workshop will be held with key fishing industry participants including the device developers and skippers, as well as seabird bycatch mitigation practitioners to prioritise development actions and identify cost effective options to assess mitigation effectiveness and practicality at-sea. It is envisaged that the project will support the longer-term use of the device(s) under commercial fishing operations through technical assistance and data collection.

**Outputs:**

1. A workshop report describing prioritised development actions and at-sea testing options.
2. One or more underwater line setting device(s) further developed to be a practical option for use on a range of fishing vessels.
3. Annual research reports describing progress against the planned development and testing.

**Note:** A two-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish Stocks:** BNS<sub>1, 2</sub>, HPB<sub>1, 2</sub>, LIN<sub>1</sub>, SNA<sub>1</sub>

**Reference:**

Goad, D., Kiddie, B., Hollands, N., Clow, A., Angel, J. 2022. Development of bottom longline underwater setting devices. BCBC2020-11b final report prepared by Vita Maris for Department of Conservation, Wellington. 30 p.

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## 4.2 MIT2024-01 Protected Species Liaison Project

**Project Code:** MIT2024-01

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2027

**Guiding Objectives:** CSP Objective A; CSP Seabird plan; National Plan of Action – Seabirds, National Plan of Action – Sharks.

### Project Objectives:

1. To maintain liaison capacity across inshore fleets around the country including surface longline, bottom longline, trawl, set net and purse seine.
2. To prioritise liaison activities based on risk, focussing on protected species capture rate outputs and confidence in skippers ability to implement increased mitigation during high-risk.
3. To coordinate Liaison Officer effort and reduce the risk of protected species bycatch by encouraging vessel operators to meet best-practice bycatch mitigation.
4. To deliver on the goals and objectives of relevant cross-government plans (NPOAs, TMPs, etc).

### Rationale:

Over the last decade, the Liaison Programme has expanded and taken on a pivotal role as the interface between skippers, government, and researchers, working to support and educate fishers on best-practice mitigation. To effectively reduce the risk of interactions with protected species, it is important for vessels to be using best-practice mitigation and take all necessary steps, both regulatory and non-regulatory, to avoid interactions. Liaison Programme work has found ongoing face-to-face engagement and dissemination of bycatch mitigation advice to be an effective way to influence behavioural change on the water.

### Research Approach:

Building on the work of the previous liaison project, MIT2021-01, the Liaison Programme will continue work encouraging vessel operators to meet best-practice bycatch mitigation. However, the programme is now reaching a stage in which the majority of the priority fleets have been covered by Liaison Officers. The review and development of Protected Species Risk Management Plans (PSRMPs) as well as following up on protected species trigger events will continue to be a core function, however the programme will aim to stop expanding and focus efforts on developing better risk prioritisation and efficient response.

Improved protected species capture verification with the rollout of electronic monitoring, means that Liaison Officer engagement can focus less on inputs (i.e. PSRMPs) and more on vessel-specific outputs (i.e. capture rates). Work between agencies is needed to allow for effective Liaison Programme operations and to overcome constraints in reporting capability, efficient responses, and feedback loops. It is envisaged that this will be addressed through the database development currently underway.

Work over the next three years is expected to establish a more effective database for management, utilise and feed back into electronic monitoring data collection, create improved risk response protocols, increase programme visibility with quota holders and ensure finer-scale operational oversight of the programme through the support of a dedicated Liaison Coordinator.

In order to keep costs down, the project will look to pass lower-risk harbour net vessels onto Seafood New Zealand as well as start to reduce the level of bycatch mitigation materials supplied to the fleets. There will be an annual review of the Liaison Programme to assess project delivery, priorities, scope, and costs.



**Outputs:**

1. New database established and actively used to input LO vessel visits, trigger responses, mitigation resources and training provided. Historical data is also carried over to the new system.
2. Development of risk response protocols.
3. Active response to priority bycatch events.
4. Regular review and updating of PSRMP's.
5. Ongoing education of priority fleets on protected species issues and mitigations.
6. Annual reports detailing progress and any developments in the fleet or operations.

