



# Conservation Services Programme Annual Plan 2020/21

June 2020  
Conservation Services Programme  
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[www.doc.govt.nz/csp](http://www.doc.govt.nz/csp)



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 2020/21, 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. Eugenie Sage  
*Minister of Conservation*



Lou Sanson  
*Director-General of Conservation*

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## 1. Overview

### Introduction

The Conservation Service Programme (“CSP”) has operated, under the administration of DOC, since 1996 with the ultimate aim of avoiding, remedying, or mitigating the adverse effects of commercial fisheries on protected species. The Conservation Services Programme Annual Plan 2020/21 (“Annual Plan”) includes the conservation services to be delivered as the Conservation Services Programme (“CSP”), and subject to cost recovery from the commercial fishing industry. 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 2018<sup>1</sup> (“Strategic Statement”).

The CSP vision is that “*commercial fishing is undertaken in a manner that does not compromise the protection and recovery of protected species in New Zealand fisheries waters*”. In order to meet this vision, the following CSP Objectives, as described in the CSP Strategic Statement 2018, 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.

### 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 outputs that are anticipated to be produced. Guiding objectives, both CSP Objectives (described in the CSP Strategic Statement 2018) 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 allocation, and relevant fish stocks. Costs are summarised in Appendix 1. All financial amounts appearing in this document are exclusive of GST.

### Guiding frameworks, research planning and prioritisation

The CSP Strategic Statement 2018, outlines the objectives of CSP and describes the process through which each annual plan of services will be developed and delivered. It provides detail on the wider management context (for example, how CSP delivers on whole of government plans such as the National Plans of Action for seabirds and sharks and relevant Threat Management Plans), the research planning and prioritisation processes used by CSP, and the way CSP is implemented by working with others. A review of the CSP Strategic Statement is planned in 2020/21.

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<sup>1</sup> Available to download from <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/resources/csp-strategic-statement-2018.pdf>

The Conservation Services Programme planning considers and works in parallel with other relevant planning and management processes such as the Hector's and Māui dolphin and the New Zealand sea lion Threat Management Plans (TMP). The iterative and inclusive planning process ensures that gaps are identified, and research synergies are maximised.

The CSP Research Advisory Group (CSP RAG), was established in December 2013 following finalisation of the CSP Strategic Statement and provided guidance for the development of this Annual Plan. Four medium term research plans have also been developed as part of the work of the CSP RAG; the CSP seabird population medium term research plan 2017 ("CSP seabird plan 2017")<sup>2</sup>, the CSP protected fish medium term research plan 2019 ("CSP fish plan 2019")<sup>2</sup>, the CSP Marine Mammal medium term research plan 2018 ("CSP mammal plan 2018")<sup>2</sup>, and the CSP protected coral medium term research plan 2019 ("CSP coral plan 2019"). These plans have been used to inform relevant sections of this Annual Plan. In time, a medium-term research plan for the remaining protected species group (marine reptiles) will also be developed.

A summary of the planning and prioritisation milestones, in accordance with the CSP Strategic Statement 2018, undertaken in developing the CSP Annual Plan 2020/21 are as follows:

1. Key resources (draft CSP Annual Research Summary and Medium-Term Research Plans) shared with the members of the CSP RAG group (December 2019) in preparation for a discussion on prioritisation later in the year.
2. Annual research summary report finalised, CSP medium term research plans updated and an initial list of research proposals for 2020/21 drafted and circulated to CSP RAG members (March 2020).
3. CSP RAG meeting held to discuss and prioritise research proposals for 2020/21 (March 2020). Additional written feedback also sought from CSP RAG.
4. Draft Annual Plan developed based on this feedback and provided for formal consultation (May 2020).
5. Analysis of submissions and development of final Annual Plan.

Observer coverage is planned based on identification of objectives for coverage and ideal levels of coverage for each fishery. This is then considered in the context of the available resource of the observer programme and feasibility of delivery and is prioritised accordingly. Historically inshore coverage has been also planned using a process developed jointly by CSP and the Inshore Fisheries team at FNZ using a tiered approach identified by a process conducted in preparation for the CSP Annual Plan 2011/12.

Throughout 2020/21 CSP and FNZ will be working to improve the joint planning process to ensure both agencies' objectives are being met and to clarify the framework needed to deliver on these objectives. This framework will be documented to provide more transparency in future.

## Consultation

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

December 2019	Key RAG resources shared, highlighting CSP annual research review and strategic planning direction.
2 March 2020	Updated medium term research plans, initial list of research proposals and CSP RAG prioritisation framework circulated to CSP RAG.

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<sup>2</sup> Available to download from <http://www.doc.govt.nz/csp-rag>

6 March 2020	Second CSP RAG meeting to discuss and prioritise initial research proposals.
22 March 2020	Additional feedback received from CSP RAG on research proposals and their prioritisation.
6 May 2020	Draft Conservation Services Programme Annual Plan 2020/21 released for public consultation.
8 June 2020	Public consultation period closes.
Mid-June 2020	Summary of public submissions and response to comments completed.
Late-June 2020	Director-General of Conservation conveys the Conservation Services Programme Annual Plan 2020/21, amended in accordance with public submissions, to the Minister of Conservation for agreement.

## **Administrative costs**

Administration costs have always been a contentious matter relating to the delivery of conservation services. Administration 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. This approach is broadly appropriate, for example, the costliest project (INT2020-01 Observing commercial fisheries in 2020/21) incurs the majority of administration expenses. For that project, administration includes observer training programmes and training materials, data management, briefing and debriefing, liaison at sea and with other agencies when necessary, and reporting. For other projects, the administration burden 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 dropped by \$15,000 between 2008/09 and 2009/10, and subsequently dropped again by \$13,000 for 2011/12 and has been maintained at this level. We welcome stakeholder views on different ways to attribute administration costs across projects.

## **COVID-19**

DOC is very cognisant that COVID-19 has had an impact and will continue to have an impact, including on fishing activities. This has been accounted for in proposing the work programme. DOC remains committed to working with Fisheries NZ, Treaty partners, industry contacts and fishers, and with all interested stakeholders to respond to future changes.

## 2. Interaction Projects

### 2.1 Observing commercial fisheries

**Project code:** INT2020-01

**Start Date:** 1 July 2020

**Completion Date:** 30 June 2021

**Guiding Objectives:** CSP Objectives A, B, C; National Plan of Action – Seabirds<sup>3</sup>, National Plan of Action – Sharks; New Zealand sea lion Threat Management Plan and Hector’s and Māui dolphin Threat Management Plan<sup>4</sup>.

**Project Objective:**

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

**Specific 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**

***Management approach***

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

The CSP Observer Programme will continue to purchase baseline services for “offshore” fisheries from FNZ Observer Services, given the scale of their operation, this allows observers to be placed strategically across New Zealand Fisheries. Inshore fisheries observer coverage will also be delivered by FNZ Observer Services, according to a joint planning process (described in Section 2.1.1). Where data collection involves using techniques beyond observation and recording, providers with specific expertise and/or equipment will be considered. For the purposes of providing costings, the rate provided by FNZ Observer Services has been used. As such, for the purposes of planning, costings for observer coverage are based on those provided by the FNZ Observer Services to provide a best estimate.

The objectives outlined in the NPOA Seabirds 2020 have been considered in the planning of the observer days this year. Ministerial decision over the future of the Hector’s and Māui Threat Management plan (HMD TMP) will likely drive changes to the inshore observer coverage,

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<sup>3</sup> National Plan of Action - Seabirds <https://www.mpi.govt.nz/dmsdocument/38054/direct>

<sup>4</sup> Hector’s and Māui Threat Management plan review is currently draft, pending Ministerial decision

however it is proposed that inshore coverage for the TMP is planned to be over and above the coverage that has been indicated in the 2020/21 CSP draft plan. The additional coverage will allow for tasks specific to the HMD TMP while gathering standard data for that method and area to meet a variety of goals and outputs across the observer program.

### ***Research Approach***

To date, the bulk of publicly available information on at-sea interactions between fishing vessels and protected species in New Zealand waters, has been collected by government (DOC/ FNZ) observers.

The allocation of observer coverage across fisheries will be made in relation to:

- Historic mortality of protected species.
- Fishing effort.
- Past observer coverage.
- The status of threatened protected species.
- Current level of information.
- Risk assessment work which has been undertaken (e.g. Rowe 2010a, Richard & Abraham. 2013, Abraham et al. 2017).
- Requirements under the National Plans of Action (NPOAs) for seabirds<sup>5</sup>, and sharks<sup>6</sup> and any relevant Threat Management Plans (TMPs).
- Information needs identified for newly introduced protected species.

Coverage levels are driven by several factors including data needs for protected species and fisheries management, compliance, international obligations and ministerial directives. These ministerial directives include squid 6T coverage for sealion captures, both trawl and setnet vessel coverage on the West coast of the North Island to address some of the Māui dolphin issues raised in the Hector's and Māui dolphin Threat Management Plan, and coverage of snapper trawl in the Hauraki Gulf to look at concerns around snapper stocks and undersized snapper. Here 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 duties of an observer in respect to the CSP Observer Programme can be summarised as:

- Monitoring and recording the interactions of protected species with fishing operations.
- Reporting on the efforts made to mitigate the adverse effects of commercial fishing on protected species.
- Recording, photographing, and tagging all protected species bycatch.
- Recovering and returning the bodies or samples of dead protected species for identification and autopsy.
- Recording observational data on numbers, and the behaviour of, marine mammal and seabird species seen around the fishing vessel.
- Collecting information to better understand cryptic mortality of protected species.
- Monitoring vessel activities against any relevant operational plans such as Protected Species Risk Management Plans (PSRMPs) or Vessel Management Plans (VMPs).

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<sup>5</sup>NPOA- Seabirds 2020 available at <https://www.mpi.govt.nz/dmsdocument/38054/direct>

<sup>6</sup>NPOA-Sharks 2013 available at <https://www.mpi.govt.nz/dmsdocument/1138/loggedIn>

- Carrying out other tasks (e.g. making observations on discard and offal discharge) as required.

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

Information collected includes:

- Environmental conditions (e.g. sea state).
- Fishing methods (including a description of gear employed) and operations.
- Processing waste management practices.
- Abundance and behaviour of protected species in vicinity of vessel.
- Mitigation practices adopted.
- Knowledge and approach of crew.
- Interactions between protected species and fishing gear.
- Auditing of Protected Species Risk Management Plans.

It is important to note that observer programmes typically have high spatial and temporal variation, as well as multiple priorities for information collection, which can make the data challenging to interpret and extrapolate to estimate actual bycatch rates by fishery, location, or other desired variables. Data accuracy and relevance can be affected by inter-observer variability, weather conditions and access to vessels, 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.

### ***Planning of observer coverage by fishery in 2020/21***

For the purposes of planning observer coverage, fisheries are divided into two broad categories:

Firstly, those fisheries that are poorly known and generally characterised by small vessel, owner operated fleets (see 2.1.1). Most of these vessels operate in the inshore area (i.e. to around 200m depth). Some small vessels, particularly bottom longline vessels under 36m, will operate in deeper waters such as the Chatham Rise and target deepwater species such as ling and so are observed as part of deepwater longline coverage. Details of the approach used to set days in these fisheries are described in Section 2.1.1 of this plan. In general, coverage within inshore fisheries is aimed at reducing uncertainty around the risk to protected species which are identified in level 1 and level 2 risk assessments (Rowe 2010a, Richard & Abraham 2015, Ford et.al. 2015, Abraham et al. 2017) as well as assessing mitigation options for identified interactions and delivering on the relevant Threat Management Plan objectives for Hector's and Māui dolphins and New Zealand sea lions. The NPOA-Seabirds 2020 plan highlights the importance of observer data in meeting the objectives of the plans including monitoring and auditing functions of risk management plans. The NPOA-Sharks 2013 also gives guidance on data collection priorities to inform protection and management of sharks, in the first instance dealing with improved data for the development of a quantitative risk assessment similar to that produced for seabirds. In addition, the sharks, seabirds and mammals medium term research plans are taken into consideration and outlines fishery specific priorities to reduce uncertainty in current risk scores.

