Fisheries New Zealand
Tini a Tangaroa

Deepwater Annual Review Report 2022/23

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Prepared by the Deepwater Team, Fisheries Management, Fisheries New Zealand

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Te Kāwanatanga o Aotearoa
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1. Introduction

This Deepwater Fisheries Annual Review Report (ARR) assesses progress against the fisheries management priorities and actions identified in the Deepwater Fisheries Annual Operational Plan (AOP) 2022/23. It also reports on the annual performance of New Zealand's deepwater fisheries during the 2022/23 fishing year in relation to environmental interactions and impacts.

1.1 Overview of New Zealand's commercial deepwater fisheries

New Zealand's commercial deepwater and middle-depth fisheries (deepwater fisheries) predominantly occur in offshore waters beyond the 12 nautical mile (NM) limit of the Territorial Sea out to the 200 NM limit of the Exclusive Economic Zone (EEZ). Total FOB[1] export revenues from deepwater fisheries during the 2023 calendar year exceeded $460 million.

The management of New Zealand's commercial deepwater fisheries is a collaborative arrangement between Fisheries New Zealand (FNZ) representing the Crown and its statutory obligations to the public, and the commercial fishing industry represented by the Deepwater Council (DWC).[2] This arrangement allows for the Management Objectives outlined in the 'National Fisheries Plan for Deepwater and Middle-depth Fisheries 2019' (National Deepwater Plan 2019) to be achieved by drawing on the combined knowledge, experience, capabilities and perspectives of both organisations.

Within the commercial deepwater fisheries portfolio, fish species have been ranked into three tiers, according to their commercial importance to guide management priorities (Table 1). Tier 1 species are high volume and/or high value fisheries and are usually targeted. They are important export revenue earners, which is reflected in the high quota value associated with these stocks. Tier 2 species are typically only target fisheries at certain times of the year and/or are important bycatch taken in fisheries targeting Tier 1 species. Tier 3 species are those caught as incidental bycatch that are not managed through the Quota Management System (QMS).

Table 1: Categorisation of commercial deepwater species by Tier.

Deepwater species[3]		
Tier 1 stocks	Hake: all stocks Hoki: all stocks Jack mackerel: JMA 3 & JMA 7 Ling: LIN 3 – LIN 7 Orange roughy: all stocks	Oreo: all stocks Southern blue whiting: all stocks Scampi: all stocks Squid: all stocks
Tier 2 stocks	Alfonsino: all stocks Black cardinalfish: all stocks Barracouta: BAR 4, BAR 5 & BAR 7 Blue (English) mackerel: EMA 3 & EMA 7 Dark ghost shark: GSH 4 – GSH 6 Deepwater crabs (KIC/GSC/CHC): all stocks Frostfish: FRO 3 – FRO 9 Gemfish: SKI 3 & SKI 7 Lookdown dory: all stocks Pale ghost shark: all stocks	Patagonian toothfish: all stocks Prawn killer: all stocks Redbait: all stocks Ribaldo: RIB 3 – RIB 8 Rubyfish: all stocks Sea perch: SPE 3 – SPE 7 Silver warehou: all stocks Spiny dogfish: SPD 4 & SPD 5 White warehou: all stocks
Tier 3 species	Non-QMS species	

[1] FOB - Free on board, which means the value of export goods, including raw material, processing, packaging, storage, and transportation up to the point where the goods are about to leave the country as exports. FOB does not include storage, export transport or insurance cost to get the goods to the export market. Export Stats - Seafood NZ

[2] Shareholders of DWC collectively hold over 90% of deepwater quota shares.

[3] For some species (e.g. ling and jack mackerel), management of some stocks falls under the National Deepwater Plan 2019, while the remainder are managed under the National Inshore Finfish Fisheries Plan.

1.2 National Deepwater Plan wider context and structure

The management of New Zealand's deepwater fisheries encompasses all deepwater target fish stocks, bycatch species and associated environmental impacts. Since 2010, New Zealand's deepwater fisheries management has been implemented through a number of iterations of the National Deepwater Plan. The National Deepwater Plan 2019 sits within a hierarchy of fundamental legislation including the Fisheries Act 1996 (the Act) and Te Tiriti o Waitangi obligations to Māori. The National Deepwater Plan 2019 consists of three parts (Figure 1).

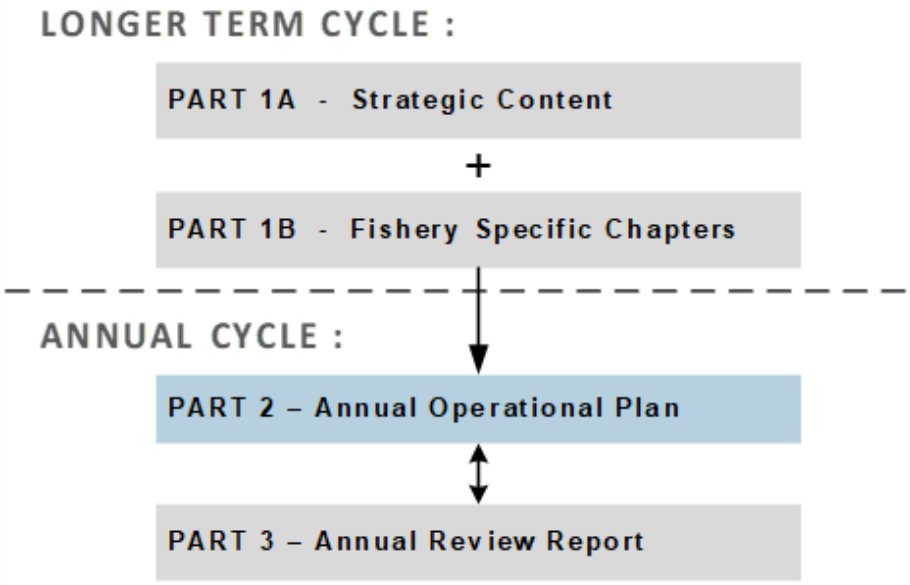

Figure 1: The three components of the National Deepwater Plan.

Part 1 establishes the enabling framework for the management of New Zealand's deepwater fisheries. Part 1 is further divided into two parts, Part 1A and Part 1B.

Part 1A of the National Deepwater Plan 2019 was approved by the Minister of Fisheries under section 11A of the Fisheries Act 1996. This means that it must be considered each time the Minister for Oceans and Fisheries makes decisions or recommendations concerning regulation or control of fishing or any sustainability measures relating to the stocks managed through this plan.

Part 1A details the overall strategic direction for New Zealand's deepwater fisheries. Specifically, it describes:

1. The strategic context and operating environment that fisheries plans are part of, including legislative requirements and government priorities;
2. Management objectives that will apply across all deepwater fisheries (Table 2); and
3. How the fisheries plan will be implemented, including the approach to engaging with stakeholders.

Table 2: Outcomes and Management Objectives of the National Deepwater Plan 2019

Use Outcome: Fisheries resources are used in a manner that provides greatest overall economic, social and cultural benefit.	
1	Ensure the deepwater and middle-depth fisheries resources are managed so as to provide for the needs of future generations
2	Ensure excellence in the management of New Zealand's deepwater and middle-depth fisheries so they are consistent with, or exceed, international best practice
3	Ensure effective management of the deepwater and middle-depth fisheries is achieved through the availability of appropriate, accurate and robust information
4	Ensure deepwater and middle-depth fish stocks and key bycatch fish stocks are managed to an agreed harvest strategy or reference points
Environment Outcome: The capacity and integrity of the aquatic environment, habitats and species are sustained at levels that provide for current and future use	
5	Ensure that maintenance of biological diversity of the aquatic environment and protection of habitats of particular significance for fisheries management are explicitly considered in management
6	Manage deepwater and middle-depth fisheries to avoid, remedy or mitigate the adverse effects of these fisheries on associated or dependent and incidentally caught fish species
7	Manage deepwater and middle-depth fisheries to avoid, remedy or mitigate the adverse effects of these fisheries on the benthic habitat
8	Manage deepwater and middle-depth fisheries to avoid, remedy or mitigate the adverse effects of these fisheries on the long-term viability of endangered, threatened and protected species populations
Governance Outcome: Sound governance arrangements that are well specified, transparent, and which support cost-effective and accountable decision-making	
9	Ensure the management of New Zealand's deepwater and middle-depth fisheries meets the Crown's obligations to Māori
10	Ensure there is consistency and certainty of management measures and processes in the deepwater and middle-depth fisheries
11	Ensure New Zealand's deepwater and middle-depth fisheries are transparently managed

Part 1B comprises the fishery-specific chapters of the National Deepwater Plan 2019, which include Fisheries Plans for each fishery. These Fisheries Plans provide management objectives at the fishery level, in line with the management objectives outlined in Part 1A. Fisheries Plans describe the operational objectives for target fisheries and the key bycatch species, and how performance against objectives will be assessed at the fishery level.

To date, fishery-specific chapters have been completed for the hoki, orange roughy, oreo, hake, ling, jack mackerel, and southern blue whiting fisheries.[4] Under the National Deepwater Plan 2019, fishery-specific chapters previously completed will be updated periodically.