**Note:** A three-year term is proposed

**Indicative Research Cost:** \$250,000 per annum

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish stocks:**

<b>Fishery</b>	<b>Indicative Cost</b>	<b>Fish Stocks</b>
Surface Longline	\$62,000	BIG1, STN1, SWO1, TOR1
Bottom Longline	\$62,000	BNS1, 2, 3, 7, 8, HPB1, 2, 3, 4, 5, 7, 8, LIN1, 2, SNA1
Inshore Trawl	\$62,000	BAR1, 5, 7, ELE3, FLA2, 3, 7, GUR1, 2, 3, 7, 8, JDO1, 7, RCO3, RSK3, SCH7, 8, SNA1, 7, 8, SPO3, 8, STA3, 5, 7, TAR1, 2, 3, 7, 8, TRE1, 7
Setnet	\$62,000	BUT2, 5, 7, ELE3, FLA1, 2, 3, 7, GMU1, HPB3, KAH1, MOK1, SCH2, 3, 5, 8, SPO1, 3, TAR3, YEM1
Purse seine	\$2,000	EMA1, JMA1, KAH1, PIL1, SKJ1, TRE1

#### 4.3 MIT2024-02 Enhancing seabird bycatch mitigation across the set and soak periods in surface longline fisheries

**Project code:** MIT2024-02

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objective A; National Plan of Action – Seabirds.

##### **Project Objectives:**

1. To support the use of mitigation configurations that are effective across the setting and soak periods in surface longline fisheries.
2. To assess how mitigation configurations (including with hook-shielding devices) influence the accessibility of hooks during the soak period.
3. To further support and facilitate the uptake of best practice seabird bycatch mitigation in the surface longline fleet.

##### **Rationale:**

The 2024 southern bluefin season marked the first year where the entire East Coast South Island surface longline fleet committed to the use of Hookpods, a tool designed to mitigate seabird bycatch during the set. It also marks the first year in which there was a high degree of protected species capture verification due to electronic monitoring. Although there have been anecdotal reports of seabirds caught on the soak in previous years, the use of Hookpods allows us to be confident in assessing that several captures are occurring beyond the setting period.

Pelagic longlines can be brought up to the surface during the soak, e.g., by large fish or hooked sharks, where exposed baited hooks can pose bycatch risk to seabirds. Operationally, concerns over the soak period have also raised the question of whether Hookpod buoyancy, although negatively buoyant as a whole, further contributes to the access of hooks during the soak period. Identifying whether Hookpods have an influence seabird captures during the soak is critical to being able to adjust specifications and operations accordingly to address risk beyond the setting period.

##### **Research Approach:**

This project will build on previous work assessing depth profiles in the surface longline fleet (i.e. MIT2023-02), as well as find synergies with proposed projects INT2024-03 and MIT2024-03. It will seek to further assess risk factors during the soak period, compare against line weighting regimes and provide recommendations for effective use of best-practice measures.

A component of this project will continue to support the surface longline fleet to apply best practice seabird bycatch mitigation (as defined in the Mitigation Standards). This can include the ongoing provision of Hookpods to the surface longline fleet, where cost efficiencies from bulk orders would be maximised. The project will also support further efforts to minimise bycatch using other methods, including those during the soak and haul period in accordance with relevant recommendations arising from MIT2022-01, MIT2023-01 and MIT2023-02.

**Outputs:**

1. Mitigation gear supplied to fleet operators.
2. A technical report of activities detailing the research trials undertaken, results, and further recommendations around mitigation uptake across the fleet.
3. All data will be provided to DOC in electronic format.

**Note:** A one-year term is proposed

**Indicative Research Cost:** \$140,000

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish Stocks:** BIG1, STN1, SWO1, TOR1

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#### 4.4 MIT2024-03 Assessment of weighted hooks as a seabird bycatch mitigation option for surface longline fisheries

**Project code:** MIT2024-03

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objective A; National Plan of Action- Seabirds

##### **Project Objectives:**

To assess the seabird bycatch mitigation efficacy and operational practicality of weighted hook options used by surface longline operators.