The second group of fisheries can be considered 'better known' and have generally had some level of ongoing observer coverage over the last ten years or more (see 2.1.2). Most of these

fisheries are characterised by large vessels operating further offshore and are termed ‘offshore’ fisheries. Observers working in these fisheries generally have multiple priorities including stock assessment, compliance, and protected species interactions. DOC contributes to a portion of observer time in these fisheries and, as such, days are planned differently to the poorly known fisheries. In order to set observer days for the period 1 July 2020 – 30 June 2021, effort data from previous years was examined, to ensure that desired coverage levels are achievable with the days planned and that these coverage levels would ideally meet the data requirements of both agencies. All time periods are based on 1 July – 30 June in line with the period that observer coverage runs (i.e. not the fishing year).

The most recent observer coverage and protected species statistics are summarised by Weaver (2019). Protected species interaction data for the period 1 July 2004 to 30 June 2011 were reported by Rowe (2009, 2010b) and Ramm (2010, 2012, 2013). Summary information for the period 1 July 2011 to 30 June 2013 is reported by Clemens-Seely et al. (2014a, b). Summary information for 1 July 2013 to 30 June 2014 is reported by Clemens-Seely and Hjørvarsdóttir (2016). Summary information for the period 1 July 2014 to 30 June 2016 is reported by Hjørvarsdóttir (2016, 2017). Summary information for 1 July 2016 to 30 June 2017 is reported by Hjørvarsdóttir and Isaacs (2018). Summary information for 1 July 2017 to 30 June 2018 is reported by Weaver (2019). Download links are provided in the References section.

**Fisheries Management Areas are referred to by three letter codes as follows:**

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	FMA6A	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: Joint DOC-MPI Inshore Observer Programme

#### Introduction

Refer to page five on the planning and prioritisation process for observer planning. Final decisions on the levels and placement of this observer coverage were undertaken by FNZ with consideration to capacity of the Observer Services Unit. These decisions were informed by risk assessments (levels 1, 2 and 3 where applicable), the National Plans of Action for Seabirds and Sharks, relevant Threat Management Plan priorities, and previous observer data and fish-stock related data collection. While the tiered approach and risk assessments highlight the observer effort required to reduce uncertainty in these fisheries, often these levels of coverage required cannot be reached due to the nature of the inshore fleet as described above.

The level of days in the planning this year was reduced in order to take into account the need to reduce levies on the industry due to Covid19. That said, the number of CSP inshore days have still increased by 275 with an overall increase of 570 from last year’s plan.

Due to ongoing industry concerns of over recovery for unachieved inshore observer coverage, FNZ committed to reviewing the cost recovery method for these fisheries. The outcome of this review was to only levy 50% of planned inshore observer days, with the balance of achieved days being recovered in the following year. Additional to this, due to PSA negotiated observer contracts, the cost of an inshore observer day has been increased to \$950 to \$1090 to reflect the increase in cost of those days.

For 2020/21 the cost of inshore observer coverage is being jointly recovered by both DOC and FNZ as with past plans. Broadly, for coverage driven by protected species interactions each cost will be recovered evenly by each agency. For coverage driven by fisheries needs but also collecting protected species information (i.e. in deepwater fisheries) the observer’s time will be prorated to reflect the time spent on each set of tasks, generally 85% Fisheries, 15% Conservation Services. Some days included in the MPI levied plan are not included in this CSP plan, in coming years these days will be added if protected species risks are identified.

The main goals of the Inshore Observer Programme 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;*
- *inform management of fish stocks by gathering biological and other information on board fishing vessels.*

Inshore Observer Projects 2020/21

The table below summarises the proposed observer projects for 2020/21

Method	Area	Statistical Area	% of effort	Total number of days	Priority
Setnet	East Coast South Island Otago	024, 026	30%	133	Monitor capture rate & interactions of Hector's dolphin & hoiho.
	East Coast South Island Kaikoura	018	25%	284	Monitor capture rate & interactions of Hector's dolphins.
	South Coast South Island	025, 027, 030	65%	181	Monitor capture rate & interactions of Hector's dolphin, hoiho, white pointer shark & other protected species.
Trawl	East Coast South Island-Tarakihi target	018, 020, 022, 024, 026	30%	393	Camera verification. Monitor capture rate and interactions of seabirds and Hector's dolphin. Collect information on interactions & effectiveness of mitigation. Audit adherence to PSRMP's
	South Coast South Island	025, 027, 030	10%	128	Monitor capture rate and interactions of seabirds and Hector's dolphin. Collect information on interactions & effectiveness of mitigation. Audit adherence to PSRMP's
	North-east North Island- Snapper target (Standard trawl)	002-010	20%	338	Monitor capture rate of black petrels & flesh-footed shearwaters, collect information on interactions & effectiveness of mitigation. Audit adherence to PRSMP's
	South-east North Island- Tarakihi target	011-016	10%	154	Monitor capture rates and collect information on protected species interactions and mitigation use. Audit adherence to PSRMP's.
	East Coast South Island Coastal	020, 022	20%	240	Monitor capture rate and interactions with seabirds and Hector's dolphin. Collect information on interactions & effectiveness of mitigation. Audit adherence to PSRMP's
Bottom Longline	North-east North Island (Bluenose target)	002-010	20%	102	Monitor capture rate of black petrels & flesh-footed shearwaters, collect information on interactions & effectiveness of mitigation. Audit adherence to PSRMP's
	North-east North Island (Snapper target)	002-010	10%	375	Monitor capture rate of black petrels & flesh-footed shearwaters, collect information on interactions & effectiveness of mitigation. Audit adherence to PSRMP's.
Bottom Longline, Setnet, Trawl	West Coast North Island	040, 041, 042, 045, 046	20%	230	Information on distribution & possible captures of Māui dolphins. Monitor interactions with other protected species. Camera verification
<b>Total</b>				<b>2,558</b>	

## **SETNET**

### **East Coast South Island / Otago and Kaikoura**

#### **Overall project objectives/information needs**

1. Estimate the capture rate of Hector's dolphin and hoiho South Island populations in **setnet fisheries**.

<b>Start Date</b>	1 July 2020
<b>Completion Date</b>	30 June 2021
<b>Targeted Statistical Area</b>	18, 024, 026

#### **Project Objectives**

1. Gather information to estimate the number of captures and the capture rate of Hector's dolphin and hoiho in setnet fisheries on the East Coast of the South Island.
2. Gather information to identify the nature and extent of interactions with Hector's dolphin, hoiho, New Zealand fur seals and shags by setnet fisheries on the East Coast of the South Island.

#### **Information Needs**

An overall capture rate for the Hector's dolphin needs to be estimated as the East Coast has some of the highest levels of coastal setnet effort in the country. Observer coverage is targeted in statistical areas where there are high levels of setnet fishing occurring within the Hector's dolphin habitat. Ongoing delivery issues in relation to safety requirements around crewing levels and ability to safely carry observers has continued to impact upon coverage rates so more data is needed to ensure a robust estimate of captures and capture rates and to inform risk assessments.

Robust estimation of total Hector's dolphin captures requires that the fishing behaviour observed is representative of normal situations (i.e. if we can assume that observer placement is not changing behaviour). To minimise any potential bias, relatively high coverage as a percentage of effort by area/month was proposed, across the entire fleet operating in these statistical areas.

Hoiho have also been identified by several processes, including risk assessments and observed captures, as being at risk from setnet fisheries from Banks Peninsula south. Due to the decrease in their mainland population from to a variety of factors, the impacts of fishing on the remaining populations increases. Current recommendations within Te Kaweka Takohaka mō te Hoiho include observer coverage in order to obtain further temporal and special data on the nature and extent of setnet interactions with hoiho.

#### **Proposed Coverage**

- Statistical area 18, 024, 026
- The planning optimisation process identified 30% coverage required to gain sufficient data
- 133 observer days are planned for ECSI - Otago and 284 days are planned for Kaikoura

#### **Secondary information to be collected**

To make the best use of Observers' time, secondary information can sometimes be collected, which will then inform other priorities. Secondary information collected will include:

- Audit of Protected Species Risk Management Plans and adherence to operational procedures
- Information on the nature and extent of setnet interactions with other seabirds, marine mammals, and protected fish.
- Observer counts to provide spatial distribution data for seabirds and marine mammals.
- Biological sampling of fish to help inform stock assessments.

- Total catch verification in line with providing better information about the specific target fisheries.

#### **Related Research**

- An East Coast South Island aerial survey has obtained robust estimates of Hector's dolphin abundance and distribution, which when combined with up to date reliable capture observations will allow estimation of the risk posed by setnet fisheries in this area.
- An ongoing autopsy programme for Hector's and Māui dolphins aims to identify sub-species, cause of death, body condition, and the extent of parasitism for any beach-cast or captured dolphins. This allows better understanding of the health and condition of the various Hector's and Māui dolphins.
- Ongoing hoiho population monitoring and adult and juvenile tracking studies will assist in the estimation of risk of interaction and identification of foraging habitat.

### *South Coast South Island*

#### **Overall project objectives/information needs**

Estimate the capture rate and interactions of hoiho, white pointer sharks and Hector's dolphin in setnet fisheries.

<b>Start Date</b>	1 July 2020
<b>Completion Date</b>	30 June 2021
<b>Targeted Statistical Areas</b>	025, 027, 030

#### **Project Objectives**

1. Gather information to estimate the number of captures and the capture rate of hoiho, and white pointer sharks.
2. Gather information to identify the nature and extent of interactions between setnet fisheries and white pointer sharks, hoiho, Fiordland crested penguins, Foveaux shag, dolphins and sea lions on the South Coast of the South Island.
3. Gather spatial distribution data for seabirds and marine mammals.

#### **Information Needs**

Observer coverage is targeted in statistical areas where there are high levels of setnet fishing occurring within the Hector's dolphin habitat. Further information is needed to ensure a robust estimate of captures and capture rates to inform risk assessments and management decisions. More data is also needed in this area to assess capture rates of hoiho and white pointer sharks.

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

The National Plan of Action - Sharks 2013 (NPOA-Sharks 2013) sets goals and objective for better understanding and ultimately reducing the incidence of capture of protected shark species. The factors which lead to captures will assist in the development of effective mitigation. Additionally, a number of captured white pointer sharks are alive (though with injuries) at time of release therefore further information on the factors which contribute to safe and successful release of animals is important to developing adequate guidelines for fishers.

Robust estimation of total captures requires that the fishing behaviour observed is representative of normal situations (i.e. if we can assume that observer placement is not changing behaviour). To minimise any potential bias, relatively high coverage as a percentage of effort by area/month is proposed.

#### **Proposed Coverage**

- Statistical areas 025, 027, 030
- The planning optimisation process identified 65% coverage required to gain sufficient data
- 181 observer days are planned

#### **Secondary information to be collected**

To make the best use of observers' time, secondary information can sometimes be collected, which will then inform other priorities. Secondary information collected will include:

- Audit of Protected Species Risk Management Plans and adherence to operational procedures

- Information on the nature and extent of setnet interactions with other seabirds, marine mammals, and protected fish.
- Observer counts to provide spatial distribution data for seabirds and marine mammals.
- Total catch verification in line with providing better information about the specific target fisheries.

#### **Related Research**

- Ongoing hoiho population monitoring and adult and juvenile tracking studies will assist in the estimation of risk of interaction.
- Hoiho review including the range and distribution, population levels and trends.
- An East Coast South Island aerial survey has obtained estimates of Hector's dolphin abundance and distribution, which when combined with up to date reliable capture observations will allow estimation of the risk posed by setnet fisheries in this area.
- Post release survival of white pointer sharks in set net fisheries.
- An ongoing autopsy programme for Hector's and Māui dolphins aims to identify sub-species, cause of death, body condition, and the extent of parasitism for any beach-cast or captured dolphins. This allows better understanding of the health and condition of the various Hector's and Māui dolphins.

## **INSHORE TRAWL**

### **West Coast North Island – trawl, set net and bottom longline**

#### **Overall project objectives/information needs**

1. Gather information on distribution and monitor for captures of Māui dolphins and other protected species in trawl, set net and bottom longline fisheries on the West Coast of the North Island.