Part 2 of the National Deepwater Plan 2019 consists of an Annual Operational Plan (AOP), which details the management priorities and actions that will be implemented on an annual basis for deepwater fisheries for each financial year. It also includes the required services, delivery mechanisms, and service prioritisation factors that will be considered each financial year.

[4] Fisheries-specific chapters are available at https://www.mpi.govt.nz/fishing-aquaculture/fisheries-management/deepwater-fisheries/

The AOP is primarily an internal planning and prioritisation document so will not be approved by the Minister for Oceans and Fisheries under section 11A.

Part 3 of the National Deepwater Plan 2019 is this ARR which is split into four sections:

- Section 1 provides an overview of New Zealand's deepwater fisheries and the context of the National Deepwater plan.
- Section 2 describes the progress that has been made during the 2022/23 financial year (1 July 2022 – 30 June 2023) towards delivering the management actions set out in the 2022/23 AOP. Achievement of these annual priorities contributes to meeting the high-level management objectives set out in Part 1A of the National Deepwater Plan 2019.
- Section 3 provides detail on delivery of fishery services relevant to Deepwater Fisheries Management that are planned by Financial Year. These processes include the planning and contracting of fisheries and conservation research projects, planning observer coverage on the deepwater fleet and the cost recovery regime.
- Section 4 provides a summary report of the combined environmental impacts of deepwater fishing activity, and the deepwater fleet's adherence to the suite of non-regulatory management measures in place during the 2022/23 October Fishing Year (1 October 2022 – 30 September 2023).

This ARR also contains several appendices:

- Appendix I summarises the commercial catch of deepwater stocks during the 2022/23 fishing year. Also included, where available, are observer coverage details, the deemed values invoiced, and export earnings during the 2023 calendar year.
- Appendix II summarises the results of the October 2023 sustainability rounds.
- Appendix III summarises fishing effort and bycatch in MSC certified stocks, and the relevant data used to review the certification.
- Appendix IV summarises cost recovery levies for deepwater stocks for the 2022/23 Financial Year.

2. Progress on management actions

2.1 Management actions delivered by Deepwater Fisheries Management

The 2022/23 AOP identified 16 management actions to progress delivery of the management objectives specified in Part 1A of the National Deepwater Plan 2019. Table 3 summarises progress relating to each of these management actions which are ranked in priority.

Table 3: Management actions to be delivered by Deepwater Fisheries Management during the 2022/23 financial year

1

Fisheries sustainability controls

Review catch limits and management settings as required

Deepwater sustainability decisions consist primarily of reviews to catch limits (TACs and TACCs) and deemed value rates across the fish stocks managed within the Deepwater Plan 2019. These are completed in two rounds, one for stocks managed with a fishing year beginning on 1 October and another for stocks with a fishing year beginning on 1 April. Most stocks for deemed value rate review will be identified through the Catch Balancing Review Process. The process is informed by the Commercial Catch Balancing Forum, which meets at least annually to discuss stocks that have met the criteria for review. Conversion factor reviews for specific species/product states will be consulted on.

Core actions[5]

Stocks undergoing assessment or characterisation to be considered for review:

- October 2023: JMA 7, SWA 3, SWA 4, LIN 7, HOK 1, ORH 3B, EM 7, BYX 2, BYX 3
- Review deemed value rates for deepwater stocks identified as meeting criteria for review.
- Review conversion factors as required.

Actions achieved

For the October 23 sustainability round, catch limits were reviewed and increased for silver warehou (SWA 3).

Catch limits were reviewed and decreased for orange roughy (ORH 3B) to give the following catch limits and allowances:

Stock	TAC	TACC	Increase/ decrease	Customary	Recreational	Other sources of fishing related mortality
SWA 3	4,040	4,000	↑	0	0	40
ORH 3B	4,995	4,752	↓	5	0	238

[5] 'Key actions' are major pieces of work, often tied to the AOP fishing year. 'Core actions' are usually undertaken every year (business as usual).

2	**Fisheries planning** Implement National Deepwater Plan (2019)
	Key actions • Ministerial approval of fisheries-specific plans for Ministerial sign off (scampi, southern blue whiting, and squid) **Core actions** • Compile and publish Annual Review Report for 2021/22, and • Develop and publish Annual Operational Plan for 2023/24
	Actions achieved • The fisheries-specific plans (SCI, SBW, SQU) were progressed but have not been signed off due to other priorities. • Annual Review Report for 2021/22 completed. • Annual Operational Plan 2023/24 completed.
3	**Ministerial services** Ensure timely completion of all Ministerial correspondence and communication requests assigned to the Deepwater Team
	Core actions • Provide quality advice and information to the Minister for Oceans and Fisheries • Respond to all Official Information Act requests and government correspondence regarding deepwater fisheries issues in a timely manner.
	Actions achieved During the 2022/23 financial year, the Deepwater Fisheries Management team completed: • 2 Ministerial Aide Memoires; • 13 Ministerial Briefing Papers; • 13 Ministerial responses; and • 8 Written Parliamentary Questions. • Since 2014, MPI's Official Information Act (OIA) Team has had responsibility for drafting responses to OIA requests. In 2022/23, the Deepwater Team contributed to the completion of OIA requests as subject matter experts, providing advice and appropriate review of information.
4	**Engagement** Engage with tangata whenua and stakeholders in the management of deepwater fisheries
	Engagement with tangata whenua and stakeholders is an integral part of fisheries management. Engagement aims to ensure that deepwater fisheries management information is available and accessible for all stakeholders to enable an informed contribution to decision making. Providing opportunity for input and participation in the deepwater fisheries planning process and the ongoing management of deepwater fisheries for tangata whenua, is a key objective of engagement.
	Core actions • Ensure that all management information, such as Fisheries Plans and Consultation Documents, are available on Fisheries New Zealand's website; • Engage with Treaty partner representatives such as Te Ohu Kaimoana and industry and eNGO stakeholders through biannual Fish Plan Advisory Group meetings (FPAG); and • Provide for input and participation through Iwi Fisheries Forums.

	Actions achieved • All sustainability round consultation papers and decision documents were uploaded to the FNZ website; • FPAG meetings were held in December 2022 and June 2023; • Information on fish stocks under consideration for the October 2022 sustainability round were provided to IFFs; and • Engaged with Mai Paritu tae atu ki Turakirae Fisheries Forum to incorporate iwi perspectives into the draft NPOA-Sharks (2024)
5	**Protected species frameworks** National Plan of Action (NPOA) Seabirds (2020)
	This Management Action outlines the priority work areas for deepwater fisheries to implement the NPOA Seabirds (2020).
	Core actions • Ongoing management of the Protected Species Risk Management Plan (PSRMP) process as it applies to trawlers >28m, scampi trawlers <28m, hoki trawlers <28m, and ling bottom longline vessels • Auditing PSRMPs against Mitigation Standards • Continue to improve and manage the process that applies to the ling bottom longline operational procedures for any vessel for which a PSRMP has not yet been developed • Investigate and implement any additional practicable and effective measures to minimise the risk of net captures, based on the outcomes of the contracted project characterising trawl net captures and potential contributing factors
	Achieved • The Deepwater Team provided 143 PSRMP audits to the DWC Environmental Liaison Officer for review during 2022/23 • PSRMPs for the deepwater fleet were audited against Mitigation Standards as part of the Mitigation Standards review process • DWC presented a paper to ACAP summarising the results of the net capture programme. Minimising the 'pooling area' (the area encompassed by the headline to the end of the wings) in the last moments of hauling appeared to be the most plausible means of reducing internal net captures.
6	**Protected species frameworks: New Zealand sea lion** Work collaboratively with the Department of Conservation on implementation and review of the New Zealand sea lion/rāpoka Threat Management Plan 2017-2022
	The New Zealand sea lion/rāpoka Threat Management Plan 2017-2022 (Threat Management Plan) prioritises management actions to enable the recovery of the sea lion population.
	Key actions • Complete review of the Sea Lion Threat Management Plan with DOC in 2022/23. • Engage with key stakeholders at meetings of both the Sea Lion Threat Management Plan Forum and Advisory Groups in 2022/23.
	Actions achieved • Regular meetings were held with DOC to progress the review of the New Zealand sea lion Threat Management Plan. • The Deepwater Team participated in the New Zealand sea lion forums held on 27 September 2022 at Ōtākou Marae and 8 August 2023 at Puketeraki Marae and helped to facilitate stakeholder sessions at the hui. • Stakeholders were provided with an update on commercial fishing interactions with sea lions in the previous year.

