Conservation Services Programme Annual Plan 2024/25

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Conservation Services Programme
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Department of Conservation
Te Papa Atawhai

New Zealand Government

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

Stephanie Rowe
Deputy Director-General Biodiversity Heritage and Visitors
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 [1] (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.

[1] Available to download from https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/resources/rag-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[2] and sharks[3], Threat Management Plans (TMPs) for the Hector's and Māui dolphin[4] and the New Zealand sea lion[5], and Te Kaweka Takohaka mō te Hoiho[6]. 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[7] 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 uncertainly 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[8]
- 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[9]
- Ministerial directives

[2] National Plan of Action - Seabirds
[3] National Plan of Action - Sharks (under review in 2024)
[4] Hector's and Māui Threat Management Plan
[5] New Zealand sea lion Threat Management Plan (under review in 2024)
[6] Te Kaweka Takohaka mō te Hoiho
[7] These are available to download from http://www.doc.govt.nz/csp-rag
[8] Fisheries observer services
[9] Timeline for camera rollout

Widescale camera rollout across the New Zealand inshore fishing fleet commenced in August 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[10].

[10] 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

Project code: INT2024-01

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, National Plan of Action – Sharks; New Zealand sea lion Threat Management Plan and Hector's and Māui dolphin Threat Management Plan.

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

Project Objectives:

1. To identify, describe and, where possible, quantify protected species interactions with commercial fisheries.
2. To identify, describe and, where possible, quantify measures for mitigating protected species interactions.
3. To collect information relevant to identifying levels of cryptic mortality of protected species resulting from interactions with commercial fisheries.
4. To collect other relevant information on protected species interactions that will assist in assessing, developing, and improving mitigation measures.

Rationale:

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

Planning of observer coverage 2024/25:

In general, coverage is aimed at reducing uncertainly around the risks to protected species as well as assessing mitigation options for identified interactions. More information on the criteria used in the observer planning process is explained in section 1.4 of this Plan's Overview.

This year, there is a planned reduction in physical observers on vessels in the inshore and HMS fleets as the Government introduces electronic monitoring. However, with 2024-25 being a transitional year as the cameras are widely implemented, DOC Observer days for 2024-25 were prioritised based on the highest risk areas and fisheries, and for protected species at greatest risk from fisheries bycatch. In line with the principles agreed between FNZ and DOC, those priorities were refined further by ensuring that observers would be placed on vessels where on-board cameras would not satisfy all requirements, such as the retrieval of tags and transponders, or the deployment of temperature and depth recorders (TDRs).

The objectives outlined in the NPOA–Seabirds 2020, Te Kaweka Takohaka mō te Hoiho 2020, the NPOA Sharks 2013, the New Zealand sea lion Threat Management Plan (NZSL TMP) and the Hector's and Māui dolphin Threat Management Plan 2020 (HMD TMP) have all been considered in the planning of the observer days this year.

Ministerial directives influencing this year's observer coverage include high (target 70%) squid 6T coverage for sea lion captures, high coverage (target 100%) for both trawl and set net on the West coast of the North Island to address some of the Māui dolphin issues raised in the HMD TMP, and coverage of snapper trawl in the Hauraki Gulf to look at concerns around snapper stocks and undersized snapper. Where coverage is driven by Ministerial direction and provides a platform for delivery of the CSP Observer Programme, CSP will continue to purchase a relevant portion of that coverage for protected species.

The most recent Conservation Services Programme Annual Research Summary 2021-22 (McGovern 2024) summarises observer coverage and protected species statistics that are taken into consideration during the observer planning process. Previous protected species interaction data references and download links can be found in the references section.

CSP will continue to purchase baseline services for offshore fisheries observers from Fisheries New Zealand Observer Services (Observer Services). Inshore fisheries observer coverage will be delivered by Observer Services, with CSP purchasing 50% of the levied cost, with the exception of potting (CSP will purchase 5% of the levied cost). This allows observers to be placed strategically across New Zealand fisheries (Appendix B). For the purposes of planning, costings for observer coverage are a best estimate based upon the daily rate provided by Observer Services.
The overall cost of the observer programme this year has decreased by over $500,000since the previous year, due to a reduction in observer coverage. Daily rates for observers have mostly increased, driven by incremental annual increases of PSA negotiated observer contracts.

Table of Contents for planned observer coverage. Fishery-specific research objectives are detailed in the relevant sections.

Research Approach

The duties of an observer in respect to the CSP Observer Programme are summarised as:

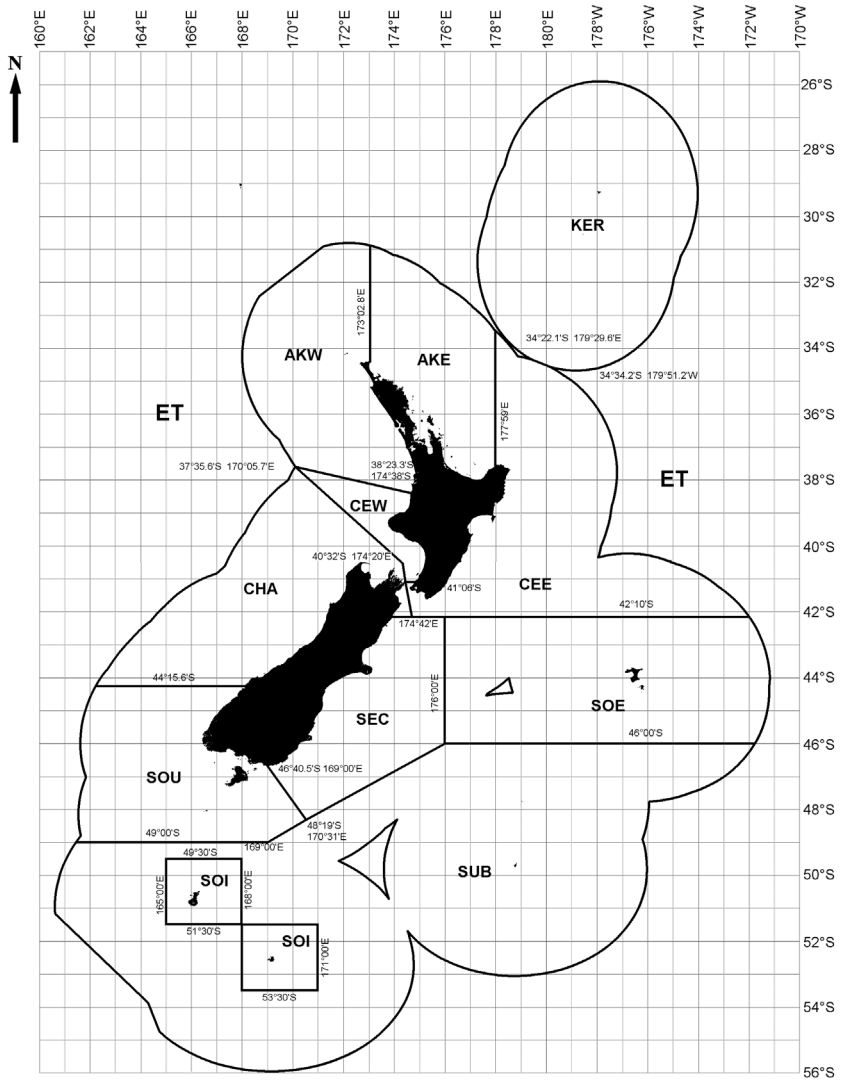
- Monitoring and recording the interactions of protected species with fishing operations, and associated conditions and circumstances.
- Recording, photographing, and (where appropriate) tagging all protected species bycatch.
- Collecting biological samples for taxonomic and genetic species identification onshore
- Recovering and returning the carcasses or samples of deceased protected species for identification, necropsy and/or genetic work.
- Recording details of fishing operations (i.e., gear employed and mitigation specifications).
- Recording observational data on abundance and behaviour of protected species observed around fishing vessels.

- Collecting information to better understand cryptic morality of protected species.
- Monitoring vessel activities against any relevant operational plans such as Protected Species Risk Management Plans (PSRMPs) or Vessel Management Plans (VMPs).
    - Types of mitigation practices applied
    - Fish waste management
- Monitoring appropriate handling and release procedures for live protected species interactions.
- Reporting on the efforts made to mitigate the adverse effects of commercial fishing on protected species.
- Carrying out other tasks (e.g. making observations on fish and offal discharge) as required.

In addition to the duties listed above, observers will collect data for specific mitigation or information acquisition projects. Examples of past projects include fish waste trials, tori line observations, blue-dyed bait trials, and TDR sink rate trials.

It is important to note that observer placements and coverage rates typically have high spatial and temporal variation, as well as multiple competing priorities for information collection. This can make data collection inconsistent and hamper efforts to interpret and extrapolate to estimate bycatch rates by fishery, location, or other variables. Data accuracy and reliability can be affected by inter-observer variability and weather conditions, while precision is affected by the observer sampling design. Data quality may also be biased by the opportunistic allocation of observers to vessels, as it is not always possible to place observers on vessels randomly or representatively. Nevertheless, the use of fisheries observers is currently considered to be the most reliable and flexible means of acquiring data on protected species interactions.