<b>Start Date</b>	1 July 2019
<b>Completion Date</b>	30 June 2020
<b>Targeted Statistical Areas</b>	040, 41, 42, 45, 46

#### **Project Objectives**

1. Gather information on any Māui dolphin captures that may occur within the trawl and set net fisheries on the West Coast of the North Island.
2. Observational survey to gather spatial distribution data for Māui dolphins.
3. Gather information on the nature and extent of interactions with other protected species in the area including in the bottom longline fishery.
4. Audit of protected Species Risk Management Plans for adherence and improvements to Mitigation Standards

#### **Information Needs**

Observer coverage is targeted to reflect the ministerial decisions made for monitoring of 100% of trawl and set net vessels operating within restricted Māui zone on the west coast North Island. Currently part of this monitoring is undertaken via placement of cameras, observers will be utilised for camera verification and for monitoring on remaining vessels that do not have cameras.

Robust estimation of total Māui dolphin captures requires that the fishing behaviour observed is representative of normal situations (i.e. if we can assume that observer placement is not changing behaviour). To minimise any potential bias, relatively high coverage as a percentage of effort by area/month needs to be achieved.

Previous observer coverage in the area has identified interactions with other protected species including seabirds such as white capped albatross, dolphins and fur seals. Improved information on the nature and extent of these interactions is important in the development of effective management and mitigation strategies.

#### **Proposed Coverage**

- Statistical areas 040, 41, 42, 45, 46
- 20% observer effort required
- 230 observer days are planned in addition to camera monitoring

#### **Secondary information to be collected**

- Observer observations to provide spatial distribution data for seabirds and marine mammals.
- Information on the nature and extent of setnet interactions with other seabirds, marine mammals, and protected fish.
- Total catch and camera verification in line with providing better information about the specific target fisheries.

**Related Research**

- Ongoing aerial and boat-based surveys of the West Coast North Island supported by biopsy sampling where possible.
- An ongoing autopsy programme for Hector's and Māui dolphins aims to identify sub-species, cause of death, body condition, and the extent of parasitism for any beach-cast or captured dolphins. This allows better understanding of the health and condition of the various Hector's and Māui dolphins.
- Research conducted to meet the objectives of the Hector's and Māui dolphin Threat Management Plan.

### **East and South Coast**

#### **Overall project objectives/information needs**

To assess the rate of Hector's dolphin and seabird captures in inshore trawl fisheries on the East coast and South Coast of the South Island. Audit and assess mitigation techniques and gather information to inform cryptic mortality estimates due to warp strikes. Catch assessment for monitoring tarakihi stocks.

<b>Start Date</b>	1 July 2020
<b>Completion Date</b>	30 June 2021
<b>Targeted Statistical Areas</b>	018, 020, 022, 024, 025, 026, 027, 030

#### **Project Objectives**

1. Estimate the capture rate of seabirds in inshore trawl fisheries on the East and South coast of the South Island.
2. Gather data on warp strikes to improve estimations of cryptic mortality.
3. Estimate capture rate of Hector's dolphins in inshore trawl fisheries on the East and South coasts of the South Island.
4. Audit of protected Species Risk Management Plans for adherence and improvements to Mitigation Standards.
5. Catch assessment

#### **Information needs**

The coverage this year is split into ECSI coastal (FLA/GUR), ECSI inshore (TAR) trawl, Southland inshore trawl and East Coast North Island (TAR2). This is partly due to the Ministerial requirement to have 100% monitoring on the East Coast tarakihi fishery, the 100% monitoring will include observer coverage and a camera rollout in this fleet.

Information on total mortality of seabirds is important to inform robust fisheries management decision making in relation to fishery related deaths. The level 2 seabird risk assessment identifies inshore trawl as posing a risk to several albatross species and there is significant uncertainty surrounding the level of cryptic and total mortality especially inshore trawl fisheries.

Previous observer coverage in statistical areas 020, 022, 024, 025, 026 identified captures of Salvin's and white-capped albatross on trawl warps in particular, 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 in order 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 South and South East Coast has 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 for the East Coast and South Coast of the South Island Hector's dolphin populations need to be estimated. For coastal ECSI and South coast South Island observer coverage is targeted in statistical areas where there are high levels of trawl fishing occurring within the Hector's dolphin habitat.

The draft National Plan of Action – Seabirds 2020, sets goals and objective for better understanding and ultimately reducing the incidence of seabird bycatch. Observational and audit data is necessary in this fishery to achieve the objectives in the NPOA.

### **Proposed Coverage**

- Statistical areas 011 – 016, 018, 020, 022, 024, 025, 026, 027, 030
- The planning optimisation process identified 30% coverage required to gain sufficient data
- Observer days planned include:
  - 240 for the ECSI coastal trawl
  - 393 for ECSI (TAR) Inshore Trawl
  - 128 for South Coast inshore trawl
  - 154 for lower North Island Inshore trawl (TAR 2)

### **Secondary information to be collected**

- Collection information on the nature and extent of interactions with other protected species.
- Observer observations to provide spatial distribution data for seabirds and marine mammals.

### **Related Research**

- Ongoing hoiho population monitoring and adult and juvenile tracking studies will assist in the estimation of risk of interaction.
- An East Coast South Island aerial survey has obtained estimates of Hector's dolphin abundance and distribution, which when combined with up to date reliable capture observations will allow estimation of the risk posed by trawl fisheries in this area. The Spatially Explicit Risk Assessment has provided estimates on high risk areas to Hector's dolphin.
- Characterisation and mitigation of protected species interactions in inshore trawl fisheries which highlights in the need for additional data on the extent of interactions and cryptic mortality in the ECSI trawl fishery.

**North-East North Island – Snapper target**

**Overall project objectives/information needs**

Monitor the capture rate of black petrels and flesh-footed shearwaters and collect information on interactions and effectiveness of mitigation, auditing of protected species risk management plans. Monitor sub-MLS snapper discards and offal management.

<b>Start Date</b>	1 July 2020
<b>Completion Date</b>	30 June 2021
<b>Targeted Statistical Areas</b>	002-010

**Project Objectives**

1. Collection information on the nature of interactions with protected species, particularly black petrels and flesh-footed shearwaters, which will assist in informing mitigation strategies.
2. Gather data on warp strikes to improve estimations of cryptic mortality.
3. Audit of protected Species Risk Management Plans for adherence and improvements to Mitigation Standards.
4. Sub-MLS snapper discards and catch verification for fisheries management.

**Information needs**

The black petrel is identified by the seabird level 2 risk assessment as the single most at-risk seabird species from commercial fisheries interactions; flesh-footed shearwaters are also in the very high-risk category.

The risk assessment has also highlighted snapper trawl as posing a risk to black petrels and flesh-footed shearwaters from trawl warps in particular, 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 in order to reduce captures and cryptic mortality.

In order to gain accurate information on the nature and extent of interactions, ongoing coverage is necessary.

Camera trials are no longer underway or included in the programme, review of historical footage is continuing. There has historically been a ministerial requirement to cover 100% of this fishery for sub-MLS snapper discards and management, this is currently under review.

**Proposed Coverage**

- Statistical areas 002-010
- The planning optimisation process identified 30% coverage to gain sufficient data
- 338 observer days (standard trawl)

**Secondary information to be collected**

- Information on the nature and extent of inshore trawl interactions with seabirds, mammals, turtles and protected fish species.

**BOTTOM LONGLINE****North-East North Island – Bluenose target**

<b>Start Date</b>	1 July 2020
<b>Completion Date</b>	30 June 2021
<b>Targeted Statistical Areas</b>	002-010

Monitor the capture rate of black petrel and flesh-footed shearwaters, and collect information on interactions and effectiveness of mitigation in bottom longline fisheries

**Project Objectives**

1. Collect information to reduce uncertainty associated with the estimated capture rate of at-risk seabird species (primarily black petrels and flesh-footed shearwaters) in inshore bottom longline fisheries targeting bluenose.
2. Collect information to improve current estimates of cryptic mortality/live-release survival in inshore bottom-longline fisheries.
3. Collect information to evaluate the efficacy of inshore bottom longline mitigation efforts.
4. Audit of protected Species Risk Management Plans for adherence and improvements to Mitigation Standards.

**Information Needs**

The black petrel is identified by the seabird spatially explicit fisheries risk assessment as the single most at-risk seabird species from commercial fisheries interactions, and limited observer coverage has been a key uncertainty in risk estimates for this species. The primary objective of observer coverage focused on black petrels is to better understand what factors most strongly determine variable capture rates, to support development of mitigation options in bottom longline fisheries (snapper, bluenose).

Another at-risk species from inshore bottom longline fisheries is flesh-footed shearwater. Risk to this species arises primarily from bottom longline vessels targeting snapper. Due to low historical observer coverage in all inshore bottom longline fishery groups, these risk estimates are subject to considerable uncertainty. Capture rates recorded by fishery observers can be expected to substantially improve these estimates. If coverage is unrepresentative (i.e. because vessels of a particular class resist accepting observers, or the presence of an observer biases fisher behaviour), capture rate estimation arising from the risk assessment will be poorly informed, and associated risk estimates are likely to remain uncertain (or possibly biased).

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 data to characterise interactions, handling procedures and to evaluate the likely fate of birds released alive is a high priority.

**Proposed Coverage**

- Statistical areas 002, 003, 004, 005, 006, 007, 008, 009, 010
- The planning optimisation process identified 50% coverage required, spread to the extent practical across the range of vessels and in space and time, to gain sufficient data
- Summer coverage is required (black petrels and flesh-footed shearwaters are absent in winter)
- 101 observer days are planned

**Secondary information to be collected**

- Information on the nature and extent of bottom longline interactions with seabirds, mammals, turtles and protected fish species.
- Information for BNS and HAP 1 catch assessments.

**Related Research**

- Joint industry government initiatives around electronic monitoring.
- Research planned to model black petrel (and flesh-footed shearwater) capture rates as a function of multiple variables potentially affecting interactions with fisheries, including analysis of higher resolution spatial and temporal distributions (of both birds and vessels), and fleet variables such as vessel experience and mitigation.

***North-East North Island – Snapper target***

<b>Start Date</b>	1 July 2020
<b>Completion Date</b>	30 June 2021
<b>Targeted Statistical Areas</b>	002-010

**Project Objectives**

1. Collect information to reduce uncertainty associated with the estimated capture rate of at-risk seabird species (primarily black petrels and flesh-footed shearwaters) in inshore bottom longline fisheries targeting snapper.
2. Collect information to improve current estimates of cryptic mortality/ live-release survival in inshore bottom-longline fisheries.
3. Collect information to assess the efficacy of electronic monitoring trial being undertaken in the area.
4. Collect information to evaluate the efficacy of inshore bottom longline mitigation efforts.

**Information Needs**

The black petrel is identified by the seabird spatially explicit fisheries risk assessment as the single most at-risk seabird species from commercial fisheries interactions, and limited observer coverage has been a key uncertainty in risk estimates for this species. The primary objective of observer coverage focused on black petrels is to better understand what factors most strongly determine variable capture rates, to support development of mitigation options in bottom longline fisheries (snapper, bluenose).

Another at-risk species from inshore bottom longline fisheries is flesh-footed shearwater. Risk to this species arises primarily from bottom longline vessels targeting snapper. Due to low historical observer coverage in all inshore bottom longline fishery groups, these risk estimates are subject to considerable uncertainty. Capture rates recorded by fishery observers can be expected to substantially improve these estimates. If coverage is unrepresentative (i.e. because vessels of a particular class resist accepting observers, or the presence of an observer biases fisher behaviour), capture rate estimation arising from the risk assessment will be poorly informed, and associated risk estimates are likely to remain uncertain (or possibly biased).

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 data to characterise interactions, handling procedures and to evaluate the likely fate of birds released alive is a high priority.

The Black Petrel camera program is continuing to operate on a number of bottom longline snapper vessels. The data collected from this will be used to update capture rate estimations and the risk assessments as outlined above. Although there will be a focus this year on non-camera vessels, coverage will still be needed on camera vessels to assess mitigation use and audit PSRMP's. 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).