7	**Protected Species Framework: Benthic Interactions:** Work collaboratively with the Department of Conservation to monitor and measure the nature and extent of benthic interactions with deepwater fishing activity
	Key actions • Support the development of potential management actions to mitigate any adverse effects on benthic biodiversity from fishing. • Contribute to development of publicly available trawl footprint information. • Establish and support a forum to design options for managing the benthic effects of bottom trawling in New Zealand's EEZ. **Core actions** • Report extent of new areas trawled, and the volume/species (where possible) of benthic bycatch.
	Actions achieved • The "Managing the Effects of Bottom Trawling in the EEZ" Forum concluded in December 2022 when both Industry and eNGO members provided separate recommendations to FNZ and DOC. These recommendations were subsequently provided to the Minister for Oceans and Fisheries and the Minister of Conservation in June 2023.
8	**National Plan of Action framework: Sharks**
	The draft NPOA-Sharks 2024 sets out goals, accompanying objectives and performance measures, to support the management of sharks. This Management Action is focused on addressing concerns for at-risk species identified in the risk assessments as well as sustainable utilisation of sharks taken by commercial fishers.
	Key actions • Analyse submissions and prepare advice for Ministerial approval of the updated NPOA-Sharks. **Core actions** • Monitor and respond to captures of protected sharks; and • Ensure that the management of sharks in New Zealand is consistent with the CMS Sharks MOU and other international management instruments.
	Actions achieved • Submissions were analysed and advice prepared for Ministerial approval of the updated NPOA-Sharks (2024) • Liaison with Compliance and Observer team was undertaken to understand protected and non-protected shark captures • All captures of protected sharks by deepwater vessels were reported to DOC in a timely manner.
9	**Deepwater monitoring** Deepwater observer coverage/sampling requirements
	Observer coverage of deepwater fisheries is planned by financial year. Planning is based on biological sampling requirements, international requirements, percentage-level coverage targets and observer programme capacity. Coverage is monitored throughout the year to ensure information is available to support stock assessments and to understand interactions with protected species.

	Core actions • Work with the observer programme to ensure that observers are informed of biological sampling targets and other requirements • Debrief observers after trips if required • Monitor percent coverage levels to ensure adequate and representative coverage is achieved and • Develop the observer coverage plan for the 2023/24 financial year by reviewing and updating sampling targets.
	Actions achieved • All core actions achieved • Observer coverage plan developed for the 2023/24 financial year • Deepwater team has regular engagement with Observer team to track progress
10	**Deepwater monitoring** Monitor the deepwater fleet adherence to the range of measures in place to manage the effects of fishing activity on protected species and sharks
	A range of management measures (including DWC non-regulatory initiatives) are employed to reduce the risk of adverse effects on protected species. Measures are described in the following Operational Procedures or Plans: • Marine Mammal Operational Procedure (DWC initiative); • Protected Species Risk Management Plans (trawl and bottom longline) and Vessel Management Plans (VMPs) – seabirds (DWC and DOC liaison programmes); • Ling Operational Procedures (bottom longline) – seabirds (DWC initiative); • Deepwater Trawl Benthic Operational Procedure (DWC initiative); • Shark Operational Procedure (DWC initiative); • Scampi Fisheries Operational Procedure – seabirds and marine mammals (DWC initiative); and • SQU 6T and SBW 6I Operational Plans - sea lions.
	Core actions • Audit Protected Species Risk Management Plans against the Mitigation Standards developed to support implementation of the NPOA Seabirds (2020); • Monitor and report adherence of the deepwater fleet to non-regulatory management measures; and • Monitor protected species interactions, notify DWC of trigger points, and report in ARR.
	Actions achieved • All core actions achieved • DWC's environmental liaison officers (ELOs) notified when triggers occurred; • Protected species interactions reported on the MPI website here • PSRMPs for the deepwater fleet were audited against Mitigation Standards as part of the Mitigation Standards review process
11	**Deepwater monitoring** Monitor adherence to non-regulatory measures in place to manage Tier 1 deepwater fish stocks at a sub-QMA scale.

	In conjunction with DWC, FNZ has implemented a series of non-regulatory sub-area catch limits in the hoki, orange roughy, and oreo fisheries. In addition, Hoki Management Areas (HMAs) have been developed by industry to reduce fishing mortality of juvenile hoki in important nursery areas. Measures are described in the following Operational Procedures: • Reporting Operational Procedures; • Orange Roughy & Oreo Operational Procedures; and • Hoki Operational Procedures
	Core actions • Audit and report adherence to sub-QMA catch limits • Consider additional management where sub-QMA catch limits are exceeded • Audit and report adherence to HMA management measures.
	Actions achieved • Adherence to the HMA management measures was audited quarterly and reported to DWC.
12	**Deepwater research planning**
	The research required to manage deepwater fisheries is detailed in the Medium-Term Research Plan for Deepwater Fisheries. Some research is contracted on an annual basis, while other research, such as trawl surveys, are contracted via multi-year contracts
	Core actions • Finalise and agree the draft Deepwater Fisheries Research Programme for delivery during the 2023/24 Financial Year (including any proposals for industry-led research) before December 2022; • Update the Medium-Term Research Plan; and • Support delivery of 2022/23 research for deepwater fisheries.
	Actions achieved • The Deepwater Fisheries Research Programme for delivery during the 2023/24 Financial Year was finalised; and • Delivery of 2022/23 research for deepwater fisheries was supported.
13	**Fisheries management controls:** Regulatory amendments
	Progressing amendments to secondary legislation, such as regulation, includes: analysis of options, drafting the Preliminary Impact and Risk Assessment (PIRA), consultation documents, Regulatory Impact Statement (RIS), and decision documents.
	Key actions • Coordinate final advice, drafting and implementation of the technical regulation package. **Core action** • Progress any other legislative amendments as required
	Actions achieved • The first tranche of the technical regulation package was approved by the Cabinet Legislation Committee in September 2023, and most changes came into force in October 2023. • An advice paper for most of the remaining components of the technical regulation package was provided to the Minister in April 2023.

14	**Fisheries management/sustainability controls** Support existing approaches to market initiatives for New Zealand's deepwater seafood. Work with DWC to support the requirements of the Marine Stewardship Council (MSC) assessment and certification processes. FNZ supports industry initiatives to achieve and maintain certification of key deepwater fisheries through the provision of fisheries data and expertise
	Core actions • Provide information for annual surveillance audits of ORH, SBW, LIN bottom longline, and the HOK, HAK and LIN trawl complex. • Commence the reassessment process for the HAK/HOK/LIN/SBW fisheries. The 5-year MSC certification period expires at the end of February 2024
	Actions achieved • Information was provided for the annual surveillance audits of ORH, SBW, LIN bottom longline, and the HOK, HAK and LIN trawl complex. • The reassessment process for the HAK/HOK/LIN/SBW fisheries was begun.
15	**Fisheries sustainability controls** Develop and implement specific harvest strategies for Tier 1 species, and management approaches for low information stocks, that enable deepwater and middle-depth fisheries to be economically viable over the long-term
	A Harvest Strategy defines a management target, soft and hard limits, a rebuild strategy, and a harvest control rule for a stock. Often in developing a Harvest Strategy, a Management Strategy Evaluation (MSE) will be undertaken which assesses a range of different management strategies, including those that incorporate economic aspects of the fishery.
	Core action • Support development of MSEs and reviews of existing MSEs for deepwater species
	Actions achieved • The HCR for SBW6B was updated in 2023.
16	**Digital monitoring** The current digital monitoring framework for the deepwater fleet comprises: • ER - electronic reporting of catch, effort, protected species captures, and landing information; and • GPR - electronic position reporting. Funding is in place for the wider roll out of on-board cameras for up to 250 inshore commercial fishing vessels by 2025. Some inshore vessels periodically target deepwater fish stocks
	Core actions • Implement changes to Electronic Reporting Circulars as required; • Contribute to post implementation assessment of ER and GPR; • Contribute to monitoring and reviewing the data quality standards and specifications process; • Utilise geospatial position reporting and electronic catch reporting to aid management; and • Work with vessel operators to ensure all geospatial position reporting and electronic catch reporting requirements are well understood and implemented consistently.

	Actions achieved • The amended versions of the electronic reporting circulars issued in 2023 did not contain any changes of particular relevance to deepwater vessels. • The rollout of onboard cameras began in late 2023. The first group of vessels did not contain any of the deepwater fleet.