Figure 1: New Zealand Fisheries Management Areas (source: Fisheries New Zealand)



Key:

AKE	FMA 1	East North Island from North Cape to Bay of Plenty
CEE	FMA 2	East North Island from south of Bay of Plenty to Wellington
SEC	FMA 3	East coast South Island from Pegasus Bay to Catlins
SOE	FMA 4	Chatham Rise
SOU	FMA 5	South Island from Foveaux Strait to Fiordland
SUB	FMA 6	Subantarctic including Bounty Island and Pukaki Rise
SOI	FMA 6A	Southern offshore islands – Auckland and Campbell Islands
CHA	FMA 7	West Coast South Island to Fiordland including Kaikoura
CEW	FMA 8	West North Island from South Taranaki Bight to Wellington
AKW	FMA 9	West North Island from North Cape to North Taranaki Bight
KER	FMA 10	Kermadecs

2.1.1 Inshore Fisheries

Inshore fisheries have relatively poor characterisation and have historically received lower observer coverage. The sector is characterised by small vessel, owner operated fleets, with vessels operating in waters up to a depth of roughly 200m. However, some small vessels (particularly bottom longline vessels under 36m) will operate in deeper waters such as on the Chatham Rise targeting deepwater species such as ling. These vessels are observed as part of deepwater longline coverage. Additionally, potting is a fishery with newly established targeted observer coverage for the 2024/25 financial year. Both inshore (CRA and BCO) and deepwater (LIN) stocks are presented under one potting section here for simplicity.

Final decisions on the levels and placement of this observer coverage were undertaken by Fisheries New Zealand with consideration of capacity of the Observer Services Unit, the on-board camera rollout, and CSP research commitments.

Planned days for 2024/25 are summarised in Appendix B. These fisheries are monitored to track changes in protected species interactions and mitigation efficacy over time. Data is collected to allow estimation of capture levels and to better understand the nature of protected species interactions to develop mitigation solutions.

Ongoing delivery issues in relation to health and safety requirements has continued to impact coverage rates of inshore fisheries. While the tiered approach and risk assessments highlight the observer effort required to reduce uncertainty in these fisheries, these barriers mean that the levels of coverage required cannot always be reached. Electronic monitoring, with on-board cameras, is anticipated to alleviate some of this concern by enabling us to verify information on protected species interactions and mitigation use where observer placement is unachievable. According to the MPI timeline, all inshore vessels within scope of the on-board camera rollout are expected to have cameras installed by February 2025.

The main goals of the Observer Programme for inshore fleets are to:

- Inform management of impacts from fishing on protected species by identifying and quantifying interactions between inshore fisheries and protected species, and assessing the effectiveness of mitigation measures, where appropriate.
- Meet obligations and commitments outlined in National Plans of Action for Seabirds and Sharks and delivering on the relevant TMP objectives for Hector's and Māui dolphins and New Zealand sea lions, and Te Kaweka Takohaka mō te Hoiho, including:
    - monitoring and auditing risk management plans as outlined in the NPOA Seabirds 2020, and
    - improved data for the development of a quantitative risk assessment for the NPOA Sharks 2013.
- Inform management of fish stocks by gathering biological and other information on board fishing vessels.

For inshore fisheries, the daily rate has risen from $1,661 to $1,767. The levy of planned inshore days has increased to 100%, from 80% in the previous year.

A. SET NET

West Coast North Island

Fish stocks	JDO1, SCH1, SCH8, SPO1, SPO8, TRE7, SNA8, KAH8, TAR1, TAR8, GUR1, GUR8
Proposed Observer Coverage	0 observer days
Planned EM Coverage*	100% camera coverage
Planned EM review	Review rates variable based on risk posed to protected species (includes 100% review within 12nm of the coast)

**Dates for planned camera rollout are subject to change. Check the MPI webpage for the most current information.*

Due to the rollout of on-board cameras, there have been no observer days planned. Instead, monitoring efforts will be centred around camera footage review. This satisfies the Ministerial decision made to monitor 100% of set net vessels operating within the restricted fishing zone to avoid capture of Māui dolphins on the West Coast North Island. In the event of camera malfunctions, observers will continue to be utilised for monitoring.

Information Needs

This fishery continues to be of interest due to the risk of white shark (*Carcharodon carcharias*) and Māui dolphin captures.

Reported white shark captures are primarily in the upper North Island in FMA1, 8 and 9. The NPOA–Sharks sets goals and objectives to better understand and ultimately reduce the capture of protected shark species. Understanding the factors that lead to captures will assist in the development of effective mitigation. We require better information on the condition of protected sharks upon release to inform estimates of post-release survival, risk analyses and to provide advice on best handling practices for fishers.

East Coast South Island – Kaikoura to Otago

Fish Stocks	TAR3, HPB3, SPO3, SCH3
Proposed Coverage	0 observer days
Planned EM Coverage*	100% camera coverage
Planned EM review	Very high levels of review (50-100%) to verify reporting of Hector's dolphin and hoiho captures.

**Dates for planned camera rollout are subject to change. Check the MPI webpage for the most current information.*

Due to the rollout of on-board cameras, there has been a significant decrease in observer days planned. Monitoring efforts are expected to be centred around footage review. However, this fishery also requires observers for the collection of data not achievable by cameras and has been prioritised to include a certain level of cameras-observer overlap. In the event of any camera malfunctions, observers will continue to be utilised for monitoring.

Observer Objectives

1. Collection of information on the nature and extent of set net interactions with all protected species, particularly Hector's dolphins and hoiho. This includes checking conditions of the capture around the vessel.
2. Retrieval of hoiho tag/transponder information
3. Auditing adherence to Protected Species Risk Management Plans (PSRMPs) and mitigation standards. This includes checking that a PSRMP and associated

documentation are up to date, accessible and known to operator and crew and that the vessel operator demonstrates awareness of high-risk areas and times (MIT2024-01).
4. Collection of protected species specimens for assessment (INT2022-02).
5. Observer abundance surveys to provide spatial distribution data for seabirds and marine mammals.
6. Collection of information to evaluate the efficacy of mitigation efforts.

Information Needs

This fishery continues to be of interest due to the risk of Hector's dolphin and hoiho captures, with the East Coast having some of the highest levels of coastal set net effort in the country.

The Hector's and Māui dolphin TMP identifies commercial fisheries risk along the south coast exceeds the level needed to meet the fisheries objective for this area. Trawl risk is estimated to be higher than for set net due to the extensive set net restrictions in place where the dolphins are most commonly found. A Bycatch Reduction Plan (BRP) is in place to incentivise and support fishers to reduce Hector's dolphin bycatch towards zero. Recommendation is for a high level of footage review for the ECSI.

Hoiho have also been identified by several processes, including risk assessments and observed captures, as being at risk from setnet fisheries on the ECSI. Due to the decrease in their mainland population from a variety of factors, the impacts of fishing on the remaining populations have a greater effect. Current recommendations within Te Kaweka Takohaka mō te Hoiho include observer coverage to obtain further temporal and spatial data on the nature and extent of setnet interactions with hoiho, including a better understanding of the proportion of juveniles and adults captured. Despite incoming electronic monitoring, observers are essential in observing vessel surroundings during setting (something that is not readily captured by cameras), and in retaining hoiho carcasses for microchip scanning and necropsy. Knowledge about the individual hoiho is critical to identifying how it impacts the population.

South Coast South Island	
Fish Stocks	BUT5, HPB3, SCH3, SCH5, SPO3
Proposed Coverage	45 observer days (30 ECSI, 15 BUT5)
Planned EM Coverage*	100% camera coverage
Planned EM review	Very high levels of review (50-100%) to verify reporting of Hector's dolphin and hoiho captures

**Dates for planned camera rollout are subject to change. Check the MPI webpage for the most current information.*

Due to the rollout of on-board cameras, there has been a significant decrease in observer days planned. Monitoring efforts are expected to be centred around footage review. However, this fishery also requires observers for the collection of data not achievable by cameras and has been prioritised to include a certain level of cameras-observer overlap. In the event of any camera malfunctions, observers will continue to be utilised for monitoring.

Observer Objectives

1. Collection of information on the nature and extent of setnet interactions with all protected species, particularly Hector's dolphins and hoiho. This includes checking conditions of the capture around the vessel.
2. Retrieval of hoiho tag/transponder information
3. Auditing adherence to Protected Species Risk Management Plans (PSRMPs) and mitigation standards. This includes checking that a PSRMP and associated documentation are up to date, accessible and known to operator and crew and that the vessel operator demonstrates awareness of high-risk areas and times (MIT2024-01).

4. Collection of protected species specimens for assessment (INT2022-02).
5. Observer abundance surveys to provide spatial distribution data for seabirds and marine mammals.
6. Collection of information to evaluate the efficacy of mitigation efforts.

Information Needs

This fishery continues to be of interest due to the risk of Hector's dolphin and hoiho captures. White shark captures are also of interest, particularly in SCH5 and BUT5 around Stewart Island.

The Hector's and Māui dolphin TMP identifies that commercial fisheries risk along the south coast exceeds the level needed to meet the fisheries objective for this area. Trawl risk is estimated to be higher than for set net due to the extensive set net restrictions in place where the dolphins are most commonly found. A Bycatch Reduction Plan (BRP) is in place to incentivise and support fishers to reduce Hector's dolphin bycatch towards zero. Recommendation is for a high level of footage review for the south coast area.

Hoiho have been identified by several processes, including risk assessments, as being at risk from setnet fisheries on the South Coast South Island and Rakiura. Due to the decrease in their mainland population from a variety of factors, their susceptibility to fishing impacts has a greater effect. Current recommendations within Te Kaweka Takohaka mō te Hoiho include observer coverage to obtain further temporal and spatial data on the nature and extent of setnet interactions with hoiho, including a better understanding of the proportion of juveniles and adults captured.