**Proposed Coverage**

- Statistical areas 002, 003, 004, 005, 006, 007, 008, 009, 010
- The planning optimisation process identified 50% coverage required
- Summer coverage is required (black petrels and flesh-footed shearwaters are absent in winter)

- 375 observer days are planned

**Secondary information to be collected**

- Information on the nature and extent of bottom longline interactions with seabirds, mammals, turtles and protected fish species.
- Audit of Protected Species Risk Management Plans and adherence to operational procedures.
- Information for snapper catch assessments.

**Related Research**

- Joint industry government initiatives around electronic monitoring.
- Research planned to model black petrel (and flesh-footed shearwater) capture rates as a function of multiple variables potentially affecting interactions with fisheries, including analysis of higher resolution spatial and temporal distributions (of both birds and vessels), and fleet variables such as vessel experience and mitigation.

### 2.1.2 “Offshore” Fisheries

As for previous years, planning of observer days was conducted jointly with FNZ to identify an overall amount of observer coverage which will meet both agencies goals. Costs were then apportioned to each agency on the basis of how much of the observers’ work in each fishery will be focused on Conservation Services. Typically, the CSP component is 15% of the total days, which reflects the time that observers are likely to spend on protected species tasks. For specific fisheries, such as scampi, southern blue whiting and squid trawl, this apportioning is increased to 20% to reflect an increased focus on protected species data collection due to specifically identified risks.

These fisheries have generally received higher levels of observer coverage compared to the fisheries discussed in 2.1.1, with coverage levels being dictated by a number of objectives from fisheries management requirements, protected species research and benthic interaction monitoring. For middle depth trawl fisheries, in order to better reflect the fact that vessels will target multiple species over a single trip, they have been divided on an area basis to both assist in addressing information needs and observer planning.

Planned days for 2020/21 are summarised in the table below. 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 in order to develop mitigation solutions.

As a result of PSA negotiated observer contracts, the costs of migratory species and deepwater observer days have been increased from \$585 to \$725, and from \$450 to \$590 respectively to reflect the increase in cost of delivering those days.

Summary of 2020/21 observer days planned in better known fisheries

Fishery	Stocks	Total Days	FNZ %	FNZ days	CSP %	CSP days
<b>Deepwater trawl fisheries:</b>						
North Island Deepwater	ORH1, ORH2A, ORH2B, ORH3A, BYX2, CDL2	87	90%	79	10%	9
Chatham Rise Deepwater	ORH3B, OEO3A, OEO4, BYX3	291	90%	262	10%	29
Sub-Antarctic Deepwater	ORH3B, OEO1, OEO6	87	90%	79	10%	9
West Coast NI Deepwater	ORH7A	70	90%	63	10%	7
<b>Pelagic trawl fisheries:</b>						
West Coast North Island	JMA7, EMA7, BAR7	50	85%	43	15%	8
<b>Middle Depth trawl fisheries:</b>						
West Coast South Island	HOK1, HAK7, LIN7, SWA1	200	85%	170	15%	30
Chatham Rise Middle Depth	HOK1, HAK1, HAK4, LIN3, LIN4, SWA3, SWA4, JMA3, BAR1, BAR4	961	85%	817	15%	144
Subantarctic Middle Depth	HOK1, SWA4, WWA5B, BAR5, JMA3, HAK1, LIN5, LIN6	763	85%	649	15%	114
Southern blue whiting	SBW6B, SBW6I	524	80%	419	20%	105
Squid	SQU1T, SQU6T	1863	80%	1490	20%	373
Hoki Cook Strait	HOK1	100	85%	85	15%	15
WCSI Hoki-Inside the line	HOK1	100	85%	85	15%	15
Scampi	SCI1, SCI2, SCI3, SCI4A, SCI5, SCI6B, SCI7, SCI8, SCI9, SCI6A	375	80%	300	20%	75
<b>Deepwater bottom longline fisheries:</b>						
Ling Bottom Longline	LIN2, LIN3, LIN4, LIN5, LIN6, LIN 7	300	85%	255	15%	45
<b>Surface longline fisheries:</b>						
Domestic SLL – North Island BIG/SWO	BIG1, SWO1	115	85%	97.8	15%	17.3
Domestic SLL – South Island BIG/SWO	BIG1, SWO1	20	85%	17.0	15%	3.0
Domestic tuna longline – North Island STN	STN1	155	85%	132	15%	23
Domestic tuna longline – South Island STN	STN1	140	85%	119	15%	21
<b>Purse seine:</b>						
Domestic purse seine	SKJ, JMA1, EMA1, PIL1	72	85%	61	15%	11
Domestic purse seine (super seiner)	SKJ	30	85%	26	15%	5

Further background to fisheries groupings and the allocation of observer days is provided in the following pages.

## PELAGIC AND MIDDLE DEPTH TRAWL FISHERIES

### Finfish

Pelagic and middle depth trawl fisheries primarily target hoki, hake, ling, warehou, jack mackerel and southern blue whiting. A large proportion of observer coverage in these fisheries will be targeted at Foreign Owned Vessels, and vessels that often target multiple species in the same trip. The rationale provided here is divided on a geographic and fishery basis to best identify CSP information needs:

#### *West Coast South Island*

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. Mitigation techniques employed include offal and discard management, and the use of bird scaring devices (legally required for larger vessels). This fleet has had observed interactions with a wide range of seabirds and, historically, has had high levels of fur seal interactions. 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 dynamic and bycatch profiles between the smaller and larger vessel fleets coverage levels have been specified separately for each.

#### *Cook Strait*

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. Trips are generally overnight with catch rates of hoki being high. This fishery has also been the site of 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. Mitigation techniques employed include offal and discard management, and the use of bird scaring devices (legally required for larger vessels). The fishery typically spans over observer years therefore coverage in the Cook Strait will be targeted at July and August 2019 and May and June 2020.

#### *Chatham Rise*

The Chatham Rise middle depth trawl fishery operates in a spatially distinct area to the other middle depth trawl fisheries, and so encounters a different assemblage of protected species. This fishery is operated exclusively by larger vessels. Observers record information on which mitigation techniques are employed in this fishery. Mitigation techniques employed include offal and discard management, and the use of bird scaring devices (legally required for larger vessels). Observer coverage for the period October to May will be spread across SEC and SOE. This coverage will be achieved under the 'Domestic Middle Depth trawl' lines identified in the preceding table.

### *Subantarctic*

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. 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.

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. Mitigation techniques employed in this fishery include 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.

### *West Coast North Island*

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. During the 2020/21 observer year coverage is planned to target the period October to December and April to June to coincide with key jack mackerel fishing periods.

### **Scampi**

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 if required. 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.

## **Squid6T**

Areas of CSP interest in this fishery include offal and discard management and captures of sea lions and seabirds in trawl nets. Observer placement in 2020/21 will be focussed to monitor interactions from January to May. The CSP Observer Programme will form 20% of days planned for the squid 6T fishery to monitor interactions with protected species and measures to reduce those interactions.

## **DEEP WATER BOTTOM TRAWL FISHERIES**

### **Orange Roughy and Oreo**

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 of corals will be taken for identification when required. 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. CSP will fund only 10% of observer days in this fishery due to the relatively low workload relating to protected species interactions.

## **SURFACE LONGLINE FISHERIES**

### ***Domestic surface longline***

Monitoring priorities for 2020/21 will include collecting information on protected species interactions, mitigation techniques and offal/discard management practices employed in the fishery. Coverage may also be utilised in relation to CSP mitigation projects relating to seabird bycatch mitigation and the auditing of the protected species risk management plans. Observer coverage will be in AKE, CEE, CHA, and KER to monitor interactions with seabirds and turtles. Coverage will be throughout the year.

## **BOTTOM LONGLINE FISHERIES**

### **Deep-sea ling**

Observer time will be focussed on monitoring and recording interactions with seabirds including captures and behaviour around the vessel. Observers record information on which mitigation techniques are employed in this fishery, including the use of tori lines and line weighting regimes. Observer coverage in 2020/21 will be focussed on smaller bottom longline vessels operating on the Chatham Rise to monitor seabird interactions during September, October, May, and June, though some coverage will be spread over all areas.

## **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. Specific information can be requested from CSP at any time and will be delivered within a reasonable timeframe (usually within 10 working days).
3. All seabirds are returned and/or photographed, where possible, for identification and autopsy (see project INT 2019-02: Identification of seabirds captured in NZ fisheries).

4. Data will be available for other DOC and FNZ projects including mitigation development/testing, bycatch estimation, risk management and other modelling projects.

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**Indicative Research Cost:** See Appendix 1 for details

**Cost Recovery:** F(CR) Item 8 (100% Industry). This project is observer coverage.

**Fish Stocks:** See Appendix 1 for details

*NOTE: This multi-year project (INT2019-02) was consulted on in 2019/20 and is included here for completeness.*

## **2.2 Identification of seabirds captured in New Zealand fisheries**

**Project Code:** INT2019-02

**Start Date:** 1 July 2019

**Completion Date:** 30 June 2022

**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 DNA analysis, 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).
5. 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 commercial fishing 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. Observers on commercial vessels are not always able to identify seabirds at sea with high precision and the assessment of the age-class, sex and provenance of captured individuals requires autopsy in the majority of cases. 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. In order to maximise cost efficiencies, and in recognition of increased observer coverage levels in the offshore Foreign Owned Vessel fleet, a new protocol has been 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). A new addition to this protocol is the collection of feather samples from bycaught seabirds to allow genetic determination of identification for difficult species groups.

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

Dead birds returned by government observers will be delivered, suitably packaged and labelled, to the contractor. 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;
- Molt 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.

Feather samples will be collected from bycaught seabirds and analysed to allow genetic determination of identification of specimens of difficult to identify species groups (e.g. wandering albatrosses).

### Specific objective 5

Where government observers recorded 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 Technical Working Group.
5. Provision of all data collected in electronic format, suitable for updating Fisheries New Zealand 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 2018.

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

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

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

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

*NOTE: This multi-year project (INT2019-04) was consulted on in 2019/20 and is included here for completeness.*

## **2.3 Identification and storage of cold-water coral bycatch specimens**

**Project Code:** INT2019-04

**Start Date:** 1 July 2019

**Completion Date:** 30 June 2022

**Guiding Objectives:** CSP Objectives B, C, E.

### **Project Objectives:**

1. Identify coral bycatch that cannot be identified by Fisheries Observers to the finest taxonomic level (assign codes to coral specimens to the species level wherever possible, when this is not possible; identify specimens to genus or family level).
2. Record all identified coral specimens and ensure storage in an appropriate taxonomic collection.
3. Update coral identification information for Fisheries Observers.

### **Rationale**

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 (previously known as Order Gorgonacea)); stony corals (all species in the order Scleractinia); and hydrocorals (all species in the family Stylasteridae). Identifying coral bycatch that is unable to be 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, benthic risk assessments and management of benthic marine protected species.

This project will improve the ability of observers to identify protected corals and so improve the quality of data collected. Observer briefings can continue and be formalised, and Observers can be informed about how the research data are used. This will improve their skills at identifying and collecting samples and bycatch data. Specialists can then confirm identifications to help understand distributions at a more detailed taxonomic level. This work will also feed into planned coral connectivity research, which will enable more robust assessment of areas at risk from fisheries impacts.

### **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), visiting international coral experts will refine the taxonomic identification even further. The updated taxonomic identification of the bycatch samples will then be shared with Fisheries New Zealand for them to update this information in the COD database.

Observer briefings, manuals, and training material will be revised based on outputs of this project in order to continue to improve the accuracy of at-sea identification.

### **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 for use in training government Fisheries Observers.

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

**Indicative Research Cost:** \$60,000 per annum

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

**Fish stocks:** BAR<sub>1, 5</sub>, BYX<sub>1, 2</sub>, HAK<sub>1</sub>, HOK<sub>1</sub>, JM<sub>3, 8</sub>, LIN<sub>1, 5, 6</sub>, ORH<sub>1, 2A, 2B, 3A, 3B</sub>, OEO<sub>4 6</sub>, SBW<sub>6A, 6R, 6I, 6B</sub>, SCI<sub>4A</sub>, SQU<sub>1T, 6T</sub>, SWA<sub>3, 4</sub>, WWA<sub>5B</sub>.