##### **Rationale:**

The surface longline fleet has been the focus of extensive engagement to improve seabird bycatch mitigation use (including CSP projects MIT2021-01, MIT2022-01, MIT2023-02 and MIT2023-05 in 2023/24). Branch line weighting is one of the key mitigation methods for this fishery, which acts to sink baited hooks beyond the reach of seabirds. Like many other mitigation methods its effectiveness is reliant on specification, in the case of branch line weighting the distance of the weight to the hook and the mass of/at the hook are the critical factors. Certain combinations of these parameters are defined in both relevant regulations and Mitigation Standards. Whilst weights have traditionally been attached to the branch line, options are now available that provide increased weight at the hook. This includes the Procella hook, a prototype which is currently being manufactured independently following feedback from a range of fishers to develop an operationally and economically feasible product. Other weighted hook options include weighted swivels attached directly to the hook. By assessing the mitigation effectiveness and practicality of these options it is envisaged that further best practice options can be identified for this fleet, allowing further flexibility for operators.

##### **Research Approach:**

This product will support the planned at-sea testing of the Procella hook and combine the approach to also assess other weighted hook options being used by operators. The tests will aim to quantify the sink rate achieved in comparison to current best practice mitigation specifications, investigate any effect on target fish catch and identify any practicality issues with their use. It is envisaged that a mix of methods will be used, including a dedicated at-sea trial, use of time-depth recording wet tags by fishers and fisher reported catch data.

##### **Outputs:**

1. A report describing the work undertaken, results and recommendations around the comparative effectiveness of Procella and other weighted hooks compared to current best practice line weighting options.
2. All data will be provided to DOC in electronic format.

**Note:** A one-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish Stocks:** BIG1, STN1, SWO1, TOR1

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#### 4.5 MIT2024-04 Adaptive management tool for small vessel bottom longline

**Project code:** MIT2024-04

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objective A; National Plan of Action- Seabirds.

##### **Project Objectives:**

To develop a pilot adaptive management tool to allow fishers to assess sink rate effectively.

##### **Rationale:**

The introduction of mitigation standards and subsequent changes to regulations to reduce the incidental captures of seabirds in bottom longline fisheries require that hooks are protected by the aerial extent of the tori line until they have reached a depth of 5m. Voluntary Mitigation Standards also state that this depth should be adjusted to 10m during high-risk periods. Current preference would be to use Time Depth Recorders (TDRs) rather than bottle tests to measure sink rates, however there is not currently an easy system to record and utilise this information in a way that allows for informative and effective adaptive management and recordkeeping.

TDR (e.g. Wet Tag, Moana sensors, etc.) data are useful for monitoring line sink rates in both bottom and surface longline and the routine collection of these data across the fleet is useful to understand the variation in sink rates achieved within and between vessels. An initial adaptive management tool to allow fishers to assess sink rate was developed as part of MIT2018-03 Setting mitigation for small longline vessels. Recommendations following this project included providing fishers with an interactive tool to explore the impacts of different parameters (i.e. sink rate, setting speed, distance astern, streamer line aerial extent, gear setup) on the hook depths achieved within the streamer line coverage, noting technological challenges that would have to be overcome.

##### **Research Approach:**

This project seeks to progress a pilot tool that can utilise Wet Tags (or similar robust, fisher-friendly TDRs) for widespread use across the fleet. Key issues to address in the development of this tool include the accurate recording of TDR deployment time to ensure accurate measurement of sink time to 5 or 10m depth, as well as the practical download and presentation of TDR data. This information is key to inform and apply the suite of seabird bycatch mitigation options used while setting.

Work will also include collaboration with Liaison Officers to advise on the platform, educate fishers on the use of the tool, and assist in the deployment of TDRs to vessels where necessary and where resources allow.

##### **Outputs:**

1. An adaptive management tool and devices to allow fishers to assess sink rate effectively.
2. A report describing the development work undertaken.