The NPOA–Sharks sets goals and objectives to better understand and ultimately reduce the capture of protected shark species. Understanding the factors that lead to captures will assist in the development of effective mitigation. We require better information on the condition of protected sharks upon release to inform estimates of post-release survival, risk analyses and to provide advice on best handling practices for fishers.

B. INSHORE TRAWL

West Coast North Island	
Fish stocks	JDO1, SCH1, SCH8, SPO1, SPO8, TRE7, SNA8, KAH8, TAR1, TAR8, GUR1, GUR8
Proposed Observer Coverage	0 observer days
Planned EM Coverage*	100% camera coverage
Planned EM review	Review rates variable based on risk posed to protected species (includes 100% review within 12nm of the coast)

**Dates for planned camera rollout are subject to change. Check the MPI webpage for the most current information.*

Due to the rollout of on-board cameras, there has been a significant decrease in observer days planned. Monitoring efforts are expected to be centred around footage review. This satisfies the Ministerial decision made for 100% monitoring of trawl vessels operating within the restricted fishing zone to avoid capture of Māui dolphins on the West Coast North Island. In the event of any camera malfunctions, observers will continue to be utilised for monitoring.

Information Needs

This fishery continues to be of interest due to the risk of white shark (*Carcharodon carcharias*) and Māui dolphin captures.

North Island trawl has seen an increasing proportion of great white shark bycatch in recent years. Reported white shark captures are primarily in the upper North Island in FMA1, 8 and 9. The NPOA–Sharks sets goals and objectives to better understand and ultimately reduce the capture of protected shark species. Understanding the factors that lead to captures will assist in the development of effective mitigation. We require better information on the condition of protected sharks upon release to inform estimates of post-release survival, risk analyses and to provide advice on best handling practices for fishers.

East Coast North Island	
Fish stocks	SNA1
Proposed Coverage	60 observer days
Planned EM Coverage*	100% camera coverage from December 2024
Planned EM review	Review rates to be determined

**Dates for planned camera rollout are subject to change. Check the MPI webpage for the most current information.*

Cameras are due to go live in December 2024 in this fishery, so planned observer days have been reduced.

Observer Objectives

1. Collection of information on the nature and extent of trawl interactions with all protected species, but particularly black petrels and flesh-footed shearwaters. This includes checking conditions of the capture around the vessel, and health assessment data for live releases.
2. Auditing adherence to Protected Species Risk Management Plans (PSRMPs) and mitigation standards. This includes checking that a PSRMP and associated documentation are up to date, accessible and known to operator and crew, and that specifications of mitigation tools (e.g. bird bafflers) meet plans (MIT2024-01).

3. Collection of protected species specimens for assessment (INT2022-02).
4. Observer abundance surveys to provide spatial distribution data for seabirds.
5. Recording warp strike observations as well as seabird abundance and behaviour to improve estimations of cryptic mortality (MIT2022-07 and MIT2023-04).
6. Collect information to evaluate the efficacy of mitigation efforts.

Information needs

This fishery continues to be of interest due to the risk of black petrel and flesh-footed shearwater captures. Black petrels are identified by the seabird SEFRA model as the single most at-risk seabird species from commercial fisheries interactions and flesh-footed shearwaters are also in the very high-risk category.

The risk assessment has highlighted trawl warps in the snapper trawl fishery as posing a risk to black petrels and flesh-footed shearwaters. Further data on the nature and extent of these interactions is necessary to understand cryptic mortality and to accurately estimate the capture rate of seabirds within this fishery. Information on mitigation use to avoid warp strikes is also important to better understand how to reduce captures and inform cryptic mortality.

East Coast of the South Island

Fish stocks	FLA3, GUR3, RCO3, TAR3, TAR5, STA3, STA5, ELE3, ELE5
Proposed Coverage	55 observer days
Planned EM Coverage*	100% camera coverage from the date cameras go live
Planned EM review	Review rates variable based on risk posed to protected species, with higher review rates in those areas with a lower Fisheries Related Mortality Limit for Hector's dolphin.

**Dates for planned camera rollout are subject to change. Check the MPI webpage for the most current information.*

Due to the rollout of on-board cameras, there has been a significant decrease in observer days planned. Monitoring efforts are expected to be centred around footage review. However, this fishery also requires observers for the collection of data not achievable by cameras and has been prioritised to include a certain level of cameras-observer overlap. In the event of any camera malfunctions, observers will continue to be utilised for monitoring.

Observer Objectives

1. Collection of information on the nature and extent of trawl interactions with all protected species, but particularly southern Buller's and Salvin's albatross and Hector's dolphins. This includes checking conditions of the capture around the vessel, and health assessment data for live releases.
2. Auditing adherence to Protected Species Risk Management Plans (PSRMPs) and mitigation standards. This includes checking that a PSRMP and associated documentation are up to date, accessible and known to operator and crew, and that specifications of mitigation tools (e.g. bird bafflers) meet plans (MIT2024-01).
3. Collection of protected species specimens for assessment (INT2022-02).
4. Observer abundance surveys to provide spatial distribution data for seabirds and marine mammals.
5. Recording warp strike observations as well as seabird abundance and behaviour inside and outside the frame of cameras to improve estimations of cryptic mortality (MIT2022-07 and MIT2023-04).
6. Collection of information to evaluate the efficacy of mitigation efforts.

Information needs

This fishery continues to be of interest due to the risk of southern Buller's and Salvin's albatross and Hector's dolphin captures.

Information on total mortality of seabirds is important to inform robust fisheries management decision making and mitigation practices in relation to fishery related deaths. The level 2 seabird risk assessment identifies that inshore trawl poses a risk to several albatross species and there is significant uncertainty surrounding the level of cryptic and total mortality, especially in inshore trawl fisheries. Previous ECSI observer coverage identified captures of southern Buller's, Salvin's and white-capped albatross on trawl warps, therefore, further data on the nature and extent of these interactions is necessary to understand cryptic mortality and to accurately estimate the capture rate of seabirds within this fishery. Information on mitigation use to avoid warp strikes is also important to better understand how to reduce captures and fishing related mortality. Data collected by fisheries observers can be used to inform management plans on the efficiency and effectiveness of mitigation techniques used.

The East and South Coast of the South Island have some of the highest levels of trawl effort in the country with known overlap and interactions with Hector's dolphin. Further assessment of captures and capture rates is needed to improve estimates for Hector's dolphin populations in the ECSI and SCSI.

C. BOTTOM LONGLINE

As discussed previously, some small BLL vessels will operate in deeper waters and target deepwater species such as ling. These vessels are observed as part of deepwater longline coverage. It is also noted that bottom longline vessels targeting BNS1, HPB1, HPB3 and SNA8 have not been included in planned observer coverage this year.

East Coast North Island – FMA1

Fish stocks	SNA1
Proposed Coverage	0 observer days
Planned EM Coverage*	100% camera coverage
Planned EM review	Review rates to be determined

**Dates for planned camera rollout are subject to change. Check the MPI webpage for the most current information.*

Due to the rollout of on-board cameras, there has been a significant decrease in observer days allocated. Monitoring efforts are expected to be centred around footage review. However, this fishery also requires observers for the collection of data not achievable by cameras and has been prioritised to include cameras-observer overlap days. In the event of any camera malfunctions, observers will continue to be utilised for monitoring.

Observer Objectives

1. Collection of information on the nature and extent of interactions with all protected species, but particularly black petrels and flesh-footed shearwaters. This includes checking conditions of the capture around the vessel.
2. Auditing adherence to Protected Species Risk Management Plans (PSRMPs) and mitigation standards. This includes checking that a PSRMP and associated documentation are up to date, accessible and known to operator and crew, and that specifications of mitigation tools (e.g. bird bafflers) meet plans (MIT2024-01).
3. Collection of protected species specimens for assessment (INT2022-02).
4. Observer abundance surveys to provide spatial distribution data for seabirds.
5. Recording health assessment data for live releases to improve estimations of cryptic mortality.
6. Collection of information to evaluate the efficacy of mitigation efforts.

Information Needs

This fishery continues to be of interest due to the risk of black petrel and flesh-footed shearwater captures. Black petrels are identified by the seabird SEFRA model as the single most at-risk seabird species from commercial fisheries interactions and flesh-footed shearwaters are also in the very high-risk category. The primary objective of observer coverage focused on black petrels and flesh-footed shearwaters is to better understand what factors most strongly determine variable capture rates. This will support development of mitigation options in bottom longline fisheries.

Current estimates of cryptic mortality in inshore bottom longline fisheries do not include consideration of post-release survivability for live-captured birds. Observer coverage tasked to collect health assessment data, characterise interactions and handling procedures, and to evaluate the likely fate of birds released alive is a high priority.

Coverage is still needed on camera vessels to assess mitigation use and audit PSRMPs. If vessel coverage is unrepresentative, capture rate estimation arising from the new model will be poorly informed and associated risk estimates are likely to remain uncertain (or possibly biased low).

Additionally, there is an interest in this fishery due to the overlap with white sharks, which are known to occur as bycatch as juveniles and occasionally adults, primarily in FMA1 with some occurrences in FMA9. The NPOA–Sharks sets goals and objectives to better understand and ultimately reduce the capture of protected shark species. Understanding the factors that lead to captures will assist in the development of effective mitigation. We require better information on the condition of protected sharks upon release to inform estimates of post-release survival, risk analyses and to provide advice on best handling practices for fishers.