## 2.4 Identification of marine mammals, turtles and protected fish captured in New Zealand fisheries

**Project Code:** INT2020-02

**Start Date:** 1 July 2020

**Completion Date:** 30 June 2023

**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 INT2017-03 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 observers and where photographic analysis cannot adequately determine taxa, genetic analysis may be undertaken.

Funding will contribute to both expert identification and development of a web-based platform which allows for the pairing of imagery to metadata, which will then be made available to relevant experts.

## Outputs

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

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

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

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

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

### 3. Population Projects

*NOTE: This multi-year project (POP2018-03) was consulted on in 2018/19 and is included here for completeness.*

#### 3.1 New Zealand Sea Lion: Auckland Islands pup count

**Project code:** POP2018-03

**Start Date:** 1 July 2018

**Completion Date:** 30 June 2022

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

**Project Objectives:**

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

#### **Rationale**

New Zealand sea lions are classified as Nationally Critical (Baker et al. 2010) and are incidentally killed each year 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. 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 re-sighting of marked animals.

Since 2001 there has been a considerable decline in pup production at the Auckland Islands. 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 a number of key information gaps that currently 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 collected during previous years in order to determine the key demographic factors driving the observed population decline of New Zealand sea lions at the Auckland Islands. It 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).

The New Zealand sea lion Threat Management Plan sets in place a holistic range of research, monitoring and management actions for New Zealand sea lions both at the Mainland / Stewart Island and the sub-Antarctic Islands. This research project, funded through CSP, forms a component of that wider suite of work and is scoped to collect pup count information required to manage the impact of commercial fishing on the Auckland Islands population, in line with CSP Objective E. It is envisaged that other research, and/or management actions, progressed as part of the TMP, will be delivered alongside the research programme proposed here to provide logistical synergies.

#### **Research Approach**

Pup production at Dundas and Enderby Island has historically been estimated using a range of methods including aerial (Baker et al. 2013) and ground-based mark-recapture methods (Chilvers 2012; Childerhouse et al. 2013). For the purposes of the CSP in 2017/18 it is proposed that a ground-based pup count only be conducted, over a shorter field season than previously

undertaken. Depending on logistical constraints, pup production at Figure of 8 Island will be by direct count following established methods (Chilvers 2012; Childerhouse et al. 2013).

It is intended that other objectives such as re-sightings, disease monitoring, and pup survival estimations will be considered and potentially undertaken as part of the outputs of the New Zealand sea lion Threat Management Plan.

### Outputs

1. Data collected, in an electronic format suitable for upload into the New Zealand sea lion database.
2. New Zealand sea lion database updated and made available to relevant investigators. Any changes to the structure of the database must be fully documented.
3. A technical report (or reports) detailing the methods used, a summary of data collected and estimates of New Zealand sea lion pup production at the Auckland Islands.

**Note:** Maximum cost efficiencies will be achieved through aligned delivery with subantarctic projects, particularly in relation to transport logistics. Previous CSP projects on New Zealand sea lion population data collection include: POP2017-05, POP2016-07, POP2015-05, POP2014-01, POP2013-01, POP2012-01, POP2012-02, POP2011-01, POP2010-01, POP2007-01, POP2006-01, POP2005-01, POP2004-01, MAM2002-1, MAM2001-1 and MAM2000-1. See also POP2012-02.

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

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

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

**Fish Stocks:** SQU6T, SCI6A.

*NOTE: This multi-year project (POP2018-04) was consulted on in 2018/19 and is included here for completeness.*

### 3.2 Flesh-footed shearwater: Population Monitoring

**Project code:** POP2018-04

**Start Date:** 1 July 2018

**Completion Date:** 30 June 2021

**Guiding Objectives:** CSP Objectives E; CSP seabird plan 2017; National Plan of Action – Seabirds.

**Project Objectives:**

1. To estimate the current population size of flesh-footed shearwaters at Motumahanga Island, Taranaki.
2. To obtain updated estimates of the population size of flesh-footed shearwaters nesting at the Chicken Islands (Lady Alice, Whatupuke and Coppermine Islands).
3. To estimate key demographic parameters of flesh-footed shearwater at Lady Alice Island/Mauimua and Ohinau Islands.
4. To carry out simultaneous tracking of flesh-footed shearwaters at Lady Alice (Hauraki Gulf) and Ohinau Islands (Bay of Plenty) in one breeding season during the incubation and early chick rearing period.
5. To describe the breeding phenology, particularly egg-laying dates at two breeding sites to assess if inter-annual and site variation exists.

**Rationale**

The Conservation Services Programme Seabird medium term research plan 2017 (CSP seabird plan 2017) outlines a five-year research programme to deliver on the seabird population research component of CSP. It is targeted at addressing relevant CSP Objectives (as described in the CSP Strategic Statement) and National Plan of Action – Seabirds Objectives. This proposal delivers on recommendations arising from POP2015-02, which was implemented to address priority population estimate gaps and better estimate key demographic rates.

Population monitoring of flesh-footed shearwaters on Ohinau and Lady Alice Islands was carried out under CSP project POP2015-02. It was recommended that ongoing and repeated monitoring of both islands should continue so a more robust conclusion about the population trends of flesh-footed shearwaters in New Zealand can be made. It was recommended that recapture efforts need to be consistently large scale to provide a robust mark-recapture dataset and help determine survivorship. It was also found that the precise breeding phenology was not well understood, and the timing of past surveys relative to egg-laying can greatly influence population estimates. Further investigation of laying dates is thus proposed to ensure comparable and accurate monitoring can be achieved in future years (by assessing annual and site related variability in this parameter).

Previous research under project POP2015-02 did not include the breeding site at Motumahanga Island in Taranaki. Recent captures in the bottom longline fishery in this area has highlighted concern for this population, where the only population estimates date from the late 1980s.

Tracking of flesh-footed shearwaters in 2017-18 has shown that these birds can exhibit broad variability in foraging behaviour with birds tracked in 2018 travelling much further offshore than those tracked in 2017. A project to track birds from both a Hauraki Gulf colony (Lady Alice Island) and a Bay of Plenty colony (Ohinau Island) in the same breeding season will determine whether birds from these populations mix at sea during incubation and early chick rearing

periods. Also, this will help improve our understanding of fisheries risk by assessing the relative rates of inshore (<50km offshore) versus pelagic (>50km offshore) foraging trips.

### Research Approach

A survey of Motumahanga Island colony (near New Plymouth) is proposed for January 2019 to meet Objective 1. Obtaining a robust quantitative estimate for this site for the first time since 1989 will help inform management about any potential impacts from local fisheries to this population.

Quantitative surveys of flesh-footed shearwater burrows on each island in the Chickens island group will be conducted between 2018 and 2021, where possible using methods consistent with Baker et al. 2010 and Waugh et al 2013. Lady Alice/Mauimua Island will be surveyed in Dec 2018-Jan 2019, Whatupuke Island in January 2020 and Coppermine Island in January 2021. Occupancy rates will be determined for each site in a standardised period of early-mid January (during the mid-incubation period).

Waugh et al. (2014) and Crowe et al. (2017) provided advice on population monitoring required to estimate adult survival, juvenile survival, fecundity, and age of first reproduction of flesh-footed shearwaters. Objective 3 of this project will build on these recommendations, conducting further demographic mark-recapture field work at the established study sites at Lady Alice/Mauimua and Ohinau Island, and increasing the sample size of marked adults and chicks at these colonies. The data collected over three breeding seasons (2018/19, 2019/2020 and 2020/21) will provide improved knowledge of key demographic parameters including adult and juvenile survival and recruitment of juveniles back at study colonies.

Detailed data on the at-sea distribution and foraging behaviour of flesh-footed shearwaters was reported from Ohinau Island during late incubation and early chick rearing (Jan-Feb 2014) by Waugh et al. (2014), and from early chick rearing on Lady Alice/Mauimua Island in Feb 2017 (Kirk et al. 2017). Objective 4 of this project would expand on this past work by simultaneous GPS tracking of a sample of 25 birds per site at Lady Alice/Mauimua and Ohinau Islands in the first half of incubation (early Dec 2018 to mid-January 2019) and during chick-rearing (mid-February to mid-March 2019). This will look at overlap in foraging locations between sites and interannual differences in foraging distribution and behaviour.

Objective 5 will repeat the observations made in Dec 2016 on Ohinau Island of egg-laying dates in flesh-footed shearwaters (Bell et al. 2017) to assess inter-island and inter-annual variation in egg-laying activity. Study nests will be monitored on both Lady Alice/Mauimua and Ohinau Islands from 1-22 Dec 2018 to quantify egg-laying dates.

### Outputs

1. A technical report (or reports) detailing methods used and results found, including an updated population estimates for four islands, updated estimates of key demographic parameters (survival of marked birds and breeding pairs, occupancy rates, breeding success and the foraging distribution of Lady Alice and Ohinau breeding flesh-footed shearwaters.
2. Data obtained, including all banding records of adults and chicks, and spatial distribution data suitable for use in fisheries risk assessment.

### References

Baker, B., Hedley, G., Cunningham, R. 2010. Data collection of demographic, distributional and trophic information on the flesh-footed shearwater to allow estimation of effects of fishing on population viability: 2009-10 field season. Research Report for Ministry of Fisheries project PRO2006/01. Ministry of Fisheries, Wellington. 62 p.

- Bell, M.; Burgin, D.; Crowe, P.; Kirk, H. 2017. Timing and duration of egg-laying in flesh-footed shearwater (*Puffinus carneipes*) in New Zealand. *Notornis*. 64: 171-174.
- Crowe, P., Bell, M., Kirk, H. and Burgin, D. 2017. Flesh-footed shearwater population monitoring on Ohinau and Lady Alice Islands, 2016/17 report. Report prepared by Wildlife Management International Limited for New Zealand Department of Conservation, Wellington. 20 p.
- Kirk, H.; Crowe, P.; Bell, M. 2017. Foraging distribution and behaviour of flesh-footed shearwaters (*Puffinus carneipes*) breeding on Lady Alice Island – February 2017. Report prepared by Wildlife Management International Limited for the New Zealand Department of Conservation, Wellington. 24p.
- Richard, Y., Abraham, E.R. 2013. Risk of commercial fisheries to New Zealand seabird populations. New Zealand Aquatic Environment and Biodiversity Report No. 109. Ministry for Primary Industries, Wellington.
- Waugh, S.M., Jamieson, S.E., Stahl, J.C., Filippi, D.P., Taylor, G.A., and Booth, A. 2014. Final Report on Project POP2011-02 Flesh-footed Shearwaters-population study and foraging areas. Report prepared by the Museum of New Zealand, Te Papa Tongarewa for the New Zealand Department of Conservation, Wellington, 68 p.
- Waugh, S.M., Tennyson, A.J.D., Taylor, G.A. and Wilson, K-J. 2013. Population sizes of shearwaters (*Puffinus* spp.) breeding in New Zealand, with recommendations for monitoring. *Tuhinga* 24: 159-204.

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

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

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

**Fish Stocks:** BIG1, BNS 1, SNA 1, GUR8.

*NOTE: This multi-year project (POP2019-04) was consulted on in 2019/20 and is included here for completeness.*

### **3.3 Southern Buller's albatross: Snares/Tini Heke population project**

**Project code:** POP2019-04

**Start Date:** 1 July 2019

**Completion Date:** 30 June 2022

**Guiding Objectives:** CSP Objective E; CSP seabird plan 2017; National Plan of Action – Seabirds.

**Project Objective:**

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

**Rationale**

The Conservation Services Programme Seabird medium term research plan 2017 (CSP seabird plan 2017) outlines a five-year research programme to deliver on the seabird population research component of CSP. It is targeted at addressing relevant CSP Objectives (as described in the CSP Strategic Statement) and National Plan of Action – Seabirds Objectives. This proposal delivers priority research components of the CSP seabird plan 2017 involving the estimation of key demographic parameters of Southern Buller's albatross at the Snares. An established study site for Southern Buller's albatross, with substantial historic mark-resight effort, exists at the Snares (Sagar 2014), one of the most accessible subantarctic island groups. Information involving demographic parameters have been collected at the three study sites annually since 1992.