**Note:** A one-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish Stocks:** BNS<sub>1, 2, 3, 7, 8</sub>, HPB<sub>1, 2, 3, 4, 5, 7, 8</sub>, LIN<sub>1, 2, 3, 4, 5, 7, 8</sub>, SNA<sub>1, 7, 8</sub>

#### 4.6 MIT2024-05 Testing the utility of visual deterrent options to mitigate incidental bycatch of protected species in set nets

**Project code:** MIT2024-05

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2025

**Guiding Objectives:** CSP Objectives A and B; National Plan of Action- Seabirds.

##### Project Objectives:

1. To describe the effects of below-water visual deterrents for set nets on protected species.
2. To describe the effects of above-water visual deterrents for set nets on protected species.
3. To recommend the direction of future developments and trials of visual deterrents to reduce protected species bycatch in set nets.

##### Rationale:

There is little concerted effort worldwide to reduce seabird captures in set net fisheries despite significant bycatch (~400,000 seabirds annually). There is no universal solution to mitigating seabird bycatch in set nets, as set net fisheries are often small-scale and use a wide range of gear. Compared to other fisheries, only modest investments have been made globally to identify suitable bycatch mitigation methods. Some mitigation technologies show promising results, yet substantial further development of these methods is needed in a New Zealand context, as behavioural responses of New Zealand species to these deterrents is unknown. Visual deterrents in particular show potential for reducing bycatch of seabirds in set nets. Green LED lights placed below water along the float line have shown some promise for reducing seabird bycatch in set nets. Mangel et al. (2018) showed reduced bycatch of guanay cormorants in set nets. Looming Eye Buoys (LEBs) deployed alongside set nets can act as a visual deterrent above water, reducing the abundance of seabirds near nets. Rouxel et al. (2021) found reduced presence of long-tailed ducks near set LEBs. However, there remains some uncertainty for both methods around their application in a New Zealand context, including potential unintended consequences for protected species (i.e., attraction). For example, white LEDs have been shown to increase bycatch of long-tailed ducks in set nets in the Baltic Sea (Field et al. 2019). Therefore, testing both methods in a non-fishing setting is preferable over their use in a fishing context immediately.

Here we propose to test the effectiveness of visual deterrents below and above water (i.e. LEDs and LEBs) on protected species (e.g. hoiho, Hector's dolphin, spotted and Otago shags, great white shark) to assess their utility for mitigating protected species bycatch. This project will be designed to complement research planned by Fisheries New Zealand under project PRO2024-03. FMA 3 is a potential study area for this project.

##### Research Approach:

This project will use a combination of under-water deployed cameras and shore and/or boat-based human observers on the surface to monitor and assess behaviour of marine wildlife in response to the visual deterrents. For this project, experiments will be performed in a non-fishing context (i.e. no nets) in areas of high bird abundance. There will be four experimental set ups: i) control (no LEDs or LEBs), ii) LEDs (LEDs deployed under water at a suitable depth, but no LEBs above water); iii) LEBs (LEBs deployed above water, no LEDs below water) and iv) LEDs and LEBs. All set ups will be monitored in a similar fashion (i.e., all set ups will have cameras below water and human observers). Depending on the results, a second set of experiments may be performed in a fishing context (i.e. using real nets) in a follow-up project.

**Outputs:**

1. A report describing the work undertaken, results and recommendations for any further development or testing work.
2. All data will be provided to DOC in electronic format.

**Note:** A one-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish Stocks:** BUT<sub>5</sub>, HPB<sub>3</sub>, SCH<sub>3, 5</sub>, SPO<sub>3</sub>, TAR<sub>3</sub>

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#### 4.7 MIT2024-06 Efficacy of seabird mitigation in large vessel trawl

**Project code:** MIT2024-06

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2026

**Guiding Objectives:** CSP Objective A; National Plan of Action- Seabirds.

##### **Project Objectives:**

1. To develop new data collection protocols to assess seabird warp strikes and net interactions in the large vessel trawl fleet.
2. To better characterise seabird interactions with large trawl vessel fishing gear and assess the efficacy of warp cable and net capture mitigation practices using the first year of data collected.