East Coast North Island – FMA2

Fish stocks	BNS2, HPB2, LIN2
Proposed Coverage	15 observer days
Planned EM Coverage*	100% camera coverage
Planned EM review	Review rates to be determined

**Dates for planned camera rollout are subject to change. Check the MPI webpage for the most current information.*

Due to the rollout of on-board cameras, there has been a significant decrease in observer days allocated. Monitoring efforts are expected to be centred around footage review. However, this fishery also requires observers for the collection of data not achievable by cameras and has been prioritised to include cameras-observer overlap days. In the event of any camera malfunctions, observers will continue to be utilised for monitoring.

Observer Objectives

1. Collection of information on the nature and extent of interactions with all protected species, but particularly black petrels and flesh-footed shearwaters. This includes checking conditions of the capture around the vessel.
2. Auditing adherence to Protected Species Risk Management Plans (PSRMPs) and mitigation standards. This includes checking that a PSRMP and associated documentation are up to date, accessible and known to operator and crew, and that specifications of mitigation tools (e.g. bird bafflers) meet plans (MIT2024-01).
3. Collection of protected species specimens for assessment (INT2022-02).
4. Observer abundance surveys to provide spatial distribution data for seabirds.
5. Recording health assessment data for live releases to improve estimations of cryptic mortality.
6. Collection of information to evaluate the efficacy of mitigation efforts.

Information Needs

This fishery continues to be of interest due to the risk of black petrel and flesh-footed shearwater captures. Black petrels are identified by the seabird SEFRA model as the single most at-risk seabird species from commercial fisheries interactions and flesh-footed shearwaters are also in the very high-risk category.

The primary objective of observer coverage focused on black petrels and flesh-footed shearwaters is to better understand what factors most strongly determine variable capture rates. This will support development of mitigation options in bottom longline fisheries. Coverage is still needed on camera vessels to assess mitigation use and audit PSRMPs. If vessels coverage is unrepresentative, capture rate estimation arising from the new model will be poorly informed and associated risk estimates are likely to remain uncertain (or possibly biased low).

Current estimates of cryptic mortality in inshore bottom longline fisheries do not include consideration of post-release survivability for live-captured birds. Observer coverage tasked to collect health assessment data, characterise interactions and handling procedures, and to evaluate the likely fate of birds released alive is a high priority.

D. POTTING

For simplicity, both the inshore (BCO and CRA) stocks and deepwater (LIN) stocks are presented in this single section on potting.

North and South Island	
Fish stocks	BCO3, BCO5, CRA2, CRA5, CRA7, CRA8, LIN3, LIN4, LIN5, LIN6, LIN7
Proposed Coverage	310 observer days (10 days BCO5, 10 days BCO8, 50 days CRA2, 50 days CRA5, 40 days CRA7, 60 days CRA8, 90 days LIN3/7)

Observer Objectives

1. Collection of information on the nature and extent of interactions with all protected species, but particularly whales, shags and coral. This includes checking conditions of the capture around the vessel.
2. Collection of protected species specimens for assessment (INT2022-02 and INT2022-03).
3. Observer abundance surveys to provide spatial distribution data for seabirds.
4. Recording health assessment data for live releases to improve estimations of cryptic mortality for seabirds.
5. Collection of information to evaluate the efficacy of mitigation efforts.

Information Needs

Previous observer coverage in potting fisheries has been irregular, however, this year marks the second targeted coverage to be established. This fishery is of interest due to risk of marine mammal entanglements and interactions with protected coral and shags.

Although commercial fishing is prohibited in the inner waters of Fiordland, rock lobster potting is permitted and known to occur in the outer areas of the fiords, where vulnerable corals are abundant. There is an interest in learning more about the impacts of potting on protected corals, and in gaining a better resolution to species ID, particularly around the Fiordland region.

Captures of shags have been also reported from the CRA potting fishery. INT2011-02 conducted a survey of fishers and identified potential factors that could influence risk of shag captures. This includes: larger neck and mesh size, the use of hanging baits rather than bait holders (snifters), and proximity to shore in shallow water (particularly in January and February when fishing gear is moved in shallow to follow the annual movement of rock lobster). Due to the small amount of verifiable data to date, these factors require further investigation in the NZ domestic fleet.

2.1.2 Highly Migratory Species and Pacific (HMS) Fisheries

HMS fisheries have relatively poor characterisation and have historically received lower observer coverage. The sector is characterised by vessels typically ranging between 12 and 25 metres in length, undertaking trips lasting up to ten days. Surface longline vessels target pelagic species such as tuna and swordfish. Primary fisheries include southern bluefin tuna on the WCSI and ECNI, and bigeye tuna and swordfish on the ECNI. The purse seine fishery typically occurs on both the east and west coast of the North Island between January and May. However, the last couple years has seen a limited availability of skipjack tuna.

Final decisions on the levels and placement of this observer coverage were undertaken by Fisheries New Zealand with consideration of capacity of the Observer Services Unit, onboard camera rollout, and CSP research commitments.

Planned days for 2024/25 are summarised in Appendix B. These fisheries are monitored to track changes in protected species interactions and mitigation efficacy over time. Data is collected to allow estimation of capture levels and to better understand the nature of protected species interactions to develop mitigation solutions.

While delivery of purse seine observer days has been successful, ongoing delivery issues in relation to health and safety requirements has continued to impact coverage rates in the surface longline fleet. The tiered approach and risk assessments highlight the observer effort required to reduce uncertainty in these fisheries, however, these barriers mean that the levels of coverage required cannot always be reached. Electronic monitoring is anticipated to alleviate some of this concern by enabling us to verify information on protected species interactions and mitigation use, where observer placement is unachievable. Presently, all surface longline vessels have cameras installed and purse seine is due for theirs in February 2025.

The main goals of the Observer Programme for HMS fleets are to:

- Inform management of impacts from fishing on protected species by identifying and quantifying interactions between inshore fisheries and protected species, and assessing the effectiveness of mitigation measures, where appropriate.
- Meet obligations and commitments outlined in National Plans of Action for Seabirds and Sharks and delivering on the relevant TMP objectives for Hector's and Māui dolphins and New Zealand sea lions.
- Inform management of fish stocks by gathering biological and other information on board fishing vessels.
- Meet fisheries coverage targets set at international organisations of which New Zealand is a member, such as the Commission for the Conservation of Southern Bluefin Tuna (CCSBT)

For HMS fisheries the daily rate has risen from $1,371 to $1,501. The levy of planned coverage for surface longline and purse seine fisheries will be 100%.

A. SURFACE LONGLINE

North Island

Fish stocks	BIG, SWO, STN
Proposed Coverage	30 observer days
Planned EM Coverage*	100% camera coverage from November 2023
Planned EM review	Review rates variable based on risk posed to protected species.

**Dates for planned camera rollout are subject to change. Check the MPI webpage for the most current information.*

Due to the rollout of on-board cameras, there has been a significant decrease in observer days allocated. Monitoring efforts are expected to be centred around footage review. However, this fishery also requires observers for the collection of data not achievable by cameras and has been prioritised to include cameras-observer overlap days. In the event of any camera rollout delays, observers will continue to be utilised for monitoring on remaining vessels without cameras.

Observer Objectives

1. Collection of information on the nature and extent of interactions with all protected species, but particularly leatherback turtle, southern Buller's and wandering albatrosses. This includes checking conditions of the capture around the vessel.
2. Auditing adherence to Protected Species Risk Management Plans (PSRMPs) and mitigation standards. This includes checking that a PSRMP and associated documentation are up to date, accessible and known to operator and crew, and that specifications of mitigation tools (e.g. tori lines) meet plans (MIT2024-01).
3. Collection of protected species specimens for assessment (INT2022-02).
4. Observer abundance surveys to provide spatial distribution data for seabirds.
5. Recording health assessment data for live releases to improve estimations of cryptic mortality (particularly for turtles).
6. Collection of information to evaluate the efficacy of mitigation efforts.
7. Aid in TDR deployment for characterising hook depth profiles during soak period (MIT2023-02).

Information Needs

This fishery continues to be of interest due to the risk of leatherback turtle, southern Buller's and wandering albatross captures.

There has been a significant amount of leatherback turtle captures in this fishery in recent years, and although most reported captures are released alive, further information is required to identify impacts on post-release survival. Observer-collected health assessment data is a priority. Tissue samples should also be taken from dead turtles, where possible.

Monitoring priorities also include collecting information on protected species interactions, mitigation techniques and offal/discard management practices employed in the fishery. Observers will aim to support CSP mitigation projects relating to seabird bycatch mitigation (i.e. TDR deployment) and PSRMP audits. Coverage has been prioritised for the summer months.

South Island	
Fish stocks	BIG, SWO, STN
Proposed Coverage	30 observer days
Planned EM Coverage*	100% camera coverage from November 2023
Planned EM review	Review rates variable based on risk posed to protected species.

**Dates for planned camera rollout are subject to change. Check the MPI webpage for the most current information.*

Due to the rollout of on-board cameras, there has been a significant decrease in observer days allocated. Monitoring efforts are expected to be centred around footage review. However, this fishery also requires observers for the collection of data not achievable by cameras and has been prioritised to include cameras-observer overlap days. In the event of any camera rollout delays, observers will continue to be utilised for monitoring on remaining vessels without cameras.