2.2 Management actions delivered in conjunction with other directorates within FNZ and MPI

Table 4: Management actions led by other teams within Fisheries New Zealand and within MPI

A	**Input to wider strategic MPI projects** Assist relevant branches within MPI with policy development and provide necessary fisheries management information LEAD: Project dependent (see below)
	MPI's Policy and Trade branch is leading the Fisheries System Reform which is a programme of work to strengthen, and modernise, the way we manage fisheries and ensure the sustainability of New Zealand's fisheries. Fisheries System Reform is focussed on changing fishing rules and policies to make them simpler, fairer, and more responsive, while also incentivising better fishing practices
	Key actions • Contribute to the process for progressing the Fisheries Amendment Bill and Primary Industries Regulatory Systems Amendment Bill
	Actions achieved • Contributed to work informing relevant parts of the Fisheries Amendment Act 2022
B	**Research monitoring and evaluation:** Ensure that all information used in management decisions meets the requirements of the Research and Science Information Standard for New Zealand Fisheries (the Research Standard) **LEAD**: Fisheries Science (Stock Assessment and Aquatic Environment)
	The Deepwater Team will continue to be closely involved in the monitoring and evaluation of research projects that relate to deepwater fisheries.
	Core actions • Assist the Fisheries Science team to deliver outputs of all 2022/23 research projects; and • Assist Fisheries Science to ensure that all science research used to support management of deepwater fisheries is assessed against the Research Standard.
	Actions achieved • The Deepwater team assisted the Fisheries Science team to deliver outputs of 2022/23 research projects as and when required; and • The Deepwater team assisted Fisheries Science to ensure that all science research used to support management of deepwater fisheries was assessed against the Research Standard in 2022/23.
C	**Observer coverage delivery** LEAD: Fisheries Monitoring (Observer Programme)

	Core actions • Ensure that the Observer Programme is adequately informed of the biological sampling targets and other observer requirements for 2022/23; • Provide training to observer recruits as part of the intake process to highlight the importance of and provide context to the work they will be conducting; • Engage with, and provide feedback to, observers through the observer newsletter and observer catch up sessions; and • Monitor effort coverage and liaise with observer programme on observer deployment throughout the year
	Actions achieved • Deepwater team work with science team to provide Observer Programme with biological sampling targets; • Deepwater team provided training to new Observers, where required; and • Deepwater team met periodically with Observer team to provide feedback
D	**Cost Recovery Process** LEAD: Corporate Services (Cost Recovery)
	Core actions • Ensure the cost recovery levy process recovers costs consistent with deepwater observer coverage and research plans, including providing information to support the levy order and 'Unders and Overs' process.
	Actions achieved • The deepwater team supported other teams including science and the observer programme as part of the 2023/24 levy setting process
E	**Compliance monitoring work** LEAD: Compliance Directorate (Fisheries New Zealand)
	Core actions • The Fisheries Management Deepwater Team will be involved in discussions with Compliance relating to the priorities for the future monitoring of deepwater fisheries; and at-sea and in-port inspections; and • Fisheries Compliance will maintain an investigative response capability for investigating identified breaches; and will advise Fisheries Management of any systemic issues that arise from investigations.
	Actions achieved • Discussed compliance activity related to meeting NPOA-Sharks objectives • The annual FNZ / vessel operators group meeting, held in June 2023, included a presentation from Fisheries Compliance that addressed topics of relevance to the deepwater fleet.
F	**Aquaculture & Fisheries Permits** LEAD: Verification and Operations Directorate (Aquaculture and Fisheries Permitting)
	Core actions The Fisheries Management Deepwater Team provides: • Advice on registration of Foreign Owned Fishing Vessels (FOVs); • Input into High Seas Permit applications; and • Input into annual tenders of Crown-held ACE.

	Actions achieved • Advice was provided for the registration of nine FOVs; • Input was provided for the 15 high seas fishing permit applications received from 1 July 2022 to 30 June 2023; and • Input was provided for the annual tender of Crown-held ACE for scampi stocks

2.3 Management actions initiated by industry

Management Actions that the Deepwater Fisheries Management team contributed towards delivery of, but that were initiated by industry, are summarised below.

Table 5: Summary of progress on industry-initiated management actions during the 2022/23 financial year.

1	**Core actions** • Respond to quota owner requests for changes to QMA boundaries or definitions • Respond to applications for vessel specific conversion factors • Support development of new fisheries within sustainable limits • Respond to any requests for special permits that relate to deepwater fisheries • Respond to any requests to use innovative trawl gear
	During the 2022/23 financial year: • There were no quota owner requests for changes to QMA boundaries or definitions • Three updated vessel specific conversion factor certificates were issued. • No applications for vessel specific conversion factor certificates were received • No requests for special permits were received • No requests to modify existing conditions for innovative trawl gear were received

2.4 Implementation of the National Plan of Action – Seabirds (2020)

The NPOA-Seabirds (2020) describes objectives to guide management of interactions with seabirds in New Zealand fisheries. This ARR reports on the prioritised actions and services needed to meet these objectives for deepwater fisheries as set out in the 2022/23 AOP.

2.4.1 Capture rate reduction targets

Capture rate reduction targets provide a gauge against which the Practical Objective of the NPOA-Seabirds (2020) can be measured. There are two performance measures under Objective 1 of the 'avoiding bycatch' goal that relate to capture rate reduction targets. There are challenges involved in setting statistically robust targets. To ensure capture rate reduction targets are set that are both appropriate and meaningful, a seabird workshop took place in the first half of the 2020/21 financial year. Meaningful targets were unable to be set because the observer capture estimates were not available at the time. In the interim, targets and proxy targets developed in 2015 under the previous NPOA seabirds continue to be used.

Table 6 sets out the deepwater capture rate reduction targets and proxy targets along with three-year averages (based on the 2020/21 to 2022/23 fishing years[6]) of observer coverage and estimated capture rates for deepwater fisheries groupings. Table 5 also shows progress against capture rate reduction and proxy targets, however the statistical analysis required to determine whether changes in estimated seabird capture rates are significant has yet to be completed.

[6] The estimated capture rate data used for the 2021/22 and 2022/23 fishing years is derived from observer data. Information from the Protected Species Capture website was not available at the time this report was compiled. The equivalent data for all other years comes from the Protected Species Capture website.

Table 6: Deepwater capture rate reduction targets and three-year averages of observer coverage and estimated seabird capture rate

Fishery	Targets				Three-year average (20/21-22/23)		Progress against target/proxy
	Suggested target/proxy (from 2015)	Baseline capture rate (per 100 tows/1000 hooks)[7]	'Target' rate/100 tows (reduction)	Meaningful target?	Observer coverage 22/23 (%)	Estimated capture rate (per 100 tows/1000 hooks)	
SBW trawl	Continue to monitor and report, target is no significant increase (based on 3-yr rolling averages)	1.72	-	No	100%	0.38	Declining trend in estimated capture rate
SQU trawl (> 28 m)	Statistically significant decrease in rate (based on 3-yr rolling average)	13.46	12.0 (14%)	Yes	88%	6.23	Estimated capture rate target met based on 20/21 to 22/23 three year rolling average
JMA trawl (> 28 m)	Continue to monitor and report, target is no significant increase (based on 3-yr rolling averages)	0.82	-	No	70%	0.14	Declining trend in estimated capture rate
SCI trawl	Observer coverage considered insufficient to provide a robust baseline. Proxy target is to have VMPs in place on all vessels, ELO to visit all scampi vessels, and a target of 15% observer coverage be set	2.85	-	No	15%	1.52	Observer coverage met target during 22/23
Deepwater trawl[8]	Continue to monitor and report, target is no significant increase (based on 3-yr rolling averages)	0.43	-	No	37%	0.27	Declining trend in estimated capture rate

[7] The baseline captures presented in this table for SBW, JMA and deepwater trawl fisheries have been recalculated from those presented in earlier ARRs based on updated estimates. The baseline period remains the same (the 2010/11 to 2012/13 fishing years)

[8] Deepwater trawl includes orange roughy and oreo species.

Fishery	Targets				Three-year average (20/21-22/23)		Progress against target/proxy
	Suggested target/proxy (from 2015)	Baseline capture rate (per 100 tows/1000 hooks)[7]	'Target' rate/100 tows (reduction)	Meaningful target?	Observer coverage 22/23 (%)	Estimated capture rate (per 100 tows/1000 hooks)	
Middle-depth trawl (>28 m)[9]	Statistically significant decrease in rate (based on 3-yr rolling averages)	3.22	2.3 (29%)	Yes	51%	2.02	Estimated capture rate target met based on 20/21 to 22/23 three year rolling average
Large vessel BLL (>28 m)	Continue to monitor and report, target is no significant increase (based on 3-yr rolling averages)	0.02		No	0%	0.01	Estimated capture rate declining
Small vessel LIN BLL (<28 m)	Work with industry to implement vessel-specific seabird management plans including the use of best practice mitigation across this fleet. Liaison officers will also provide seabird training sessions to crew. Observer coverage target of 15% of effort to be set.	-	-	No	5%	Not available	Low observer coverage during 2022/23. This fleet is scheduled to have cameras installed during 2024

[9] Middle-depth trawl includes trawl effort for all species other than those with specific categories. This includes hoki, hake, ling, and a number of Tier 2 species.

2.4.2 Deepwater management approach - seabirds

In deepwater fisheries, seabird interactions are avoided or mitigated by:

- mandatory use of seabird scaring devices and implementation of seabird mitigation measures;[10]
- implementation of best practice seabird mitigation measures through Protected Species Risk Management Plans (PSRMPs) and Operational Procedures;
- an annual crew training and vessel outreach programme;
- ongoing exploration of new or improved mitigation methods, and
- FNZ observers monitoring at-sea vessel adherence to PSRMPs.

PSRMPs outline a set of operational procedures that are specific to each vessel. These include fish waste management systems, the correct deployment of seabird scaring devices, and the removal of 'stickers' (fish caught in net mesh) between each tow. Contingency plans for equipment failures (that may increase seabird capture risk), and additional reporting requirements for capture events are also included.