##### **Rationale:**

The large vessel trawl fleet continues to account for a substantial proportion of bycatch risk to seabirds in New Zealand despite extensive efforts to reduce the attraction of fishing activities to seabirds and to mitigate seabird warp strikes. Existing observer data was found to be insufficient to adequately quantify the effectiveness of bird bafflers and other mitigation (MIT2022-05 Large vessel trawl warp mitigation) and the efficacy of options to reduce the net capture of seabirds in the fleet remains uncertain. This project will develop new targeted at-sea data collection protocols for seabird interactions with warp cables and the trawl net during hauling. Such data will allow for the assessment of the efficacy of a range of baffle configurations, as well as further assessment of methods to mitigate net captures, such as minimising the pooling area. The data collection protocols developed will also be designed to maximise their utility in better understanding cryptic seabird mortality, the level of which remains highly uncertain for New Zealand trawl fisheries.

##### **Research Approach:**

It is envisaged that data collection would primarily be through Fisheries Observers, using additional tools such as temporary camera deployments at the back of the vessel. The scope of the data collection will be the interaction of seabirds with trawl warps during the entire fishing operation, and nets during haul. The project will consider the collection of both direct interactions (e.g. cable strike, net capture) as well as more data rich proxies (e.g. bird abundance in defined risk zones). The use of proxy data will increase the power to assess relative efficacy of different mitigation solutions.

The first stage of the project will be a workshop including mitigation experts, industry participants and other interested stakeholders. The workshop will scope the practicality of different data collection options, assess the value of tools such as cameras, and agree a fully defined scope for the protocols to be developed.

Following initial roll-out of the protocols, sample data collected will be considered to assess their utility for the intended analyses, and any follow-up workshop(s) will be organized should such changes be required.

In year two, the project will analyse the first year of data collection to better characterise seabird interactions with large trawl vessel fishing gear and assess the efficacy of warp cable and net

capture mitigation practices to the extent possible. Recommendations will also be made for ongoing monitoring options.

**Outputs:**

1. Workshop help to refine project scope and assess data collection tools.
2. Revised data collection protocols.
3. Report on the first year of data collection, including a characterisation of seabird interactions with large trawl vessel fishing gear and an assessment of the effectiveness of different seabird bycatch mitigation options based.
4. Recommendations for any further improvements for ongoing monitoring options to enable assessment of seabird bycatch mitigation effectiveness in the fleet.
5. All data will be provided to DOC in electronic format.

**Note:** A two-year term is proposed

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

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish Stocks:** BAR<sub>1, 4, 5, 7</sub>, BYX<sub>1, 3, 7</sub>, CDL<sub>2</sub>, HAK<sub>1, 4, 7</sub>, HOK<sub>1</sub>, JMA<sub>3, 7</sub>, LIN<sub>6</sub>, OEO<sub>1, 3A, 6</sub>, ORH<sub>1, 2A, 2B, 3B, 7A, 7B</sub>, RBT<sub>3</sub>, RBY<sub>1, 2</sub>, SBW<sub>6A</sub>, SCI<sub>1, 2, 4A</sub>, SPE<sub>4</sub>, SQU<sub>1T, 6T</sub>, SWA<sub>3, 4</sub>, WWA<sub>3, 5B</sub>

#### 4.8 MIT2024-07 Hector's dolphin acoustic deterrence devices in trawl fisheries

**Project code:** MIT2024-07

**Start Date:** 1 July 2024

**Completion Date:** 30 June 2026

**Guiding Objectives:** CSP Objectives A, B and C; Hector's and Māui dolphin Threat Management Plan

##### **Project Objectives:**

1. To assess, through lab characterisation, the types and specifications of acoustic devices currently in use in New Zealand inshore fisheries.
2. To define characteristics and specifications that would be most effective for categorising acoustic devices into classes suitable for different operations.
3. To identify viable acoustic devices of each class for further testing after the consideration of operational, biological and environmental factors in modelling scenarios.
4. To assess the effectiveness of at least one acoustic device in each class/category in the marine environment around an active fishing operation.

##### **Rationale:**

Reports of Hector's dolphin captures have recently increased following the rollout of onboard cameras. Although spatiotemporal actions are seen to be the most effective form of mitigation, evidence from prior research as well as interest from industry, suggests there is reason to support the trial of pingers and Acoustic Deterrent Devices (ADDs) as a mitigation tool to reduce bycatch of Hector's and Māui dolphins in NZ inshore fisheries.