Observer Objectives

1. Collection of information on the nature and extent of interactions with all protected species, but particularly southern Buller's and wandering albatrosses. This includes checking conditions of the capture around the vessel.
2. Auditing adherence to Protected Species Risk Management Plans (PSRMPs) and mitigation standards. This includes checking that a PSRMP and associated documentation are up to date, accessible and known to operator and crew, and that specifications of mitigation tools (e.g. tori lines) meet plans (MIT2024-01).
3. Collection of protected species specimens for assessment (INT2022-02).
4. Observer abundance surveys to provide spatial distribution data for seabirds.
5. Recording health assessment data for live releases to improve estimations of cryptic mortality.
6. Collection of information to evaluate the efficacy of mitigation efforts.
7. Aid in TDR deployment for characterising hook depth profiles during soak period (MIT2023-02).

Information Needs

This fishery continues to be of interest due to the risk of southern Buller's and wandering albatross captures.

Monitoring priorities for 2024/25 also include collecting information on protected species interactions, mitigation techniques and offal/discard management practices employed in the fishery. Observers will aim to support CSP mitigation projects relating to seabird bycatch mitigation (i.e. TDR deployment) and the auditing of PSRMPs.

B. PURSE SEINE

North Island

Fish stocks	SKJ, JMA1, EMA1, PIL1, KAH1, TRE1
Proposed Coverage	0 observer days
Planned EM Coverage*	100% camera coverage from February 2025
Planned EM review	Review rates to be determined

**Dates for planned camera rollout are subject to change. Check the MPI webpage for the most current information.*

Due to the rollout of on-board cameras in February 2025 and the relatively low risk to protected species in this fishery, there have been no observer days planned. Monitoring efforts are expected to be centred around footage review. In the event of any camera malfunctions, observers will continue to be utilised for monitoring.

Observer Objectives

1. Collection of information on the nature and extent of interactions with all protected species, but particularly spine-tailed devil rays. This includes checking conditions of the capture around the vessel.
2. Auditing adherence to Protected Species Risk Management Plans (PSRMPs) and mitigation standards. This includes checking that a PSRMP and associated documentation are up to date, accessible and known to operator and crew, and that specifications of mitigation tools (e.g. brailer) meet plans (MIT2024-01).
3. Collection of protected species specimens for assessment (INT2022-02).
4. Recording health assessment data for live releases to improve estimations of cryptic mortality.

Information Needs

This fishery is of interest due to the risk of spine-tailed devil ray captures. However, most captures are alive and uninjured when using a brailer type system to return rays to sea. Furthermore, all of the recorded spine-tailed devil ray captures have occurred the skipjack target fishery, which has seen low availability in recent years. Research has shown relatively high confidence in fisher reporting for this fishery as well (Finucci et al., 2022). These factors make for a relatively lower-risk fishery for rays.

Monitoring priorities include collecting information on protected species interactions, mitigation techniques and health assessment data.

2.1.3 Deepwater and Middle Depth Fisheries

Deepwater and middle depth fisheries have relatively good characterisation with historically higher levels of observer coverage compared to inshore fisheries and have received a consistent level of observer coverage over the last ten years or more. The sector is characterised by large vessels operating beyond the 12 nautical mile limit of the territorial sea out to and beyond the 200 nautical mile limit of the Exclusive Economic Zone (EEZ). These are termed and managed as 'offshore' fisheries.

Pelagic and middle depth trawl fisheries involve domestic and foreign owned vessels that primarily target hoki, hake, ling, warehou, jack mackerel and southern blue whiting, that often target multiple species in the same trip. Bottom trawl fisheries primarily target orange roughy, oreo, and squid. The rationale provided here is divided on a geographic and fishery basis to best identify CSP information needs and assist in observer planning.

Observers working in these fisheries have multiple priorities including stock assessment data collection, compliance monitoring, protected species research and benthic interaction monitoring. DOC contributes to a smaller portion of observer time in these fisheries and, as such, days are planned differently to the data deficient inshore fisheries, with a greater focus on fish stock biological data.

As with previous years, planning of observer days was agreed with Fisheries New Zealand to identify an overall amount of observer coverage to meet both agencies' goals. Costs were then apportioned to each agency based on how much of the observers' work in each fishery will be focused on Conservation Services. Typically, the CSP component is 10-15% of the total deepwater days, which reflects the time likely to be spent on protected species tasks. For specific fisheries (e.g., scampi, southern blue whiting, and squid trawl), this apportioning is increased to 20%, reflecting an increased focus on protected species data due to specifically identified risks.

Planned days for 2024/25 are summarised in Appendix B. These fisheries are monitored to track changes in protected species interactions and mitigation efficacy over time. Data is collected to allow estimation of capture levels and to better understand the nature of protected species interactions to develop mitigation solutions.

As a result of PSA negotiated observer contracts, the daily costs of migratory species and deepwater observer days have decreased from 2023/24 as follows to reflect the increase in cost of delivering those days:

- Middle Depth from $1,052 to $1,035
- Deepwater from $1,046 to $1,035

The levy of planned coverage for Deepwater and Middle Depth will be 100%.

A. TRAWL

Cook Strait

Fish stocks	HOK1
Proposed Coverage	126 observer days

This fishery operates distinctly from other hoki fisheries, in that vessel size is limited to less than 46m. Many vessels shift to this fishery from other areas with a short but intense period of fishing taking place during the Cook Strait spawning season, from late June to mid-September. Trips are generally overnight. This fishery has some of the highest numbers of fur seal captures, therefore observer coverage in this fishery has been increased. Observers record information on which mitigation techniques are employed in this fishery including offal and discard management, and the use of bird scaring devices (legally required for larger vessels). The fishery typically operates between observer years therefore coverage in the Cook Strait will be targeted in July and August 2023 and May and June 2024.

Chatham Rise

Fish stocks	HOK1, HAK1, HAk4, LIN3, LIN4, SWA3, SWA4, JMA3, BAR1, BAR4, SKI3; ORH3B, OEO3A, OEO4, BYX3
Proposed Coverage	890 observer days (600 Middle Depth, 290 Deepwater)

The Chatham Rise middle-depth trawl fishery operates in a spatially distinct area to the other middle-depth trawl fisheries, and so encounters different protected species. This fishery is operated exclusively by larger vessels.

Observer time will be focussed on assessing the extent of protected coral landed on vessels as well as monitoring and recording interactions with, and behaviours of, seabirds. Sub-samples and photographs of corals will be taken for identification. Observers record information on which mitigation techniques are employed in this fishery, including offal and discard management, the use of bird scaring devices (legally required for larger vessels) and trawling known tracks to avoid catching deep sea invertebrates. CSP will fund only 10% of observer days in this fishery due to the relatively low workload relating to protected species interactions.

Observer coverage for the period October to May will be spread across SEC and SOE (shown in Figure 1). This coverage will be achieved under the domestic middle-depth trawl lines identified in the table in Appendix B.

Subantarctic

Fish stocks	HOK1, SWA4, WWA5B, BAR5, JMA3, SKI7; ORH3B, OEO1, OEO6; SBW6I, SBW6B
Proposed Coverage	850 observer days (500 Middle Depth, 100 Deepwater, 250 days SBW)

The subantarctic middle-depth trawl fishery is largely dominated by tows targeting southern blue whiting around the Bounty Islands and Campbell Island where captures of both New Zealand sea lions and fur seals have taken place. There has been a high coverage in the southern blue whiting fishery following 2013, when a large amount of sea lions were captured. FNZ intends to provide 100% observer coverage in SBW6I. Observer time will be focussed on monitoring and recording behaviour of, and interactions with, fur seals and sea lions. Data is also collected on seabird interactions and behaviour due to the location of this fishery and its close vicinity to

many seabird breeding islands. The landing of protected coral will also be recorded, and sub-samples will be taken for identification.

Observer time will be focussed on assessing the extent of protected coral landed on vessels as well as monitoring and recording interactions with, and behaviours of, seabirds. Sub-samples and photographs of corals will be taken for identification. Mitigation techniques employed in this fishery include offal and discard management, the use of bird scaring devices and trawling known tracks to avoid catching deep sea invertebrates.

Observers are tasked with recording information on which mitigation techniques are employed on vessels to better understand interactions between fishing gear and captures of protected species including offal and discard management and the use of bird scaring devices.

Due to increased interactions with New Zealand sea lions around Campbell Island, CSP will fund 20% of the observer days in the southern blue whiting portion of the subantarctic fishery, reflecting an increasing focus of observers' time being on protected species observation, particularly marine mammal abundance and behaviour. Overall, it is intended that all vessels operating in the southern blue whiting fishery will be observed.

North Island

Fish stocks	JMA7, EMA7, BAR7; ORH1, ORH2A, ORH2B, ORH3A, BYX2, CDL2
Proposed Coverage	460 observer days (350 days Middle Depth, 110 Deepwater)

This fishery group is dominated by the jack mackerel trawl fishery. Observer time will be focussed on recording protected species interactions and the behaviour of cetaceans, pinnipeds, and seabirds around the vessel. Observers will also record information on which mitigation and avoidance techniques are employed in this fishery. Vessels can employ several techniques aimed at reducing the likelihood of interacting with dolphins, including not fishing during hours of the day when dolphin interactions are more likely, not shooting nets when dolphins are sighted and avoiding a shallow headline depth.