Throughout 2022/23, actions in deepwater fisheries to support the NPOA-Seabirds (2020) were focused on continuing to improve and manage the PSRMP process. Table 7 sets out the objectives and specific services that were planned for Deepwater Fisheries Management. Many of the services contributed to the achievement of more than one objective. These measures contribute to a reduction over time in the number and rate of seabird captures resulting from fishing activity and contribute to achieving the practical and biological objectives of the NPOA-Seabirds (2020).

Table 7: Deepwater services planned for 2022/23

NPOA Objectives	Planned deepwater services for 2022/23
Cross-objective work driven by NPOA	• Coordinate publication of Seabird Annual Report for 2021/22 on behalf of FNZ and DOC *Published on FNZ website*
Goal 1: Avoiding bycatch	
4. Ensure all New Zealand commercial fishers are using practices that best avoid the risk of seabird bycatch, enabled by appropriate regulations 5. Practices that effectively avoid risk of seabird are supported and promoted to non-commercial fishers	• Review the changes made in 2021 to the bottom longline seabird mitigation circular to reflect Mitigation Standards and update this circular in 2022 as required; *Circular review not commenced* • Collect data to better understand line sink rates on bottom longline vessels; *Data collected and presentation made to Aquatic Environment working group in April 2023* • Capture rate reduction targets will be agreed by the Seabird Advisory Group (SAG) in 2021/22; *This did not happen due to up to date capture information not being available* • Audit existing PSRMPs against Mitigation Standards; *Undertaken as part of the Mitigation Standards review process* • Report on at-sea audits of adherence to PSRMPs;

[10] Regulations require trawlers over 28 m in overall length to deploy a seabird scaring device during all tows (https://www.mpi.govt.nz/dmsdocument/20321-Seabird-Scaring-Devices-Circular-2010-No.-F517) and all bottom longliners to deploy streamer (tori) lines, and restrict offal and fish discharge. Bottom longline vessels are required to weight longlines so that an approved sink rate is met (https://gazette.govt.nz/notice/id/2021-go3770).

NPOA Objectives	Planned deepwater services for 2022/23
	Reported in this ARR and in the Seabird Annual Report • Review and update Mitigation Standards as required; *Mitigation Standards reviewed but not updated* • Report captures and capture rate data for the previous fishing year; and *Captures and capture rates reported in the Seabird Annual Report and in this document* • Review and update mitigation regulations as appropriate *Mitigation regulations reviewed as part of the Mitigation Standards review process but not updated*
Goal 2: Healthy seabird populations	
6. Research, monitoring, and management actions are prioritised for seabird populations of particular concern and their risk ratios reduce 7. The number of fishing-related mortalities is decreasing towards zero	• Implement new research programme along with Observer Services on hook sink rates using time-depth recorders. *The programme concluded during 2021/22* • Clearly identify additional priority research or management actions. *Considered as part of the Mitigation Standards review process*
Goal 3: Research and information	
8. Research is undertaken to improve bycatch mitigation across sectors, especially where there are high bycatch rates and no known effective mitigation (note: mitigation may include spatial and temporal closures) 9. Monitoring programmes for New Zealand commercial fisheries are designed and implemented to provide statistically robust information to assess progress towards the NPOA Seabirds 2020's objectives 10. Observation and monitoring methods are researched, developed, and implemented across all sectors 11. A research programme provides information to reduce uncertainty in estimates of risk to seabirds from fishing across all sectors	• Continue to review the factors that contribute to seabirds getting caught in trawl nets in deepwater fisheries *Results of net capture programme published by DWC in a paper to ACAP.* • Review the forms and data collection methods used by observers and fishers to make sure they are appropriate to support the NPOA Seabirds 2020 *No changes identified during 2022/23* • Document monitoring objectives and needs based on risk assessment outputs *Observer coverage during 2022/23 continued to reflect seabird monitoring objectives*
Goal 4: International engagement	
12. The risk to New Zealand seabirds from fisheries outside the New Zealand EEZ is assessed and communicated to international organisations, governments, and other stakeholders	• Contribute to advocacy for management of fishing impacts on seabirds on the high seas through participation in the South Pacific Regional Fisheries Management Organisation *New Zealand is leading the review of the SPRMFO seabird conservation and management measures*

NPOA Objectives	Planned deepwater services for 2022/23
13. New Zealand advocates for the development, adoption, improvement, and update of seabird conservation measures 14. New Zealand actively works bilaterally, multi-laterally, and with international organisations to build capacity to reduce the risk to New Zealand seabirds	

2.4.3 National Plan of Action for the Conservation and Management of Sharks

The NPOA-Sharks (2013) was reviewed and updated in 2021 and 2022 with input from an advisory group, made up of representatives from the Ministry for Primary Industries, Department of Conservation, Ministry of Foreign Affairs and Trade, Te Ohu Kaimoana, the commercial fishing industry, environmental organisations, and the recreational fishing sector. The new NPOA has not yet been published. The Draft NPOA-Sharks (2024) differs from previous NPOAs by incorporating the role of te Ao Māori and mātauranga Māori relating to sharks, including information on why sharks are considered taonga species. In addition, the Draft NPOA-Sharks (2024) includes performance measures attached to objectives for each of the following goals:

- Maintain the biodiversity and long-term population viability of New Zealand shark populations, taking into account their role in the ecosystem.
- Encourage the legal full utilisation of dead sharks and maintain the prohibition of shark finning in New Zealand.
- Encourage behaviour to avoid unwanted shark catch, focussing on protected species in the first instance, and maximising live release when unavoidable catch occurs.
- Non-fishing anthropogenic effects do not adversely affect the viability of New Zealand shark populations.
- Fisheries New Zealand and the Department of Conservation will enhance their engagement with Māori, to ensure that Māori aspirations regarding utilisation and/or protection of shark taonga and aspects of mātauranga Māori are incorporated into the management of sharks.
- New Zealand engages internationally to promote the conservation and management of sharks, including through enhanced monitoring, data collection and information sharing.
- Continuously improve the data available to conserve sharks and manage fisheries that impact on sharks, with prioritisation guided by the risk assessment framework and conservation status.

3 Deepwater observer coverage, fisheries research, and cost recovery levies

This section of the ARR provides detail on FNZ fisheries and conservation services that are relevant to Deepwater Fisheries Management and are planned by financial year (1 July – 30 June). These processes include the planning and contracting of fisheries and aquatic environment research projects, planning observer coverage on the deepwater fleet, and the cost recovery regime.

3.1 Observer coverage

Biological sampling and environmental monitoring are informed by the requirements of the National Deepwater Plan 2019 and carried out by FNZ Observer and Verification Services. Data collected by observers is used by FNZ to:

- Monitor key fisheries against harvest strategies;
- Monitor biomass trends for non-target species;
- Assess fishery performance against environmental benchmarks as available; and
- Enable more timely responses to sustainability and environmental impact issues.

Observer coverage is planned by both FNZ and DOC, based on the management objectives of both agencies. Observer coverage is used by DOC to collect information regarding fisheries interactions with protected species.

3.2 2022/23 observer coverage performance

In 2022/23, observer coverage for each fishery was planned based on a combination of biological sampling targets, desired percentage coverage targets, and expected deployment requirements. Planning required assumptions to be made regarding the number of vessels that would operate in each fishery and the number of biological samples an observer takes per 'observer day' in each fishery. Details on the planning process and calculations can be found in the 2022/23 AOP.

In 2022/23, delivery on the observer coverage plan was affected by factors including:

- Smaller vessels not able to carry observers and still meet watchkeeping requirements.

The observer days delivered in relation to the days planned for each fishery complex for the 2022/23 financial year is summarised in Table 8 and figures 2 and 3. Table 7 relates to observer days that are planned by fish stock based on either prior years' effort or biological sampling requirements, so this can lead to fluctuations in the resulting coverage over time.

Tables 10 and 11 provide information on the numbers of length frequency and otolith samples collected by observers for deepwater species during the 2022/23 fishing year. Table 9 also provides information on how the level of observer sampling conducted during the 2022/23 fishing year compared to sampling targets as defined in the 2022/23 AOP. This report provides the opportunity for review of performance against those targets.

Table 8: Comparison of planned and achieved observer coverage for the 2022/23 financial year.