The characteristics of available pingers and ADDs have been demonstrated to differ markedly from the specifications provided by their manufacturer. As such, these devices may be unreliable for use as mitigation simply by following manufacturers guidelines.

Devices that have been used in other fisheries may not be appropriate with respect to either New Zealand conditions, fishing methodologies, nor appropriate for the hearing range and behaviour of the species for which captures are looking to be mitigated.

The application of acoustic devices for mitigation in a New Zealand context, may have unintended consequences for both fisheries and marine mammals. It is important for all stakeholders to understand the viability and limitations of using such devices. It is therefore important to have a robust project to evaluate the use of such devices, if they are to be used for mitigating captures of Hector's dolphins in New Zealand fisheries.

##### **Research Approach:**

This CSP project will aim to achieve a staged approach to pinger and ADD research.

Stage one will start with lab characterisation of devices currently in use by the New Zealand inshore fishing industry for both set net and trawl. Work will include the characterisation of device source level and frequency spectra, as well as the examination of potential variability within each device type/model.

Using the outputs from stage one, stage two will define device classes and model representative scenarios for devices tested in stage one. Modelling will consider factors such as environmental conditions, configuration on nets/trawl gear, and elements relating to the hearing range of Hector's dolphins, which will inform viable device options for field trials.

The third stage of this project will design an at-sea trial for at least one viable device of each class, following recommendations from stage two. Trial design methodologies will be presented for consideration of wider stakeholder feedback.

Following this, under stage four, at-sea trials will be conducted to assess the viable device/s against model predictions and identify any factors to consider for effective use in an operational setting. Recommendations and learnings from this work will be provided for future research.

It is envisioned that Stages 1-3 will be completed in the first year with Stage 4 planned for completion in year two.

**Outputs:**

1. Report describing the specifications of acoustic devices currently in use in New Zealand, as well as recommendations for viable devices to be trialled for mitigating further dolphin bycatch. The report will also consider at-sea trial methodologies and design recommendations.
2. Final report describing results, analyses and recommendations on viable device specifications for industry and considerations for effective implementation. Recommendations will be provided for future research.
3. All data will be provided to DOC in electronic format.

**Note:** A two-year term is proposed

**Indicative Research Cost:** \$80,000 per annum

**Cost Recovery:** F(CR) Item 4 (100% Industry)

**Fish Stocks:** BUT5, FLA3, GUR 3, HPB3, SCH3, 5, SPO3, TAR3, TRE7

## Appendix: Cost Recovery Tables

### A: CSP 2024/25 Project Costs

Code	Project	Research	Admin	Total	CR Item	Industry %	Industry	Crown
<b>Interaction Projects</b>								
INT2022-02	Identification of seabirds captured in New Zealand fisheries	\$80,000	\$6,044	\$86,044	4	100	\$86,044	\$0
INT2022-03	Identification, storage and genetics of cold-water coral bycatch specimens	\$80,000	\$6,044	\$86,044	4B	100	\$86,044	\$0
INT2022-05	Determining the resilience of the black coral <i>Antipathella fiordensis</i> to fisheries impacts	\$30,000	\$2,266	\$32,266	4B	100	\$32,266	\$0
INT2023-04	Identification of marine mammals, turtles and protected fish captured in New Zealand fisheries	\$15,000	\$1,133	\$16,133	4	100	\$16,133	\$0
INT2023-06	Investigating the impact of fisheries on endangered hoiho diet, microbiome, and disease susceptibility	\$50,000	\$3,777	\$53,777	4	100	\$53,777	\$0
INT2024-02	Port-based audit and Protected Species retention programme	\$100,000	\$7,555	\$107,555	4	100	\$107,555	\$0
INT2024-03	Understanding the effects of fishing depth on turtle and seabird bycatch	\$30,000	\$2,266	\$32,266	4	100	\$32,266	\$0
INT2024-04	Exploring impacts and recovery potential of protected deep-sea stony corals, utilising Remotely Operated Vehicle capability on RV Sonne in the New Zealand region	\$140,000	\$10,577	\$150,577	4B	100	\$150,577	\$0
INT2024-05	Testing bycatch mitigation scenarios for protected corals in New Zealand using best available information	\$80,000	\$6,044	\$86,044	4	100	\$86,044	\$0
INT2024-06	Interaction of spotted shags with northern North Island set net fisheries	\$30,000	\$2,266	\$32,266	4	100	\$32,266	\$0
INT2024-07	Collection and curation of tissue samples from protected fishes and turtles	\$20,000	\$1,511	\$21,511	4	100	\$21,511	\$0
INT2024-08	Westland petrel overlap with commercial fishing effort	\$20,000	\$1,511	\$21,511	4	100	\$21,511	\$0
<b>Population Projects</b>								
POP2022-01	Black Petrel population monitoring	\$100,000	\$7,555	\$107,555	3	50	\$53,777	\$53,777
POP2022-08	Auckland Island seabird research: Gibson's and white-capped albatross	\$160,000	\$12,087	\$172,087	3	50	\$86,044	\$86,044
POP2022-10	Antipodean island seabird research: Antipodean albatross + white chinned petrel	\$160,000	\$12,087	\$172,087	3	50	\$86,044	\$86,044