Observer time will be focussed on assessing the extent of protected coral landed on vessels as well as monitoring and recording interactions with, and behaviours of, seabirds. Sub-samples and photographs of corals will be taken for identification. Mitigation techniques employed in this fishery include offal and discard management, the use of bird scaring devices and trawling known tracks to avoid catching deep sea invertebrates.

West Coast South Island

Fish stocks	ORH7A, HOK1, HAK7, LIN7, SWA1, SKI7
Proposed Coverage	546 observer days (70 days Deepwater, 400 days Middle Depth, 126 Hoki-Inside the line)

Inside the line is Hoki target inside 12nm, but excludes Cook Strait. Coverage will largely be targeted at the 'hoki season' from July to September. Observers record information on which mitigation techniques are employed in this fishery including offal management and discards, and the use of bird scaring devices (legally required for larger vessels). This fleet has high levels of interactions with a wide range of seabirds and fur seals. The fleet can be broadly divided by size, with larger vessels (both domestic and foreign owned vessels) operating outside of the 25nm offshore management area and the smaller fleet operating within 25nm of the coast. Due to the differences in fleet dynamics and bycatch profiles between the smaller and larger vessel fleets coverage levels have been specified separately for each.

Scampi	
Fish stocks	SCI6A, SCI1, SCI2, SCI3, SCI4A
Proposed Coverage	685 observer days (225 6A, 460 Other)

Scampi coverage is for the East coast and Cook Strait regions. The priority for observers in southern areas will be to monitor interactions with seabirds and New Zealand sea lions. Priority for observations in northern waters will be monitoring of interactions with very high-risk seabirds such as black petrels and flesh-footed shearwaters. In southern waters monitoring of interactions with sea lions and albatross is prioritised. The landing of protected coral will also be recorded, and sub-samples will be taken for identification. Data is also collected on seabird interactions and behaviour around vessels. Observers record information on which mitigation techniques are employed in this fishery, including offal and discard retention, the use of bird scaring devices and net restrictors, as well as specific gear configurations used. Over the last five years scampi coverage has increased to better understand protected species interactions. CSP will fund 20% of observer days in this fishery due to the significant protected species focus of the coverage.

Squid	
Fish stocks	SQU1T, SQU6T
Proposed Coverage	1,500 observer days

Previously, SQU6T had a ministerial directive of 90% observer coverage due to interactions with sea lions. Upon making the use of SLEDs mandatory in January 2022, it was recommended that observer coverage be reduced to 70% in future years so that more coverage could go into other fisheries that impact sea lions.

Areas of CSP interest in this fishery include offal and discard management, captures of sea lions and seabirds in trawl nets, and adherence to implementation of and specifications regarding Sea Lion Exclusion Devices (SLEDs). Observer placement in 2024/25 will be focussed on monitoring interactions from January to May. The CSP Observer Programme will form 20% of time planned for the squid 6T fishery to monitor interactions with protected species and measures taken by fishers to reduce those interactions.

B. BOTTOM LONGLINE

Ling	
Fish stocks	LIN3, LIN4, LIN5, LIN6, LIN7
Proposed Coverage	193 observer days (120 days >34m, 73 days <34m)

Observer time will be focussed on monitoring and recording interactions with seabirds including captures and behaviour around vessels. Observers will record information on which mitigation techniques are employed in this fishery, including the use of tori lines and line weighting regimes. Observer coverage in 2024/25 will be focussed on smaller bottom longline vessels operating on the Chatham Rise to monitor seabird interactions.

Additionally, DOC has an interest in this fishery due to the overlap with white sharks, which are known to occur as bycatch as juveniles and occasionally adults, throughout North Taranaki and around the top end to at least Karikari Peninsula on the East Coast (in SN, TWL and BLL fisheries).

CSP Observer Programme Outputs

1. A descriptive report summarising observer data relating to protected species collected in offshore fisheries and inshore fisheries will be provided to stakeholders as part of the Annual Research Summary (ARS) reports.
2. All seabirds and corals are returned and/or photographed, where possible, for identification and necropsy (see project INT2022-02: Identification of seabirds captured in NZ fisheries and INT2022-03: Identification, storage and genetics of cold-water bycatch specimens), as well as marine mammals, turtles and protected fish (INT2023-04, INT2021-04).
3. All vessels with a Protected Species Risk Management Plan will be audited against their plan by observers, with the results provided to Liaison Officers for appropriate follow-up.
4. Data will be available for other DOC and Fisheries New Zealand projects including mitigation development/testing, bycatch estimation, risk management and other modelling projects.

References

Abraham, E.R., Neubauer, P., Berkenbusch, K. and Richard, Y. 2017. Assessment of the risk to New Zealand marine mammals from commercial fisheries. New Zealand Aquatic Environment and Biodiversity Report No 189. Available for download from https://fs.fish.govt.nz/Doc/24554/AEBR-2017-189-Marine-mammal-risk-assessment.pdf.ashx

Finucci, B., Dunn, M.R., Pinkerton, M.H., Sutton, P. 2022. Characterisation of New Zealand protected shark captures to 2021. New Zealand Aquatic Environment and Biodiversity Report No. 289. 74 p. Available for download from https://www.mpi.govt.nz/dmsdocument/53236-AEBR-289-Characterisation-of-New-Zealand-protected-shark-captures-to-2021

McGovern, H. 2024. Conservation Services Programme Annual Research Summary 2021-22. Report prepared by the Conservation Services Programme of the New Zealand Department of Conservation, Wellington. 86p. Available for download from https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/reports/202122-annual-plan/csp-annual-research-summary-2021-22.pdf

Richard, Y.; Abraham, E.R. 2015 Assessment of the risk of commercial fisheries to New Zealand seabirds, 2006-07 to 2012-13. New Zealand Aquatic Environment and Biodiversity Report No. 162. Available for download from https://www.mpi.govt.nz/dmsdocument/10523/loggedIn

Rowe, S.J. 2009: Conservation Services Programme observer report: 01 July 2004 to 30 June 2007. DOC Marine Conservation Services Series 1. Department of Conservation, Wellington. 93p. Available for download from http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-reports/csp-observer-report-01-july-2004-to-30-june-2007/

Rowe, S. 2010a: Level 1 Risk Assessment for incidental seabird mortality associated with New Zealand fisheries in the NZ-EEZ. Marine Conservation Services, Department of Conservation, Wellington. 75 p. Available for download from https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/level1-seabird-risk-assessment.pdf

Indicative Research Cost: See Appendix B for details

Cost Recovery: F(CR) Item 8 (100% Industry)

Fish Stocks: See Appendix B for details

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
- Moult 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: BAR1, 4, 5, 7, BIG1, BNS1, 2, 3, 7, BUT5, 7, BYX2, 3, ELE3, 5, 7, EMA1, 3, 7, FLA1, 2, 3, 7, GMU1, GSH1, 3, 4, 7, 8, 9, GSP1, 7, GUR1, 2, 3, 7, 8, HAK1, 4, 7, HOK1, HPB1, 2, 3, 4, 7, 8, JDO1, 2, 3, 7, JMA1, 3, 7, KIN1, 7, 8, LEA1, 2, 3, LIN1, 2, 3, 4, 5, 6, 7, MAK1, MOK1, 3, 5, ORH1, 2A, 2B, 3A, 3B, OEO1, 3A, 4, 6, RCO1, 3, 7, RSN1, 2, RIB1, 2, RSK1, 3, 7, 8, SBW6A, 6R, 6I, 6B, SCH1, 2, 3, 4, 5, 7, SCI1, 2, 4A, 6A, 6B, SKI1, 3, 7, SNA1, 2, 3, 7, 8, SPD1, 3, 4, 5, 7, 8, SPE1, 3, 4, 7, SPO1, 3, 7, 8, SQU1T, 6T, SSK1, 3, 7, 8, STA1, 3, 4, 5, 7, STN1, SWA1, 3, 4, SWO1, TAR1, 2, 3, 4, 5, 7, 8, TOR1, TRE1, 2, 7, TRU3, 4, WAR1, 2, 3, 7, 8, WWA2, 3, 4, 5B, 7, YEM1, 8, 9

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 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.IN 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: BAR1, 4, 5, BNS3, BYX1, 2, 3, CDL1, HAK1, HOK1, HPB5, 7, JMA3, 7, 8, LIN1, 2, 5, 6, 7 OEO1, 3A, 4, 6, ORH1, 2A, 2B, 3A, 3B, 7A, 7B, SBW6A, 6R, 6I, 6B, SCH5, SCI2, 3, 4A, SNA1, SPO3, SQU1T, 6T, SWA3, 4, TAR1, 2, TRE1, 7, WWA5B

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 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: CRA8

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: BAR1, 4, 5, 7, BIG1, BNS1, 2, 3, 7, BUT5, 7, BWS1, ELE3, 5, 7, EMA1, 3, 7, FLA1, 2, 3, 7, GMU1, GSH1, 3, 4, 7, 8, 9, GSP1, 7, GUR1, 2, 3, 7, 8, HAK1, 4, 7, HOK1, HPB1, 2, 3, 4, 7, 8, JDO1, 2, 3, 7, JMA1, 3, 7, KIN1, 7, 8, LEA1, 2, 3, LIN1, 2, 3, 4, 5, 6, 7, MOK1, 3, 5, ORH1, 2A, 2B, 3A, 3B, OEO1, 3A, 4, 6, RCO1, 3, 7, RSN1, 2, RIB1, 2, RSK1, 3, 7, 8, SBW6A, 6R, 6I, 6B, SCH1, 2, 3, 4, 5, 7, SCI1, 2, 4A, 6A, 6B, SKI1, 3, 7, SNA1, 2, 3, 7, 8, SPD1, 3, 4, 5, 7, 8, SPE1, 3, 4, 7, SPO1, 3, 7, 8, SQU1T, 6T, SSK1, 3, 7, 8, STA1, 3, 4, 5, 7, STN1, SWA1, 3, 4, SWO1, TAR1, 2, 3, 4, 5, 7, 8, TOR1, TRE1, 2, 7, TRU3, 4, WAR1, 2, 3, 7, 8, WWA2, 3, 4, 5B, 7, YEM1, 8, 9

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 is required to inform our advice towards risk reduction and engagement through the Liaison Programme (MIT2024-01).