Fishery complex	Target stocks	Total days planned	Total days delivered	Percent delivered
Deepwater trawl				
North Island deepwater	ORH 1, ORH 2A, ORH 2B, ORH 3A, BYX 2 & CDL 2	110	32	29%
Chatham Rise deepwater	ORH 3B, OEO 3A, OEO 4 & BYX 3	290	305	105%

Fishery complex	Target stocks	Total days planned	Total days delivered	Percent delivered
Sub-Antarctic deepwater	ORH 3B, OEO 1 & OEO 6	100	110	110%
West Coast deepwater	ORH 7A	70	79	113%
Middle-depth trawl				
West Coast North Island	JMA 7, EMA 7 & BAR 7	300	312	104%
West Coast South Island (FMA 7)	HOK 1, HAK 7, LIN 7 & SWA 1	400	485	121%
WCSI HOK 'inside the line'	HOK 1	105	105	100%
Cook Strait HOK	HOK 1	200	148	74%
Chatham Rise middle-depth (FMA 3/FMA 4)	HOK 1, HAK 1, HAK 4, LIN 3, LIN 4, SWA 3, SWA 4, JMA 3, BAR 1 & BAR 4	555	516	93%
Sub-Antarctic middle-depth exc. SQU/SBW (FMA 5/FMA 6)	HOK1, SWA 4, WWA 5B, BAR 5 & JMA 3	325	365	112%
Southern blue whiting	SBW (all)	250	333	133%
Squid	SQU 1T & SQU 6T	1,846	2,082	113%
Bottom longline				
Bottom longline LIN >34 m	LIN 3- LIN 7	185	205	111%
<34 m mixed bottom longline		445	46	10%
Scampi trawl				
Scampi	SCI 6A	200	204	102%
	Scampi (other)	300	255	85%
Total		5,681	5,582	98%

Table 9: Percent observer coverage obtained within deepwater fisheries during the 2022/23 fishing year

Fishery complex	Target stocks		Commercial tows / hooks	Observed tows / hooks	Target percentage	Percent observed
Deepwater trawl						
North Island deepwater	ORH 1, ORH 2A, ORH 2B, ORH 3A, BYX 2 & CDL 2		1,100	119	20%	11%
	Orange roughy target		493	90		18%
Chatham Rise deepwater	ORH 3B, OEO 3A, OEO 4 & BYX 3		1,649	689	30%	42%
	Orange roughy target		897	350		39%
	ORH3B	*NW Rise*	129	73		57%
		E&S Rise	768	277		36%
Sub-Antarctic deepwater	ORH 3B, OEO 1 & OEO 6		445	390	75%	88%
	Orange roughy target		108	70		65%
West Coast deepwater	ORH 7A (excluding Westpac Bank)		471	160	50%	34%
Hoki and middle-depth trawl[11]						

[11] Excludes effort by trawl vessels less than 28 metres in length except for the WCSI 'inside the line' and Cook Strait hoki fisheries.

Fishery complex	Target stocks	Commercial tows / hooks	Observed tows / hooks	Target percentage	Percent observed
West Coast North Island	JMA 7, EMA 7 & BAR 7	1,729	1,209	30%	70%
West Coast South Island (FMA 7)	HOK 1, HAK 7, LIN 7 & SWA 1	1,694	1,480	30%	87%
WCSI HOK 'inside the line'	HOK 1	904	157	20%	17%
Cook Strait HOK[12]	HOK 1	771	228	20%	30%
Chatham Rise middle-depth (FMA 3/FMA 4)	HOK 1, HAK 1, HAK 4, LIN 3, LIN 4, SWA 3, SWA 4, JMA 3, BAR 1 & BAR 4	6,036	2,139	30%	35%
	Hoki target	5,228	1,579		30%
Sub-Antarctic middle-depth excl. SQU/SBW (FMA 5/FMA 6)	HOK 1, SWA 4, WWA 5B, LIN 5, LIN 6, HAK 1, BAR 5 & JMA 3	2,555	1,665	30%	65%
	Hoki target	1,140	653		57%
Southern blue whiting	SBW (all)	617	617	100%	100%
Squid	SQU 1T & SQU 6T	2,182	1,910	80%	88%
	SQU 6T target	706	675		96%
Bottom longline					
Bottom longline[13]	LIN 3-7 <34 m	2,886,047	140,000	30%	5%
	LIN 3-7 >34 m	13,667,462	4,372,238	30%	32%
Scampi trawl					
Scampi	Scampi (all)	4,816	707	20%[14]	15%
	SCI 6A only	1,704	34	25%	18%

Table 10: Numbers of length frequency samples and otoliths collected by observers during the 2022/23 fishing year for Tier 1 deepwater species, by area

Species		Area/method		LF target	# of LF samples		# of fish measured	Otolith target	# of otoliths pairs collected	
Jack mackerel	*Trachurus declivis*	JMD 3		-	70	-	2,947	-	413	-
		JMD 7		200	373	✓	27,763	900	1,681	✓
	Trachurus murphyi	JMM 3		-	42	-	977	-	197	-
		JMM 7		200	40	✗	151	900	52	✗
	Trachurus novaezelandiae	JMN 3		-	2	-	33	-	1	-
		JMN 7		200	292	✓	29,376	900	1,034	✓
Ling		LIN 3 & 4	BLL	100	65	✗	921	500	467	✗
			Trawl	100	101	✓	1,920	500	586	✓
		LIN 5 & 6	BLL	100	136	✗	2,138	500	724	✓
			Trawl	100	360	✓	20,390	500	2,861	✓

[12] Defined as statistical areas 016 and 017.

[13] Total and observed deepwater bottom longline effort is expressed in number of hooks set rather than number of tows.

[14] Target percentage of 20% applies to all scampi stocks other than SCI 6A.

Species		Area/method		LF target	# of LF samples		# of fish measured	Otolith target	# of otoliths pairs collected	
		LIN 7	BLL	200	65	✗	1,290	500	622	✓
			Trawl		98	✗	2,823		586	✓
		LIN Cook Strait		-	3	-	27	-	5	-
Hake		HAK 1		100	124	✓	3,012	1,000	737	✗
		HAK 4		100	3	✗	28	1,000	14	✗
		HAK 7		200	239	✓	9,729	1,000	1,684	✓
Hoki		Sub-Antarctic[15]		400	461	✓	38,931	1,600	4,139	✓
		Chatham Rise		400	787	✓	76,687	1,600	7,720	✓
		WCSI	>46 m	400	753	✓	67,879	1,000	6,911	✓
			<46 m	200	75	✗	7,924	600	776	✓
		Cook Strait		200	141	✗	14,727	1,000	1,397	✓
		ECNI		-	12	-	807	-	41	-
Orange roughy		ORH 1 Area A		30	-	✗	-	30	-	✗
		ORH 1 Area B		30	3	✗	260	30	40	✓
		ORH 1 Area C		30	-	✗	-	30	-	✗
		ORH 1 Area D		30	6	✗	372	30	83	✓
		ORH 2A (North)		30	2	✗	37	-	11	-
		ORH 2A (South)		-	7	-	621	-	150	-
		ORH 3A		-	-	-	-	-	-	-
		ORH 3B (NW Chatham Rise)		50	9	✗	500	300	85	✗
		ORH 3B (E&S Chatham Rise)		50	101	✓	7,597	300	1,804	✓
		ORH 3B (Sub-Ant & Puysegur)		100	14	✗	1,080	300	255	✗
		ORH 7A & Westpac Bank		50	60	✓	3,542	300	1,142	✓
Oreo	**Black**	BOE 1		-	8	-	679	-	10	-
		BOE 3A		-	28	-	1,906	-	279	-
		BOE 4		-	8	-	466	-	50	-
		BOE 6		-	38	-	2,729	-	322	-
	Smooth	SSO 1		-	8	-	480	-		-
		SSO 3A		-	33	-	2,388	-	338	-
		SSO 4		-	24	-	2,028	-	289	-
		SSO 6		-	62	-	4,650	-	513	-
	Spiky	SOR 3A		-	-	-	-	-	-	-

[15] Includes samples taken from statistical areas 26 and 27 within Fisheries Management Area (FMA) Southeast Coast (SEC).

Species		Area/method	LF target	# of LF samples		# of fish measured	Otolith target	# of otoliths pairs collected	
		SOR 4	-	-	-	-	-	-	-
Scampi		SCI 1	50	83	✗	5,774			
		SCI 2	50	33	✗	6,229			
		SCI 3	50	142	✓	18,594			
		SCI 4A	50	55	✗	6,587			
		SCI 6A	50	184	✓	20,720			
Southern blue whiting		SBW 1	-	2	-	40	-	20	-
		SBW 6I	100	261	✓	41,947	900	4,355	✓
		SBW 6B	50	18	✗	4,838	600	198	✗
		SBW 6R	-	3	-		-	35	-
		SBW 6A	-	12	-	679	-	111	-
Squid (all species combined)		SQU 1T	-	676	-	73,608			
		SQU 6T	-	428	-	42,970			

Biological sampling targets may not have been met due to variability in vessel fishing plans and target species.