POP2023-01	Aerial survey of leatherback turtles off Northeast North Island	\$100,000	\$7,555	\$107,555	3	50	\$53,777	\$53,777
POP2023-02	Southern Buller's population study	\$150,000	\$11,332	\$161,332	3	50	\$80,666	\$80,666
POP2023-03	Updated population estimate and marine habitat utilisation of yellow-eyed penguins/hoiho breeding on Campbell Island	\$90,000	\$6,799	\$96,799	3	50	\$48,400	\$48,400
POP2023-04	Campbell Island seabird research	\$90,000	\$6,799	\$96,799	3	50	\$48,400	\$48,400
POP2023-05	Auckland Islands New Zealand sea lions	\$150,000	\$11,332	\$161,332	2	90	\$145,199	\$16,133
POP2024-01	Flesh-footed Shearwater population monitoring	\$30,000	\$2,266	\$32,266	3	50	\$16,133	\$16,133
POP2024-02	Improving knowledge on coral life history traits: assessing reproductive capacity to infer productivity, vulnerability and resilience of protected deep-sea corals in the New Zealand region	\$65,000	\$4,911	\$69,911	4B	100	\$69,911	\$0
<b>Mitigation Projects</b>								
MIT2023-06	Underwater line setting devices for bottom longline vessels	\$75,000	\$5,666	\$80,666	4	100	\$80,666	\$0
MIT2024-01	Protected Species Liaison Programme	\$250,000	\$18,887	\$268,887	4	100	\$268,887	\$0
MIT2024-02	Enabling seabird bycatch mitigation in the surface longline fleet	\$140,000	\$10,577	\$150,577	4	100	\$150,577	\$0
MIT2024-03	Assessment of weighted hooks as a seabird bycatch mitigation option for surface longline fisheries	\$40,000	\$3,022	\$43,022	4	100	\$43,022	\$0
MIT2024-04	Adaptive management tool for small vessel bottom longline	\$30,000	\$2,266	\$32,266	4	100	\$32,266	\$0
MIT2024-05	Testing the utility of visual deterrent options to mitigate incidental bycatch of protected species in set nets	\$80,000	\$6,044	\$86,044	4	100	\$86,044	\$0
MIT2024-06	Efficacy of seabird mitigation in large vessel trawl	\$50,000	\$3,777	\$53,777	4	100	\$53,777	\$0
MIT2024-07	Hector's dolphin acoustic deterrence in trawl and set net fisheries	\$80,000	\$6,044	\$86,044	4	100	\$86,044	\$0
<b>TOTAL</b>		<b>\$2,515,000</b>	<b>\$300,000<sup>11</sup></b>	<b>\$2,705,000</b>			<b>\$2,215,626</b>	<b>\$489,374</b>

<sup>11</sup> Includes \$110,000 of admin costs for the Observing commercial fisheries programme