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, which has previously been fulfilled through fisheries observers. The success of this project relies on the voluntary support of industry for engagement and protected species retention. Relevant species identification and necropsies will be fulfilled through the 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. All seabirds and corals are returned and/or photographed, where possible, for identification and necropsy (see project INT2022-02: Identification of seabirds captured in NZ fisheries and INT2022-03: Identification, storage and genetics of cold-water bycatch specimens).

3. Data will be available for other projects including mitigation development/testing and risk management projects.
4. 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: BAR1, 5, 7, BIG1, BUT2, 5, 7, BNS1, 2, 3, 7, 8, ELE3, FLA1, 2, 3, 7, GMU1, GUR1, 2, 3, 7, 8, HPB1, 2, 3, 4, 5, 7, 8, JDO1, 7, KAH1, LIN1, 2, MOK1, RCO3, RSK3, SNA1, 7, 8, SCH2, 3, 5, 7, 8, SPO1, 3, 8, STA3, 5, 7, STN1, SWO1, TAR1, 2, 3, 7, 8, TOR1, TRE1, 7, YEM1

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

Project Code: INT2024-03

Start Date: 1 October 2024

Completion Date: 30 September 2025

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

Project Objectives:

1. Characterise depth and temperature profiles using a wider range of TDR data obtained from surface longline vessels, identify their effects on leatherback turtle and seabird bycatch.
2. Investigate if catch composition, proximity to floats and catch per unit effort is correlated with turtle and seabird bycatch and how changes to set depth may affect target species catch rates.
3. Recommend approaches that can be explored for reducing 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:

Expanding on the initial surface longline depth profile characterisations in MIT2023-02 (Understanding and mitigating seabird and turtle bycatch during the pelagic longline soak period), this desktop study will pool TDR data collected under projects MIT2023-02, MIT2024-02 and MIT2024-03 to characterise depth and temperature profiles across a wider range of the fleet, and assess impacts of fishing depth, catch composition and catch per unit effort on seabird and turtle bycatch.

Using recent EM verified bycatch data and where possible, historic observer data, the project will also assess informative parameters such as duration of set, size of animal, moon phase, number of hooks to nearest float, etc. The project will be informed by other relevant turtle and seabird projects currently ongoing or planned by DOC/FNZ and will recommend any other mitigation options for possible future use or testing.

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: $20,000 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

DOC CSP project MIT2024-02 Enhancing seabird bycatch mitigation across the set and soak periods in surface longline fisheries

DOC CSP project MIT2024-03 Assessment of weighted hooks as a seabird bycatch mitigation option for surface longline fisheries

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: BAR1, 4, 5, BNS3, BYX1, 2, 3, CDL1, HAK1, HOK1, HPB5, 7, JMA3, 7, 8, LIN1, 2, 5, 6, 7 OEO1, 3A, 4, 6, ORH1, 2A, 2B, 3A, 3B, 7A, 7B, SBW6A, 6R, 6I, 6B, SCH5, SCI2, 3, 4A, SNA1, SPO3, SQU1T, 6T, SWA3, 4, TAR1, 2, TRE1, 7, WWA5B

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: BAR1, 4, 5, BNS3, BYX1, 2, 3, CDL1, HAK1, HOK1, HPB5, 7, JMA3, 7, 8, LIN1, 2, 5, 6, 7 OEO1, 3A, 4, 6, ORH1, 2A, 2B, 3A, 3B, 7A, 7B, SBW6A, 6R, 6I, 6B, SCH5, SCI2, 3, 4A, SNA1, SPO3, SQU1T, 6T, SWA3, 4, TAR1, 2, TRE1, 7, WWA5B

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

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

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

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

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 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

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

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

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 were 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: BAR1, 4, 5, BIG1, HAK1, HOK1, JMA3, 7, LIN3, 4, 5, 6,7, ORH3B, 7A, RCO3, SBW6I, SQU1T, 6T, STN1, SWO1, TAR 3

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, Jensz 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.

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: BAR1, 4, 5, BNS3, BYX1, 2, 3, CDL1, HAK1, HOK1, HPB5, 7, JMA3, 7, 8, LIN1, 2, 5, 6, 7 OEO1, 3A, 4, 6, ORH1, 2A, 2B, 3A, 3B, 7A, 7B, SBW6A, 6R, 6I, 6B, SCH5, SCI2, 3, 4A, SNA1, SPO3, SQU1T, 6T, SWA3, 4, TAR1, 2, TRE1, 7, WWA5B

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: BNS1, 2, HPB1, 2, LIN1, SNA1

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.

4.2 MIT2024-01 Protected Species Liaison Programme

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 DOC/FNZ database development currently underway.

Work over the next three years is expected to implement 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. Active use of the new database 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:

Fishery	Indicative Cost	Fish Stocks
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 enable 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

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 bycatch species 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

4.5 MIT2024-04 Sink rate 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: BNS1, 2, 3, 7, 8, HPB1, 2, 3, 4, 5, 7, 8, LIN1, 2, 3, 4, 5, 7, SNA1, 7, 8

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, Hectors' dolphin, spotted and Otago shags, great white shark) to assess their utility for mitigating protected species bycatch, as well as any potential unintended consequences. 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 (e.g. attraction or herding) 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: BUT5, HPB3, SCH3, 5, SPO3, TAR3

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 baffler 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: BAR1, 4, 5, 7, BYX1, 3, 7, CDL2, HAK1, 4, 7, HOK1, JMA3, 7, LIN6, OEO1, 3A, 6, ORH1, 2A, 2B, 3B, 7A, 7B, RBT3, RBY1, 2, SBW6A, SCI1, 2, 4A, SPE4, SQU1T, 6T, SWA3, 4, WWA3, 5B

4.8 MIT2024-07 Hector's dolphin acoustic deterrence devices in trawl and set net 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 the effectiveness of viable acoustic devices in each class/category (set net and trawl) in the marine environment around an active fishing operation, and test against modelled predictions.
2. To identify any additional factors to consider for effective use in operational settings as well as recommendations for future research.

Rationale:

Reports of Hector's dolphin captures have recently increased following the rollout of onboard cameras. Although spatiotemporal actions are currently seen to be the most effective form of mitigation, other mitigation methods, such as the use of acoustic devices, have been used with some success in other commercial fisheries. This supports the trial of appropriate acoustic devices as a mitigation tool to reduce bycatch of Hector's and Māui dolphins in NZ inshore fisheries.

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

Furthermore, the characteristics of available acoustic devices have been demonstrated to differ markedly from the specifications provided by their manufacturer (Erbe et al. 2011). Using an acoustic device designed for mitigation for one species often does not evoke the same behavioural effect on others. The characterisation of acoustic devices therefore needs to be appropriate for the likely sensitive hearing range of the relevant marine mammal species (Hector's and Māui dolphins), and will increase the probability of mitigation success (Erbe and McPherson 2012).

As such, Seafood New Zealand has initiated a lab characterisation of two types of devices currently in use by the New Zealand inshore fishing industry for both set net and trawl. The work includes the characterisation of device source level and frequency spectra, as well as the examination of potential variability within each device type/model. This work will define device classes and model representative scenarios for tested devices, considering factors such as environmental conditions, configuration on nets/trawl gear, and elements relating to the hearing range of Hector's dolphins.

This project aims to build on this work with further research to ensure effective best practice with the use of these devices, and limit unintended consequences to dolphins through testing the previous modelled assumptions in real world at-sea scenarios.

Research Approach:

The first stage of this project will design an at-sea trial for at least one viable device of each class (set net and trawl), following recommendations from modelling scenarios and AEBR 254. Field trial design methodologies will be presented for the consideration of wider stakeholder feedback.

Following this, at-sea trials will be conducted to assess the viable device/s against modelled predictions and identify any factors to consider for effective use in an operational setting. The outcome of these trials will be reported along with recommendations to guide best practice usage and recommendations for future research.

Outputs:

1. Report describing preliminary work and options for at-sea trial design and methodologies.
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. A two-page summary of the key outputs and considerations for effective implementation to be distributed to skippers.
4. All data will be provided to DOC in electronic format.

Note: A two-year term is proposed

Indicative Research Cost: $60,000 per annum

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

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

References:

Erbe, C., et al. (2011). Acoustic characterization of pingers on Queensland Shark Control nets. International Marine Mammal - Gillnet Bycatch Mitigation Workshop. Boston, MA, USA. https://www.bmis-bycatch.org/references/lkw39ahy

Erbe, C and McPherson, C. 2012. Acoustic characterisation of bycatch mitigation pingers on shark control nets in Queensland, Australia. Endangered Species Research. 19 (2): pp. 109-121.