**Research Approach**

This project will continue the established mark-recapture monitoring methodology to further improve estimates of key demographic parameters, particularly adult survival which was noted as declining in the most recent data assessment by Sagar et al. (2017). Breeding success will also be quantified through the deployment of trail cameras. Several cameras will be placed on trees or stakes within colonies to include as many nests as practical in the field of view. Images will be recorded hourly during daylight hours. Similar cameras set up on Auckland Islands in 2018 obtained data on nesting productivity of white-capped albatross with up to 11 months of images stored on camera.

**Outputs**

1. A technical report providing methods used and results found, including an updated population estimate and updated estimates of key demographic parameters (survival of marked birds and breeding pairs, occupancy rates, and breeding success) of Southern Buller's albatross at the Snares.
2. Provision of all data collected (including all banding records of adults and chicks) in electronic format.

**References**

Sagar, P. 2014. Population studies of Southern Buller's albatrosses on The Snares. Research report prepared by NIWA, for DOC, MPI, and DWG.

Sagar, P., Thompson, D. & Scofield, P. 2017. Population Study of Southern Buller's Albatross on The Snares. Report prepared for the Deepwater Group Limited. 13p.

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

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

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

**Fish Stocks:** BAR1, BAR4, BAR5, BIG1, HOK1, LIN5, LIN7, SCI3, SCI6A, SQU1T, SQU6T, STN1, SWA4, WWA5B.

### 3.4 Auckland Islands seabird population research

**Project code:** POP2020-01

**Start Date:** 1 July 2020

**Completion Date:** 30 June 2021

**Guiding Objectives:** CSP Objective E; CSP seabird plan 2017; National Plan of Action – Seabirds.

**Project Objectives:**

Objective	Species	Target biological information
1	Gibson's albatross	A - Adult survival and other demographic parameters (Adams Island) B - Estimate of total population size
2	White-capped albatross	A - Adult survival and other demographic parameters (Disappointment Island) B - Population size of study colony

#### Rationale

The Conservation Services Programme Seabird medium term research plan 2017 (CSP seabird plan 2017) 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 NPOA – Seabirds Objectives. It was developed at the request of the CSP Research Advisory Group. Key components of research described in the CSP seabird plan 2017 for delivery in 2020/21 were identified and prioritised by the CSP RAG. This proposal covers prioritised components involving field work at the Auckland Islands, which have been developed to maximise cost and logistical efficiencies between components. Supporting rationale for all the components is summarised in the CSP seabird plan 2017.

#### Species specific objectives and research approach:

**Gibson's albatross** – the first objective (Objective 1A) is to continue the mark-recapture study on Adams Island (Auckland Islands) to collect information on key demographic parameters. This will follow established methods (Walker & Elliot 1999, 2005, Rexer-Huber et al. 2019).

The second objective is to estimate the total population size at the Auckland Islands (Objective 1B). The research approach will be based on recommendations from Elliott et al. (2016).

#### Outputs:

1. A report describing research undertaken to estimate the population size and trends for Gibson's albatross based on mark-recapture research completed.
2. Provision of all data collected (including all banding records of adults and chicks) in electronic format.

Previous CSP population projects on Gibson's albatross include POP2017-04, POP2016-02, POP2015-03, POP2014-02, POP2013-03, POP2012-07, POP2004-02 and BRD2001-01.

**White-capped albatross** – the key focus will be to collect band re-sighting data from a study colony established on Disappointment Island to contribute to the estimation of key demographic parameters including adult survival. Annual breeding success will be assessed using trail camera monitoring. Methods will follow those established during the establishment of the study colony (Rexer-Huber et al. 2018). (Objective 2A).

A secondary objective is to estimate population size of the study colony by an aerial photographic survey using a drone and ground truthing (Objective 2B).

In prioritising resources for this project, priority will be given to work under Objective 2A over work under Objective 2B.

**Outputs:**

1. A report describing research undertaken on population demographics and study colony size for white-capped albatross based on mark-recapture research completed.
2. Provision of all data collected (including all banding records of adults) in electronic format.

Previous CSP population projects on white-capped albatross include POP2017-04, POP2016-02, POP2015-03, POP2014-02, POP2013-02, POP2012-05 and POP2005-02.

**References**

Elliott, G., Walker, K., Parker, G., Rexer-Huber, K. 2016. Gibson's wandering albatross census and population study 2015/16. Report prepared for the New Zealand Department of Conservation, Wellington. 19p. Available for download from <http://www.doc.govt.nz/our-work/conservation-services-programme/csp-reports/2015-16/gibsons-wandering-albatross-survey-auckland-islands-2015-16/>

Rexer-Huber, K., Thompson, D.R., Parker, G.C. 2018. White-capped albatross mark-recapture study at Disappointment Island, Auckland Islands. Report to the Conservation Services Programme, Department of Conservation. Parker Conservation, Dunedin. 15 p.

Rexer-Huber K., Elliott G., Thompson D., Walker K., Parker G.C. 2019. Seabird populations, demography and tracking: Gibson’s albatross, white-capped albatross and white-chinned petrels in the Auckland Islands 2018–19. Final report to the Conservation Services Programme, Department of Conservation. Parker Conservation, Dunedin. 19 p.

Walker, K.; Elliott, G. 1999: Population changes and biology of the wandering albatross *Diomedea exulans gibsoni* at the Auckland Islands. *Emu* 99: 239-247.

Walker, K.; Elliott, G. 2006: At-sea distribution of Gibson’s and Antipodean wandering albatrosses, and relationships with long-line fisheries. *Notornis* 53 (3): 265-290.

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

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

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

**Fish Stocks:**

Objective/Species	Indicative Cost	Fish Stocks
1. Gibson’s albatross	\$80,000	ALB1, BIG1, STN1, SWO1
2. White-capped albatross	\$40,000	BAR5, 7 BIG1, HOK1, SCI6A, SQU1T, 6T, STN1, SWA4

### 3.5 Protected coral identification and awareness

**Project Code:** POP2020-02

**Start Date:** 1 July 2020

**Completion Date:** 30 June 2021

**Guiding Objectives:** CSP Objectives B, C; CSP Coral Plan.

**Project Objective:**

Update the coral identification guide for observers and fishers to accurately identify bycaught protected coral species at sea.

#### **Rationale**

The current CSP coral identification guide was last updated in 2014 and requires improvements for quick and accurate identification of bycaught protected coral species. Accurately identifying corals to the finest taxonomic level provides vital baseline information that can help to better inform research and marine protection such as predictive modelling, benthic risk assessments and management of benthic marine protected species. The identification guide will contain more information and imagery of species that are commonly misidentified or difficult to differentiate. The guide will also include information to increase the awareness of the importance and vulnerability of deep-water corals in New Zealand.

#### **Research approach**

This project will involve working with expert coral taxonomists to update the current coral identification guide to follow a similar design format to the other CSP identification guides (New Zealand seabirds, New Zealand coastal seabirds, New Zealand protected fish and reptiles). Current and previous coral identification projects (INT2019-04 and INT2015-03) will provide information around which species are commonly misidentified at sea and may require additional information to aid observers. The guide will be circulated during the development and design stages to allow stakeholder and end user feedback to inform the process.

To enhance the prior guide, information will be interspersed throughout the guide to enhance the understanding of the value of deep-water corals as a habitat and their vulnerability to fishing, for example, providing ages of some previously bycaught specimens, what species that live in conjunction with corals, what commercial fisheries corals are predominantly bycaught in as well as reproduction mechanisms. The guide will require translations to other languages to be utilised as a resource for foreign crew on New Zealand fishing vessels.

#### **Outputs**

1. A workshop report developed as a result of a workshop with stakeholders to provide feedback during the development phase.
2. Updated coral identification guide aligned with the design of other CSP identification guides.
3. Printed copies for distribution to end-users.
4. Design files, suitable for future updates.

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

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

**Cost Recovery:** N/A (100% Crown funded)

**Fish Stocks:** N/A

### 3.6 Basking shark habitat suitability modelling

**Project code:** POP2020-03

**Start Date:** 1 July 2020

**Completion Date:** 30 June 2021

**Guiding Objective:** CSP Objective E.

**Project Objective:**

To model basking shark distribution in New Zealand waters and identify environmental variables that may be driving changes in habitat use.

**Rationale**

The waters around central and southern New Zealand, extending east to the Louisville Ridge are the Southern Hemisphere's hot spot for basking shark (*Cetorhinus maximus*). Up until the late 1990s large aggregations were commonly seen in coastal waters off the east coast of the South Island, less frequently off Southland and the lower North Island, during summer. Since then sightings in coastal waters have dropped to almost zero with the last confirmed sighting being of a single basking in Tory Channel, Marlborough Sounds, in 2012 (C. Duffy unpublished data). Over the same period reported bycatch in mid-water trawl fisheries also fell to very low levels, although during the last two fishing years there have been clusters of bycatch events reported along the edge of the Southland shelf south and east of Snares Islands. Although it is not known if the disappearance of inshore aggregations and decline in bycatch is due to unsustainable incidental mortality of basking sharks, the very small estimated global effective population size (<100,000 individuals) and limited genetic differentiation of global stocks mean this a possibility.

**Research Approach**

This project will use existing data on observed and fisher-reported captures of basking sharks in commercial fisheries, miscellaneous observations of basking sharks (sightings, media reports, records in museum collections and the scientific literature, and beach cast specimens) and existing environmental data layers to model and map basking shark distribution within the Territorial Sea and Exclusive Economic Zone. This work will be used to identify environmental variables (e.g. sea surface temperature, chlorophyll-*a*) that may be driving seasonal and long-term changes in basking shark distribution.

**Outputs**

1. A technical report describing the methods used along with maps of the presence and predicted distribution of basking sharks in relation to commercial fishing effort.
2. Data on basking shark distribution in electronic format suitable for use in risk assessment.
3. Recommendations for any future research required to improve the estimation of risk to basking sharks from commercial fishing.

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

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

**Cost Recovery:** N/A (100% Crown funded)

**Fish Stocks:** N/A

### 3.7 Grey petrel population estimate – Antipodes Island

**Project code:** POP2020-04

**Start Date:** 1 July 2020

**Completion Date:** 30 June 2021

**Guiding Objectives:** CSP Objective E; CSP seabird plan 2017; National Plan of Action – Seabirds.

**Project Objective:**

To collate existing data and recommend a methodology to provide an updated population estimate and assessment of the population trend of grey petrels at Antipodes Island.

**Rationale**

The Conservation Services Programme Seabird medium term research plan 2017 (CSP seabird plan 2017) outlines a five-year research programme to deliver on the seabird population research component of CSP. It is targeted at addressing relevant CSP Objectives (as described in the CSP Strategic Statement) and National Plan of Action – Seabirds Objectives. This proposal delivers an initial step towards the research objective of updating the population estimate for grey petrels at Antipodes Island. The Antipodes Island population is by far the largest population globally for the species, and the trend in population size over time remains highly uncertain.

**Research Approach**

Previous research has included population estimates undertaken under contract to DOC CSP in the early 2000s (Bell 2002; Bell et al 2013) and under contract to the then Ministry of Fisheries in the early 2010s, which also included tracking of birds to describe their foraging range. Methods, data obtained and results from previous work is dispersed between published and grey literature. This project will collate and assess all previous work, including any unpublished data if available.

Recommendations for field work to provide an updated estimate of population size, and assessment of population trend, will be made in the context of previous surveys and best practice advice on survey methodology (Parker & Rexer-Huber 2015). It is envisaged that delivery of this field work component will form part of a future CSP Annual Plan.

**Outputs**

1. A report that collates existing data on the grey petrel population at Antipodes Island.
2. Recommendations on a methodology to resurvey the population in order to obtain an updated population estimate and assess population trend.