Table 11: Numbers of length frequency samples and otoliths collected by observers during the 2022/23 fishing years for Tier 2 deepwater stocks

Species	QMA	Number of length frequency samples	Number of fish measured	Pairs of otoliths collected
Barracouta	BAR 4	32	1,881	232
	BAR 5	237	14,076	1,957
	BAR 7	114	3,555	776
Alfonsino	BYX 1	-	-	-
	BYX 2	15	1,035	75
	BYX 3	5	340	25
	BYX 7	3	17	9
Cardinal fish	CDL 2	-	-	-
	CDL 3	-	-	-
	CDL 5	-	-	-
Blue (English) mackerel	EMA 3	-	-	-
	EMA 7	77	3,478	332
Frostfish	FRO 4	-	-	
	FRO 5	2	105	5
	FRO 7 - 9	86	2,574	424
Giant spider crab	GSC 3	2	20	
	GSC 5	26	655	
	GSC 6A	143	3,057	
	GSC 6B	2	23	
Dark ghost shark	GSH 4	3	99	
	GSH 5	4	70	
	GSH 6	7	130	
Pale ghost shark	GSP 1	9	159	
	GSP 5	12	221	
	GSP 7	-	-	
Lookdown dory	LDO 1	1	20	-
	LDO 3	2	71	-
Prawn killer	PRK 1	-	-	
Patagonian toothfish	PTO 1	-	-	-
Redbait	RBT 3	25	1,362	111
	RBT 7	-	-	-
Rubyfish	All stocks	-	-	-
Ribaldo	RIB 3 & 4	15	288	74
	RIB 5 & 6	24	445	125
	RIB 7	4	61	21

Species	QMA	Number of length frequency samples	Number of fish measured	Pairs of otoliths collected
Gemfish	SKI 3	63	1,915	351
	SKI 7	62	1,835	345
Spiny dogfish	SPD 4	-	-	
	SPD 5	1	99	
Sea perch	SPE 3	2	40	10
	SPE 4	10	91	50
	SPE 5	-	-	-
	SPE 6	1	20	5
	SPE 7	4	70	20
Silver warehou	SWA 1	15	366	75
	SWA 3	180	6,877	930
	SWA 4	183	5,678	994
White warehou	WWA 3 & 4	5	142	27
	WWA 5B	18	968	103

3.3 Deepwater fisheries research

Research needs for deepwater fisheries are driven from the Objectives within the National Deepwater Plan 2019 and are primarily delivered through FNZ Fisheries Research Services. These research needs are outlined in the Medium Term Research plan, which is a living document updated regularly to reflect changes in management priorities and identification of new information.

This research programme focuses on obtaining comprehensive, consistent, and robust information in a cost-effective manner. To accomplish this, the research programme specifies the routine research and data collection necessary to meet Management Objectives. Research projects contracted for the 2022/23 financial year, which are detailed in Table 11, included stock assessments, and trawl and acoustic surveys.

All research projects are reviewed by FNZ Science Working Groups and are assessed against the Research and Science Information Standard for New Zealand Fisheries. This review process aims to ensure the quality of the research is sufficient to underpin Deepwater Fisheries Management. Delivery of quality research is driven through Management Objective 3 within the National Deepwater Plan 2019 which aims to ensure the effective management of deepwater and middle-depth fisheries through the availability of appropriate, accurate and robust information.

Table 12 details the status of the Aquatic Environment Research planned for the 2022/23 financial year and Table 13 details the status of biodiversity research relating to deepwater fisheries.

Progress reports are not available for all projects. Reports are made publicly available at the conclusion of each project. Projects listed as complete may not have published reports available at the time this ARR is published. Links to published research reports can be found in Table 14 of this Report.

Table 12: Deepwater research planned for the 2022/23 financial year and current status

Project code	Title	Status
HOK2022-01	Hoki population modelling and stock assessment +	Complete FAR2023-40 Hoki 2022 Stock Assessment FAR2024-16 Catches and Size and Age Structure 2021/22 Hoki Fishery Inputs for 2023 Assessment
HOK2022-02	Acoustic survey of Cook Strait and ECSI hoki	Complete
HOK2020-02	Land based sampling of hoki	Multi-year project. Complete FAR2023-40 Hoki 2022 Stock Assessment
LIN2022-01	Stock assessment of ling in LIN 7	Complete FAR2024-02-2023 Ling Stock Assessment off West Coast South Island LIN7
MID2021-01	Routine age determination of middle depth and deepwater species from commercial fisheries and resource surveys	In progress—this is a multi-year project
MID2021-02	Multi-species deepwater trawl surveys	In progress—this is a multi-year project with 5 surveys Chatham Rise Middle Depths Trawl Survey January 2022 Southland and Sub Antarctic Hoki and Middle Depth Trawl Survey 2022
ORH2022-01	Stock assessment of orange roughy in ORH 7A	Nearly complete, plenary on 16/05/2024. Project was delayed due to COVID aboard first survey in 2021
ORH2021-03	Estimation of the abundance of orange roughy on the southwest Challenger Plateau (ORH7A including Westpac Bank)	Completed in July 2023 FAR2024-26-Estimation of the abundance of orange roughy on the southwest Challenger Plateau
SBW2022-01	Stock assessment of SBW6I	Complete FAR2023-37 Southern Blue Whiting Acoustic Estimates SWB6I Aug-Sep-2022
SBW2021-02	Refine Harvest Control Rule to allow for gaps in acoustic surveys in the SBW6B fishery	FAR2023-38 Southern Blue Whiting Updated Harvest Control Rule SBW6B
SCI2022-01	Estimation of the abundance of scampi in SCI 6A using trawl and photographic surveys	Complete
SCI2022-02	Photographic and trawl survey of scampi in SCI3 and 4A	In Progress
SWA2021-01	Assessment of biomass for silver warehou in SWA 3 and 4	Complete

Project code	Title	Status
		FAR2023-53 Silver Warehou Stock Assessment Research in 2023 SWA3 and SWA4
SQU2022-01	Development of harvest strategies for squid in SQU1 and SQU6T	Complete FAR2023-59 Further Development of Models for Arrow Squid FAR2023-50 Toward an Assessment of Arrow Squid in New Zealand Waters

Table 13: Aquatic Environment and Biodiversity research planned for the 2022/23 financial year and current status

Project code	Title	Status
BYC2021-01	Trialing a semi-quantitative shark and turtle risk assessment	Complete AEBR 311 Developing and testing spatial distribution models for selected shark and turtle species (mpi.govt.nz) AEBR-319-Development-of-spatial-fisheries-risk-assessment-methods-for-sharks-and-turtles-in-New-Zealand-waters (mpi.govt.nz)
BYC2021-02	Protected chondrichthyan captures characterisation	Complete AEBR 289 Characterisation of New Zealand protected shark captures, to 2021 (mpi.govt.nz)
BYC2021-03	Bycatch monitoring and quantification of fish in deepwater fisheries	Ongoing – Year 2 (out of 3) complete. Expected completion Nov 2024. Year 1 report AEBR 315 Non-target fish and invertebrate catch and discards in New Zealand arrow squid and scampi trawl fisheries from 2002–03 to 2020–21
BYC2022-02	Risk assessment for selected shark species	Ongoing
PRO2021-02	Estimation of warp capture cryptic mortality multipliers with seabird corpse catcher devices	Complete

Table 14: Ongoing multi-year biodiversity research projects that relate to deepwater fisheries.

Project code	Title	Status
BEN2019-04	A spatially explicit benthic impact assessment for inshore and deepwater fisheries in New Zealand	Complete AEBR-329-Spatially-Explicit-Benthic-Impact-Assessment-For-Bottom-Trawling
BEN2019-05	Towards the development of a spatial decision support tool for managing the impacts of bottom fishing on in-zone, particularly vulnerable or sensitive habitats.	Complete – report in publication process
BEN2020-01	Extent and intensity of seabed contact by mobile bottom fishing in the New Zealand Territorial Sea and Exclusive Economic Zone (trawl footprint	Complete AEBR-316-Bottom-Contact-Of-Commercial-Trawl-And-Dredge-Fisheries-New-Zealand-1990-2021
BEN2020-07	Underwater Topographic Features in the New Zealand region: development of an updated 'SEAMOUNT' database and information on the extent and intensity of deep-sea trawl fisheries on them	Complete AEBR-291-Underwater-Topographic-Features-SEAMOUNT-Database-NZ-Region-4268.pdf
BEN2021-03	Taxonomic identification of benthic invertebrate samples	Ongoing - Year 1 and 2 complete, final year results and project completion June 2024.
BEN2022-01	The extent and intensity of seabed contact by mobile bottom fishing in the New Zealand Territorial Sea and Exclusive Economic Zone	Final report in review
BEN2023-01	Mobile bottom fishing footprint - assessment and development of estimation methods using ER and GPR data	Ongoing – methods presented to AEWG April 2024. Project completion expected April 2025
DAT2020-05	Risk atlas development for protected species risk models	Ongoing
ENV2020-20	Temporal and spatial distribution of non-target catch, and non-target species, in deepwater fisheries.	Complete AEBR 303 Temporal and spatial distribution of non-target catch and non-target catch species in deepwater fisheries AEBR 304 Temporal and spatial distribution of non-target catch and non-target catch species in deepwater fisheries: supplementary information
PMM2020-06	Auckland Islands New Zealand sea lion tracking	Cancelled
PSB2019-01	Estimation of total seabird captures using standardised estimation methods	Ongoing

PSB2019-09	Opportunistic aerial survey of white-capped albatross on the Auckland Islands	Cancelled
ZBD2018-01	5-year continuous plankton survey (phase 3)	Ongoing
ZBD2020-07	Recovery of seamount communities	Complete AEBR-262-Chatham-Rise-seamount-recovery-survey-August-2020

3.2.1 Research reports

Final research reports from previously contracted work that were published in the 2022/23 financial year that relate to deepwater fisheries are shown in Table 14 below. Links to these documents are provided.

Table 15: Final research reports and documents published during the 2022/23 financial year of relevance to deepwater fisheries.