McPherson, Craig, et al. *Feasibility Study: Vessel-based Hector's Dolphin Acoustic Monitoring Systems*. Ministry for Primary Industries, 2021. https://www.mpi.govt.nz/dmsdocument/44734-AEBR-254-Feasibility-study-vessel-based-Hectors-dolphin-acoustic-monitoring-systems

Appendix: Cost Recovery Tables

A: CSP 2024/25 Project Costs

Code	Project	Research	Admin	Total	CR Item	Industry %	Industry	Crown
Interaction Projects								
INT2022-02	Identification of seabirds captured in New Zealand fisheries	$80,000	$6,117	$86,117	4	100	$86,117	$0
INT2022-03	Identification, storage and genetics of cold-water coral bycatch specimens	$80,000	$6,117	$86,117	4B	100	$86,117	$0
INT2022-05	Determining the resilience of the black coral *Antipathella fiordensis* to fisheries impacts	$30,000	$2,294	$32,294	4B	100	$32,294	$0
INT2023-04	Identification of marine mammals, turtles and protected fish captured in New Zealand fisheries	$15,000	$1,147	$16,147	4	100	$16,147	$0
INT2023-06	Investigating the impact of fisheries on endangered hoiho diet, microbiome, and disease susceptibility	$50,000	$3,823	$53,823	4	100	$53,823	$0
INT2024-01	Observing commercial fisheries	$1,076,230	$110,000	$1,186,230	4	100	$1,186,230	$0
INT2024-02	Port-based audit and Protected Species retention programme	$100,000	$7,646	$107,646	4	100	$107,646	$0
INT2024-03	Understanding the effects of fishing depth and soak period on turtle and seabird bycatch	$20,000	$1,529	$21,529	4	100	$21,529	$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	$10,704	$150,704	4B	100	$150,704	$0
INT2024-05	Testing bycatch mitigation scenarios for protected corals in New Zealand using best available information	$80,000	$6,117	$86,117	4	100	$86,117	$0
INT2024-06	Interaction of spotted shags with northern North Island set net fisheries	$30,000	$2,294	$32,294	4	100	$32,294	$0
INT2024-07	Collection and curation of tissue samples from protected fishes and turtles	$20,000	$1,529	$21,529	4	100	$21,529	$0
INT2024-08	Westland petrel overlap with commercial fishing effort	$20,000	$1,529	$21,529	4	100	$21,529	$0
Population Projects								
POP2022-01	Black Petrel population monitoring	$100,000	$7,646	$107,646	3	50	$53,823	$53,823
POP2022-08	Auckland Island seabird research: Gibson's and white-capped albatross	$160,000	$12,233	$172,233	3	50	$86,117	$86,117
POP2022-10	Antipodean island seabird research: Antipodean albatross + white chinned petrel	$160,000	$12,233	$172,233	3	50	$86,117	$86,117

POP2023-01	Aerial survey of leatherback turtles off Northeast North Island	$100,000	$7,646	$107,646	3	50	$53,823	$53,823
POP2023-02	Southern Buller's population study	$150,000	$11,469	$161,469	3	50	$80,734	$80,734
POP2023-03	Updated population estimate and marine habitat utilisation of yellow-eyed penguins/hoiho breeding on Campbell Island	$90,000	$6,881	$96,881	3	50	$48,441	$48,441
POP2023-04	Campbell Island seabird research	$90,000	$6,881	$96,881	3	50	$48,441	$48,441
POP2023-05	Auckland Islands New Zealand sea lions	$150,000	$11,469	$161,469	2	90	$145,322	$16,147
POP2024-01	Flesh-footed Shearwater population monitoring	$30,000	$2,294	$32,294	3	50	$16,147	$16,147
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	$4,970	$69,970	4B	100	$69,970	$0
Mitigation Projects								
MIT2023-06	Underwater line setting devices for bottom longline vessels	$75,000	$5,734	$80,734	4	100	$80,734	$0
MIT2024-01	Protected Species Liaison Programme	$250,000	$19,115	$269,115	4	100	$269,115	$0
MIT2024-02	Enhancing seabird bycatch mitigation across the set and soak periods in surface longline fisheries	$140,000	$10,704	$150,704	4	100	$150,704	$0
MIT2024-03	Assessment of weighted hooks as a seabird bycatch mitigation option for surface longline fisheries	$40,000	$3,058	$43,058	4	100	$43,058	$0
MIT2024-04	Sink rate management tool for small vessel bottom longline	$30,000	$2,294	$32,294	4	100	$32,294	$0
MIT2024-05	Testing the utility of visual deterrent options to mitigate incidental bycatch of protected species in set nets	$80,000	$6,117	$86,117	4	100	$86,117	$0
MIT2024-06	Efficacy of seabird mitigation in large vessel trawl	$50,000	$3,823	$53,823	4	100	$53,823	$0
MIT2024-07	Hector's dolphin acoustic deterrence devices in trawl and set net fisheries	$60,000	$4,588	$64,588	4	100	$64,588	$0
TOTAL		**$3,561,230**	**$300,000**	**$3,861,230**			**$3,371,441**	**$489,789**

B: CSP Observer Cost recovery

Fishery	Stocks	Effort %	Total Days	2024/25 levied	MPI %	MPI days	CSP %	CSP days	Cost Per day	CSP Research Cost
Highly Migratory Species (100% of plan levied)										
Domestic surface longline - North Island	BIG, SWO, STN	3%	30	30	85%	26	15%	5	$1,501	$6,754
Domestic surface longline - South Island	BIG, SWO, STN	5%	30	30	85%	26	15%	5	$1,501	$6,754
Inshore (100% of plan levied)										
SNA 1 trawl - standard (no PSH)	SNA1	15%	60	60	50%	30	50%	30	$1,767	$52,996
Set net ECSI - Kaikoura	BUT5, HPB3, SPO3, SPO5, SCH3, SCH5	4%	30	30	50%	15	50%	15	$1,767	$26,498
ECSI Trawl - TMP	FLA3, GUR3, RCO3, TAR3, TAR5, STA3, STA5, ELE3, ELE5	2%	55	55	50%	28	50%	28	$1,767	$48,580
Set net BUT 5	BUT5	28%	15	15	50%	8	50%	8	$1,767	$13,249
BLL HPB 2	BNS2, HPB2, LIN2	3%	15	15	50%	8	50%	8	$1,767	$13,249
BCO 3 potting	BCO3	6%	10	10	95%	10	5%	1	$1,767	$883
BCO 5 potting	BCO5	1%	10	10	95%	10	5%	1	$1,767	$883
Potting - CRA 2	CRA2	5%	50	50	95%	48	5%	3	$1,767	$4,416
Potting - CRA 5	CRA5	2%	50	50	95%	48	5%	3	$1,767	$4,416
Potting - CRA 7	CRA7	4%	40	40	95%	38	5%	2	$1,767	$3,533
Potting - CRA 8	CRA8	2%	60	60	95%	57	5%	3	$1,767	$5,300
Deepwater & Middle Depth (100% of plan levied)										
Southern blue whiting	SBW6I, SBW6B	70%	250	250	80%	200	20%	50	$1,035	$51,760
Squid	SQU1T, SQU6T	70%	1500	1500	80%	1200	20%	300	$1,035	$310,560
North Island deepwater	ORH1, ORH2A, ORH2B, ORH3A, BYX2, CDL2	20%	110	110	90%	99	10%	11	$1,035	$11,387
Chatham Rise deepwater	ORH3B, OEO3A, OEO4, BYX3	30%	290	290	90%	261	10%	29	$1,035	$30,021
Sub-Antarctic deepwater	ORH3B, OEO1, OEO6	80%	100	100	90%	90	10%	10	$1,035	$10,352

West coast deepwater	ORH7A	50%	70	70	90%	63	10%	7	$1,035	$7,246
West coast North Island	JMA7, EMA7, BAR7	35%	350	350	85%	298	15%	53	$1,035	$54,348
West coast South Island	HOK1, HAK7, LIN7, SWA1, SKI7	30%	400	400	85%	340	15%	60	$1,035	$62,112
Chatham Rise middle depth	HOK1, HAK1, HAK4, LIN3, LIN4, SWA3, SWA4, JMA3, BAR1, BAR4, SKI3	30%	600	600	85%	510	15%	90	$1,035	$93,168
Sub-Antarctic middle-depth	HOK1, SWA4, WWA5B, BAR5, JMA3, SKI7	45%	500	500	85%	425	15%	75	$1,035	$77,640
Cook Strait hoki	HOK1	45%	126	126	85%	107	15%	19	$1,035	$19,565
WCSI Hoki-Inside the line	HOK1	39%	126	126	85%	107	15%	19	$1,035	$19,565
Scampi 6A	SCI6A	34%	225	225	85%	191	15%	34	$1,035	$34,938
Scampi Other	SCI1, SCI2, SCI3, SCI4A	39%	460	460	85%	391	15%	69	$1,035	$71,429
LIN BLL >34m	LIN3, LIN4, LIN5, LIN6, LIN7	19%	120	120	85%	102	15%	18	$1,035	$18,634
Ling BLL <34m	LIN3, LIN4, LIN5, LIN6, LIN7	5%	73	73	85%	62	15%	11	$1,035	$11,335
Potting - LIN	LIN3, LIN4, LIN5, LIN6, LIN7	11%	90	90	95%	86	5%	5	$1,035	$4,658
Total (excluding $110,000 administration cost)										**$1,076,230**