**References**

- Bell, E.A. 2002. Grey petrels (*Procellaria cinerea*) on Antipodes Island, New Zealand: research feasibility, April to June 2001. DOC Science Internal Series 60. Department of Conservation, Wellington. 31p.
- Bell, E.A., Bell, B.D., Sim, J.L., Imber, M.J. 2013. Notes on the distribution, behaviour and status of grey petrel (*Procellaria cinerea*) on Antipodes Island, New Zealand. *Notornis* 60 (4): 269-278.
- Parker, G. C., Rexer-Huber, K. 2015. Literature review of methods for estimating population size of burrowing petrels based on extrapolations from surveys. Research Report by Parker Conservation for Department of Conservation.

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

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

**Cost Recovery:** N/A (100% Crown funded)

**Fish Stocks:** N/A

### 3.8 Utilisation of the marine habitat of yellow-eyed penguins from Stewart Island/Rakiura

**Project code:** POP2020-05

**Start Date:** 1 July 2020

**Completion Date:** 30 June 2021

**Guiding Objectives:** CSP Objective E; CSP seabird plan 2017; National Plan of Action – Seabirds; Te Kaweka Takohaka mō te Hoiho<sup>7</sup>.

#### **Project Objective:**

Determining overlap of foraging ranges with, and assessing effects of, inshore fisheries on an endangered species in a region that may serve as mainland stronghold.

#### **Rationale**

The proposed project aligns with the Strategic Priorities Six “Ensure Bycatch does not threaten hoiho” and Seven “Protect and support marine habitats and ecosystems that nourish hoiho” of *Te Mahere Rima Tau / Five-year Action Plan* that supports *Te Kaweka Takohaka mō te Hoiho*.

This project is an extension/continuation of the CSP project POP2018-02 which mapped the habitat utilisation of yellow-eyed penguin/hoiho around the NZ mainland (North Otago to Southland).

Hoiho have been experiencing dramatic declines in numbers on the New Zealand mainland over the past years. A great variety of factors have been identified that contribute to the ongoing negative trend, ranging from ocean warming and fisheries interactions (bycatch, degradation of benthic habitat) to pollution, disease outbreaks and predation (primarily uncontrolled dogs).

On Stewart Island/Rakiura, especially the latter problems are virtually absent. Moreover, foraging conditions appear to be advantageous as birds do not have to travel far, resulting in very short foraging trips and rapid chick growth. It furthermore appears as if the penguins show an affinity for aquaculture operations where mussel farms may act as artificial reefs increasing prey availability. Overall, it appears as if Stewart Island/Rakiura – especially the island’s southern half – may represent a refugium for the species’ northern population. Hence, the island may be of great importance for the species, especially if the negative population trend on the mainland continues.

There is a considerable set netting effort around Stewart Island/Rakiura. Unlike around most of the mainland, there is no ban for inshore set netting and nets can be deployed very close inshore. This potentially renders set netting the single greatest threat for Yellow-eyed penguins/hoiho on Stewart Island/Rakiura. There is very little information about the utilisation of the marine habitat by yellow-eyed penguins/hoiho on Stewart Island/Rakiura that would allow robust assessment of the potential impacts of set net fisheries on the species.

#### **Research Approach**

Yellow-eyed penguin at-sea movements will be recorded using GPS dive loggers at key locations on Stewart Island/Rakiura during the breeding season (October-February) and – if feasible – during the pre-moult period (February-March). Moreover, camera loggers will be deployed to get a snapshot of the prey types the penguins target. Sites to be covered will range from the Anglem

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<sup>7</sup> Available to download from here:

<https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/birds/sea-and-shore/draft-te-kaweka-takohaka-mo-te-hoiho-2019.pdf>

coast (Rollers & Golden Beach) via the Patterson Inlet (Bravo Group) to Port Pegasus in the South.

Recorded GPS and dive data will be spatially analysed to map foraging hot spots and to determine core marine pathways used by the penguins to access their breeding colonies. This is particularly relevant on the open coast where this information can be used to inform set netting operations and minimize the risk of incidental bycatch.

The project will generate detailed distribution maps of penguins at sea, that help to identify sensitive regions where set netting activities may have the greatest impact on the species. It will furthermore establish baseline information about the ecology of yellow-eyed penguins/hoiho on Stewart Island/Rakiura that is vital for the development of conservation strategies and actions in a region that may prove vital for the species in the not so distant future.

### Outputs

1. GPS-tracking data of hoiho and data on prey types obtained during breeding and pre-moult periods. Tracking data will be archived in the online archive Movebank.
2. Monthly interim reports detailing the progress of the project will be made available online together with previous (2018-02) reports.
3. A final project report in a format suitable for DOC publication detailing methodology, results and recommendations.

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

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

**Cost Recovery:** N/A (100% Crown funded)

**Fish Stocks:** N/A

## 4. Mitigation Projects

*NOTE: This multi-year project (MIT2019-03) was consulted on in 2019/20 and is included here for completeness.*

### 4.1 Lighting adjustments to mitigate against deck strikes/vessel impacts

**Project code:** MIT2019-03

**Start Date:** 1 July 2019

**Completion Date:** 30 June 2021

**Guiding Objective:** CSP Objective D.

**Project Objective:**

To investigate if lighting adjustments (colour and strength) have the potential of reducing the occurrence of vessel impacts in commercial fishing.

#### Rationale

Artificial light at night (ALAN) has been identified as a contributing factor to fisheries interactions for petrel and shearwater species. It attracts birds toward vessels and can contribute to interactions when highly illuminated vessels move near seabird breeding islands. Light attraction disproportionately impacts fledglings, who haven't yet learned to avoid it. Lights on fishing vessels can cause deck-strike of species that aren't otherwise caught as bycatch, such as diving petrels and storm petrels. Birds can become injured when they strike the vessel, oiled by deck equipment, and die of exposure if not found and released. Vessel lighting at night is essential for safety on both recreational and commercial fishing vessels. Identifying which colours and intensities of light have the least impact on seabirds will assist in maintaining safety standards while minimising the impacts of light spill on seabirds, reducing the likelihood of them crashing on fishing (and other) vessels.

#### Research Approach

This project would involve an analysis of observer data on fishing vessel impacts at night and a land-based island trial (looking at the effects on birds of differing light colour and strength) in the Hauraki Gulf (potential sites being Hauturu or Mohikinau Islands) recording seabird activity by thermal imaging software. Following the outcomes of the first year, a vessel-based trial will be conducted.

#### Outputs

1. Review of literature on lighting impacts on seabirds and assessment of observed fishing vessel impacts in relation to lighting.
2. Report detailing the proposed methodology of land/sea-based testing.
3. An assessment of device efficacy and recommendations on potential improvements and future opportunities for development.

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

**Indicative Research Cost:** \$20,000 in first year, \$40,000 in second year

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

**Fish Stocks:** BAR<sub>1, 5</sub>, BIG<sub>1</sub>, BNS<sub>1</sub>, HAK<sub>1</sub>, HOK<sub>1</sub>, JDO<sub>1</sub>, JMA<sub>3, 7</sub>, LIN<sub>2, 4, 6</sub>, ORH<sub>1, 3</sub>, RBY<sub>1</sub>, SBW<sub>1, 6</sub>, SCH<sub>5</sub>, SCI<sub>1, 4A</sub>, SNA<sub>1</sub>, STN<sub>1, 8</sub>, SQU<sub>6T</sub>, SWA<sub>3, 4</sub>, TAR<sub>1, 5</sub>, TRE<sub>1</sub>, WAR<sub>3</sub>.

## 4.2 Hook-shielding use in the surface longline fishery

**Project code:** MIT2020-01

**Start Date:** 1 July 2020

**Completion Date:** 30 June 2022

**Guiding Objectives:** CSP Objective CSP Objective A; CSP seabird plan 2017; National Plan of Action – Seabirds.

**Project Objectives:**

1. Facilitate ongoing use of hook-shielding devices in the surface longline fishery
2. Assess the operational and bycatch reduction effectiveness of hook-shielding devices used in the surface longline fishery

### Rationale

Surface longline fisheries in New Zealand pose a bycatch risk to a range of seabird species, and implementation of highly effective mitigation has continued to be challenging (for example developing effective yet practical tori line designs for small vessels, and safety concerns regarding some line weighting options). Hook-shielding devices represent a new, stand-alone, mitigation option for hook setting in pelagic longlines, and is recognised globally as a best practice mitigation option. These devices physically protect the barb of the hook until it has sunk below the reach of seabirds. As a stand-alone method, it overcomes the difficulties encountered in deploying effective traditional mitigation options such as tori lines and line weighting. This project forms part of a Government supported roll-out of Hookpods, currently the only proven and available hook-shielding device, to the domestic surface longline fleet to address the bycatch risk posed during hook setting.

### Research Approach

DOC and Fisheries New Zealand have funded the provision of hook-shielding devices to surface longline operators to achieve best practice bycatch reduction. Operators receiving hook-shielding devices will provide data on their operational use, and observations will also be made by fishery liaison officers, observers and compliance officers. Replacement devices will be provided as part of this project to operators providing the required data on device loss or failure. This project will also collate and report on operational data provided by fishers, liaison officers, observers and compliance officers, and make a comparative assessment of bycatch and target fish capture rates between vessels using hook-shielding devices and those using other mitigation options. This analysis will be two-stage, initial data to November 2020 will be reported to inform project planning for 2021/22, and a more comprehensive analysis will be undertaken in late 2021 after a full year of operation.

### Outputs

1. Replacement hook-shielding devices provided to participating vessels.
2. Year one report providing an initial assessment of bycatch and target fish capture rates, and device practicality/durability, to inform year two of the project.
3. Final report on device uptake, device practicality/durability and a comparative analysis of bycatch and target fish capture rates.

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

**Indicative Research Cost:** \$110,000 in 2020-21, \$150,000 in 2021-22 (subject to review)

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

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

### 4.3 Protected Species Liaison Project

**Project Code:** MIT2020-02

**Start Date:** 1 July 2020

**Completion Date:** 30 June 2021

**Guiding Objectives:** CSP Objective A; CSP seabird plan 2017; National Plan of Action – Seabirds, National Plan of Action – Sharks.

**Project Objective:**

Grow liaison capacity across inshore fleets around the country including trawl, set net, bottom longline and surface longline fisheries.

**Rationale**

In order to effectively reduce the risk of interactions with protected species, it is important for vessel operators to use best practice mitigation and take all necessary steps, whether they are regulatory or non-regulatory, to avoid interactions. To achieve ongoing reductions in bycatch towards zero, there needs to be consistent use of the most effective mitigation measures currently available, while still encouraging continual improvement through innovation.

It is proposed through the Draft National Plan of Action – Seabirds 2020 that a suite of best practice mitigation standards will be implemented for each fishing method and will be reviewed annually by the Seabird Advisory Group. It is envisaged that the Liaison Project will play a central role in the implementation of these standards through the development of Protected Species Risk Management Plans (PSRMPs) on each vessel.

The purpose of the PSRMPs will change within this next phase, using best practice mitigation measures that the vessel will be implementing to demonstrate their achievement of the relevant mitigation standard, rather than just outlining the vessel's current practices. Auditing of these plans by MPI Fisheries Observers and compliance checks will then verify the steps that the vessel is taking to meet the mitigation measures outlined in the plan and highlight where there is still work to be done. PSRMPs will also cover mitigation actions to reduce or eliminate other protected species taxa (e.g. marine mammals), as relevant to the fishery.

Within the coming years the capacity of the program is expected to grow substantially in size to provide full outreach to all relevant inshore fisheries. The role of the liaison officers will largely remain the same, supporting and educating fishers in best practice mitigation and providing a vital interface between skippers, government, and researchers. The growth of the program will consist of additional Liaison Officers to expand into more fisheries and areas, increased contact with high risk vessels and fleets and development of training plans for crew on protected species and bycatch mitigation. The project will also expand the role of the liaison coordinator to ensure the operational oversight of the program and improve reporting.

Measuring success and constraints in reporting capability have been identified as improvements required in the rollout of this next phase of the project. This will be addressed through database development and standardisation of processes. There will also be increased engagement with quota holders to support the uptake of the plans and mitigation measures.

**Outputs**

1. Database of liaison activity, including PSRMPs developed and updated, vessels visited, trigger responses and mitigation materials and training provided.
2. Creation of a government working group involving DOC and multiple aspects of FNZ

(Fisheries Management, Compliance and The Observer Programme) to ensure feedback loops and work through challenges within the Liaison Programme.

3. Development of management responses to triggers.
4. Training plans for fishers on mitigation and handling procedures.
5. Quarterly reports back to relevant stakeholders (including industry and eNGO's) detailing progress and any developments which have come from each fleet.
6. Annual reporting will be provided as part of the proposed Seabirds – Annual Research Report.
7. Yearly review of progress and implementation will be conducted through both DOC's CSP Technical Working Group and the Seabird Advisory Group as part of the NPOA – Seabirds.

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

**Indicative Research Cost:** \$240,000 (Note: it is intended that additional Crown funds from the Biodiversity 2018 budget will also be used to grow liaison outreach into additional fisheries and provide more effort for high risk vessels in order to work towards zero bycatch).

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

**Fish stocks:**

Objective/Species	Indicative Cost	Fish Stocks
1. Surface Longline	\$60,000	ALB1, BIG1, STN1, SWO1
2. Bottom Longline	\$60,000	BIG1, BNS1, HPB1, SNA1
3. Inshore Trawl	\$60,000	BAR1, 7, FLA1, GUR1, JDO1, LIN1, 2, RCO3, SNA1, 2, TAR1, 2, 3, TRE1, 7
4. Setnet	\$60,000	SCH3, 5, SPO3, ELE3, 5, MOK3, SPD5

## 4.4 Mitigation gaps analysis towards reducing protected species bycatch

**Project code:** MIT2020-03

**Start Date:** 1 July 2020

**Completion Date:** 30 June 2021

**Guiding Objective:** CSP Objective A.

### **Project Objectives:**

1. To provide an assessment of the level of bycatch reduction that existing mitigation tools can achieve for protected marine species (i.e. seabirds, corals, marine mammals, fish, and reptiles).
2. To identify the most significant gaps in mitigation technology/practice that will need to be filled in order to achieve further reductions of protected species bycatch.

### **Rationale**

To achieve reduced protected species bycatch it is vital to understand what current mitigation techniques can deliver for protected marine species bycatch reduction and to identify the most significant gaps. This will help identify priorities for innovation and help in the development of innovation roadmaps.

Based on available information on the use of bycatch mitigation techniques across different fishing methods, information on the known effectiveness of these mitigation techniques and levels of residual bycatch (of protected marine species) across different fishing methods, the project will aim to assess the level of further bycatch reduction existing mitigation techniques could deliver if fully deployed across all relevant fisheries.

Based on this assessment, the gap analysis would develop a matrix looking at fishing methods and the bycatch reduction priorities for protected marine species (i.e. seabirds, corals, marine mammals, fish, and reptiles) and identify the largest gaps between what current mitigation techniques can deliver and where highest bycatch, or bycatch of most vulnerable protected species, occurs. The assessment and the gap analysis would then be peer reviewed by key stakeholders.

### **Research Approach**

The initial phase of this project will involve data compilation on fishing effort, use of mitigation options and effectiveness of mitigation options. At this stage expert opinion is likely to be required to consider uncertainties in the data collated (e.g. data on mitigation use and effectiveness of some mitigation options). This would then allow the completion of an initial quantitative or semi-quantitative assessment of the potential bycatch reduction from increased implementation of current mitigation options.

A workshop will be held bringing together research providers, fisheries managers and fishing industry representatives to review the assessment and identify and prioritise gaps in current mitigation techniques across fishery types.

### **Outputs**

1. An assessment of current mitigation use and potential for bycatch reduction through increased use of current mitigation options.
2. A gaps analysis workshop with key stakeholders.
3. Workshop report and recommendations on future areas of bycatch mitigation research.

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

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

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

**Fish Stocks:**

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

# Appendix 1: Cost Allocation Tables

## A: CSP 2020/21 Projects

Code	Project	Research	Admin	Total	CR Item	Industry %	Industry	Crown
<b>Interaction Projects</b>								
INT2019-02	Identification of seabirds captured in New Zealand Fisheries	\$100,000	\$12,207	\$112,207	4	100	\$112,207	\$0
INT2019-04	Identification and storage of cold-water coral bycatch specimens	\$60,000	\$7,324	\$67,324	4B	100	\$67,324	\$0
INT2020-01	Observing commercial fisheries	\$1,331,281	\$110,000	\$1,441,281	8	100	\$1,441,281	\$0
INT2020-02	Identification of marine mammals, turtles and protected fish captured in New Zealand fisheries	\$15,000	\$1,831	\$16,831	4	100	\$16,831	\$0
<b>Population Projects</b>								
POP2018-03	New Zealand sea lion: Auckland Island pup count	\$100,000	\$12,207	\$112,207	2	90	\$100,986	\$11,221
POP2018-04	Flesh-footed shearwater population monitoring	\$100,000	\$12,207	\$112,207	3	50	\$56,103	\$56,103
POP2019-04	Southern Buller's albatross: Snares/Tini Heke population project	\$40,000	\$4,883	\$44,883	3	50	\$22,441	\$22,441
POP2020-01	Auckland Islands seabird population research	\$120,000	\$14,648	\$134,648	3	50	\$67,324	\$67,324
POP2020-02	Protected coral identification and awareness	\$30,000	\$3,662	\$33,662	-	0	\$0	\$33,662
POP2020-03	Basking shark habitat suitability modelling	\$30,000	\$3,662	\$33,662	-	0	\$0	\$33,662
POP2020-04	Grey petrel population estimate - Antipodes Island	\$20,000	\$2,441	\$22,441	-	0	\$0	\$22,441
POP2020-05	Utilisation of the marine habitat of Yellow-eyed penguins from Stewart Island/Rakiura	\$30,000	\$3,662	\$33,662	-	0	\$0	\$33,662
	Additional Crown subantarctic island transportation cost <sup>8</sup>	\$60,000	-	-	-	0	\$0	\$60,000
<b>Mitigation Projects</b>								
MIT2019-03	Lighting adjustments to mitigate against deck strikes/vessel impacts	\$40,000	\$4,883	\$44,883	4	100	\$44,883	\$0
MIT2020-01	Hook-shielding use in the surface longline fishery	\$110,000	\$13,427	\$123,427	4	100	\$123,427	\$0
MIT2020-02	Protected species liaison project	\$240,000	\$29,296	\$269,296	4	100	\$269,296	\$0
MIT2020-03	Mitigation gaps analysis towards reducing protected species bycatch	\$30,000	\$3,662	\$33,662	4	100	\$33,662	\$0
<b>TOTAL</b>		<b>\$2,456,281</b>	<b>\$240,000</b>	<b>\$2,696,281</b>			<b>\$2,355,765</b>	<b>\$340,516</b>

<sup>8</sup> Additional Crown contribution towards transportation costs for projects taking place in the subantarctic above and beyond the project costs listed above.

## B: CSP Observer Allocation

Fishery	Stocks	Total Days	2020/21 levied	FNZ %	FNZ days	CSP %	CSP days	Cost Per day	CSP Research Cost
<b>Deepwater trawl fisheries:</b>									
North Island Deepwater	ORH1, ORH2A, ORH2B, ORH3A, BYX2, CDL2	87	87	90%	79	10%	9	\$590	\$5,310
Chatham Rise Deepwater	ORH3B, OEO3A, OEO4, BYX3	291	291	90%	262	10%	29	\$590	\$17,110
Sub-Antarctic Deepwater	ORH3B, OEO1, OEO6	87	87	90%	79	10%	9	\$590	\$5,310
West Coast NI Deepwater	ORH7A	70	70	90%	63	10%	7	\$590	\$4,130
<b>Pelagic trawl fisheries:</b>									
West Coast North Island	JMA7, EMA7, BAR7	50	50	85%	42.5	15%	7.5	\$590	\$4,425
<b>Middle Depth trawl fisheries:</b>									
West Coast South Island	HOK1, HAK7, LIN7, SWA1	200	200	85%	170	15%	30	\$590	\$17,700
Chatham Rise Middle Depth	HOK1, HAK1, HAK4, LIN3, LIN4, SWA3, SWA4, JMA3, BAR1, BAR4	961	961	85%	817	15%	144	\$590	\$84,960
Subantarctic Middle Depth	HOK1, SWA4, WWA5B, BAR5, JMA3, HAK1, LIN5, LIN6	763	763	85%	649	15%	114	\$590	\$67,260
Southern blue whiting	SBW6B, SBW6I	524	524	80%	419	20%	105	\$590	\$61,832
Squid	SQU1T, SQU6T	1863	1863	80%	1490	20%	373	\$590	\$219,834
Hoki Cook Strait	HOK1	100	100	85%	85	15%	15	\$590	\$8,850
WCSI Hoki-Inside the line	HOK1	100	100	85%	85	15%	15	\$590	\$8,850
Scampi	SCI1, SCI2, SCI3, SCI4A, SCI5, SCI6B, SCI7, SCI8, SCI9, SCI6A	375	375	80%	300	20%	75	\$590	\$44,250
<b>Deepwater bottom longline fisheries:</b>									
Ling Bottom Longline	LIN2, LIN3, LIN4, LIN5, LIN6, LIN 7	300	300	85%	255	15%	45	\$590	\$26,550
<b>Surface longline fisheries:</b>									
Domestic SLL - North Island BIG/SWO	BIG1, SWO1	115	115	85%	97.8	15%	17.3	\$725	\$12,506
Domestic SLL - South Island BIG/SWO	BIG1, SWO1	20	20	85%	17.0	15%	3.0	\$725	\$2,175
Domestic tuna longline - North Island STN	STN1	155	155	85%	132	15%	23	\$725	\$16,856
Domestic tuna longline - South Island STN	STN1	140	140	85%	119	15%	21	\$725	\$15,225

## B: CSP Observer Allocation (Continued)

Fishery	Stocks	Total Days	2020/21 levied	FNZ %	FNZ days	CSP %	CSP days	Cost Per day	CSP Research Cost
<b>Purse seine fisheries:</b>									
Domestic purse seine	SKJ, JMA1, EMA1, PIL1	72	72	85%	61	15%	11	\$725	\$7,830
Domestic purse seine (super seiner)	SKJ	30	30	85%	26	15%	5	\$725	\$3,263
<b>Inshore Fisheries</b>									
WCNI setnet, trawl, & BLL	BNS1, BNS8, HPB1, HPB8, JDO1, SCH1, SCH8, SPO1, SPO8, TRE7, SNA8, KAH8, TAR1, TAR8, GUR1, GUR8, WAR1, WAR8	230	115	0.5	58	0.5	58	1090	\$62,675
SNA1 trawl	SNA1	338	169	50%	85	50%	85	\$1,090	\$92,105
TAR2 trawl	TAR2	154	77	50%	39	50%	39	\$1,090	\$41,965
ECSI trawl	FLA3, GUR3, TAR3	633	317	50%	158	50%	158	\$1,090	\$172,493
SCSI trawl	FLA3, STA5	128	64	50%	32	50%	32	\$1,090	\$34,880
Bottom longline - North east NI (SNA)	SNA1	375	188	50%	94	50%	94	\$1,090	\$102,188
Bottom longline - BNS target (FMA1)	BNS1, HPB1	102	51	50%	26	50%	26	\$1,090	\$27,795
Set net - ECSI (Kaikoura & Otago)	TAR3, HPB3, SPO3, SCH3	417	209	50%	104	50%	104	\$1,090	\$113,633
Set net - SCSI	SCH5, SPO3, BUT5	181	91	50%	45	50%	45	\$1,090	\$49,323
<b>Total</b>									<b>\$1,331,281</b>

ECSI = East Coast South Island

SCSI = South Coast South Island

WCSI = West Coast South Island

WCNI = West Coast North Island