Annual documents	
2023 May Plenary	Fisheries New Zealand (2022). Fisheries Assessment Plenary, November 2022: stock assessments and stock status. Compiled by the Fisheries Science and Information Group, Fisheries New Zealand, Wellington, New Zealand. 684 p.
	Fisheries New Zealand (2023) Fisheries Assessment Plenary, May 2023: stock assessments and stock status. Compiled by the Fisheries Science Team, Fisheries New Zealand, Wellington, New Zealand. 1,904 p. Vol 1 Alfonsino to Hoki (p1 to 648.)
	Fisheries New Zealand (2023) Fisheries Assessment Plenary, May 2023: stock assessments and stock status. Compiled by the Fisheries Science Team, Fisheries New Zealand, Wellington, New Zealand. 1,904 p. Vol 2 Horse Mussel to Red Crab (p649 to 1,244).
	Fisheries New Zealand (2023) Fisheries Assessment Plenary, May 2023: stock assessments and stock status. Compiled by the Fisheries Science Team, Fisheries New Zealand, Wellington, New Zealand. 1,904 p. Vol 3 Red Gurnard to Yellow-Eyed Mullet (p1,245 to 1,904).
2021 AEBAR	Fisheries New Zealand (2021). Aquatic Environment and Biodiversity Annual Review 2021. Compiled by the Fisheries Science Team, Ministry for Primary Industries, Wellington New Zealand. 768p.
Aquatic Environment and Biodiversity Reports (AEBRs)	
AEBR 262	Clark, M.R.; Bowden, D.A.; Stewart, R.; Schnabel, K.; Quinn, W.; Lennard, B.; Goode, S.L.; Davis, A. (2021). Seamount recovery: factual voyage report of a survey of seamounts on the northwest and southeast Chatham Rise (TAN2009)
AEBR 264	Anderson, O.F.; Pallentin, A.; Bowden, D.A.; Chin, C.; Davey, N.; Eton, N.; Fenwick, M.; George, S.; Macpherson, D. (2021). Quantifying Benthic Biodiversity—Phase II: a factual voyage report from RV Tangaroa voyage TAN2004 to Campbell Plateau, 17 May–7 June 2020
AEBR 268	Baker, G.B.; Candy, S.; Parker, G. (2021). Improving estimates of cryptic mortality for use in seabird risk assessments: loss of seabirds from longline hooks
AEBR 266	Edwards, C.T.T.; Dunn, A. (2021). Assessment of risk factors for seabird net captures in selected sub-Antarctic trawl fisheries
AEBR 269	Schnabel, K.E.; Mills, V.S.; Tracey, D.M.; Macpherson, D.; Kelly, M.; Peart, R.A.; Maggs, J.Q.; Yeoman, J.; Wood, C.R. (2021). Identification of benthic invertebrate samples from research trawls and observer trips, 2020–21

AEBR 270	Bell, E.; Ray, S.; Crowe, P. (2021). Population trends, at-sea distribution, and breeding population size of black petrels (*Procellaria parkinsoni*) on Great Barrier Island/Aotea: 2019–2020 operational report
AEBR 271	Finucci, B.; Jones, E.G.; Marsh, C.; Pinkerton, M.; Sibanda, N.; Sutton, P.; Francis, M.P. (2021). Spatial and temporal distribution of seven deepwater sharks in New Zealand waters
AEBR 267	Behrens, E.; Wood, B.; Bowden, D; Chin, C.; Anderson, O. (2021). Plastics and marine debris across the ocean floor in New Zealand waters
AEBR 274	Mormede, S.; Baird, S.J.; Roux, M.-J. (2021). Developing quantitative methods for the assessment of risk to benthic habitats from bottom fishing activities using the test case of holothurians on the Chatham Rise
AEBR 276	Stephenson, F.; Bowden, D.A.; Finucci, B.; Anderson, O.F.; Rowden, A.A. (2021). Developing updated predictive models for benthic taxa and communities across Chatham Rise and Campbell Plateau using photographic survey data
AEBR 279	Finucci, B.; Anderson, O.F.; Edwards, C.T.T. (2022). Non-target fish and invertebrate catch and discards in New Zealand jack mackerel trawl fisheries from 2002–03 to 2018–19
AEBR 280	Bell, E.; Lamb, S.; Ray, S. (2022). Population trends and breeding population size of black petrels (*Procellaria parkinsoni*) — 2020/2021 operational report
AEBR 281	Bowden, D.A.; Anderson, O.F.; Rowden A.A.; Stephenson F. (2022). Assessing the utility of habitat suitability models developed for Chatham Rise when applied to Campbell Plateau
AEBR 282	Anderson, O.F.; Finucci, B. (2022). Non-target fish and invertebrate catch and discards in New Zealand orange roughy and oreo trawl fisheries from 2002–03 to 2019–20
AEBR 284	Filippi, D.P.; Elliott, G. (2022). Use of innovative tag technology to examine foraging patterns of seabirds and association with fishing vessels
AEBR 286	Dunn, M.R. (2022). Climate change and the distribution of commercially caught marine fish species in New Zealand. Part 1: Spatio-temporal changes since 1989
AEBR 287	Dunn, M.R.; Goeden, Z.; Neubauer, P.; Behrens, E.; Arnold, R. (2022). Climate change and the distribution of commercially caught marine fish species in New Zealand. Part 2: Predicting changes in distribution
Fisheries Assessment Reports (FARs)	
FAR2022/27	Horn, P.L. (2022). A synopsis of the biology of ling (*Genypterus blacodes*) and a history of its fishery and assessment in New Zealand. *New Zealand Fisheries Assessment Report 2022/27*. 78 .
FAR2022/28	Escobar-Flores, P.C.; O'Driscoll, R.L. (2022). Acoustic survey of spawning hoki in Cook Strait and off the east coast South Island during winter 2021. *New Zealand Fisheries Assessment Report 2022/28.* 78 p.
FAR2022/32	Hartill, B.; Parkinson, D.; Armiger, H.; Smith, M.; Miller, A.; Drury, J.; Spong, K.; Evans, O.; Tuck. I.D. (2022). Estimating the abundance of scampi in SCI 1 (Bay of Plenty) and SCI 2 (Wairarapa/Hawke Bay) in 2021. New Zealand Fisheries Assessment Report 2022/32. 52 p.
FAR2022/34	Kienzle, M. (2022). Catch per unit effort standardisation and stock assessment of blue mackerel in EMA 7 to fishing year 2017–18. *New Zealand Fisheries Assessment Report 2022/34.* 34 p.

FAR2022/37	Hartill, B.; Middleton, D.A.J.; Walsh, C.; Spong, K.; Ó Maolagáin, C. (2022). Catch-at-age sampling of *Trachurus novaezelandiae* from JMA 1 in 2019–20 and 2020–21. *New Zealand Fisheries Assessment Report 2022/37.* 16 p.
FAR2022/38	Dunn, M.R.; A'mar, T.; Doonan, I. (2022). Assessment of the Mid-East Coast orange roughy stock for 2022. *New Zealand Fisheries Assessment Report 2022/38.* 77 p.
FAR2022/41	Escobar-Flores, P.C.; Ladroit, Y. (2022). Acoustic survey of orange roughy in ORH Mid-East Coast (ORH 2A, 2B, & 3A), June 2021. *New Zealand Fisheries Assessment Report 2022/41.* 43 p.
FAR2022/43	McGregor, V.L.; Dunn, M.R.; Langley, A.D.; Dunn, A. (2022). Assessment of hoki (*Macruronus novaezelandiae*) in 2021. *New Zealand Fisheries Assessment Report 2022/43*. 247 p.
FAR2022/44	Langley, A.D. (2022). Analysis of CPUE data from key hoki fisheries for the monitoring of recent recruitment, *New Zealand Fisheries Assessment Report 2022/44.* 41 p.
FAR2022/49	Saunders, R.J. (2022). Squid statolith ageing feasibility study. *New Zealand Fisheries Assessment Report 2022/49*. 5 p.
FAR2022/51	Holmes, S.J.; Doonan, I.J. (2022). Descriptions of the black oreo and smooth oreo fisheries in OEO 1, OEO 3A, OEO 4, and OEO 6 from 1978–79 to 2019–20. *New Zealand Fisheries Assessment Report 2022/51*. 40 p.
FAR2022/52	Saunders, R.J.; Ó Maolagáin, C.; Hulston, D.; Spong, K. (2022). Commercial catch sampling for species proportion, sex, length, and age of jack mackerels in JMA 7 in the 2019–20 fishing year, with a summary of all available data sets. *New Zealand Fisheries Assessment Report 2022/52*. 26 p.
FAR2022/53	Devine, J.A.; Stevens, D.W.; Ballara, S.L. (2022). Trawl survey of middle depth fish species off the west coast South Island, July–August 2021 (TAN2107). *New Zealand Fisheries Assessment Report 2022/53.* 131 p.
FAR2022/55	Ballara, S.L.; O'Driscoll, R.L. (2022). Catches and size and age structure of the 2020–21 hoki fishery and a summary of input data used for the 2022 stock assessment. *New Zealand Fisheries Assessment Report 2022/55.* 183 p.
FAR2022/56	Ballara, S.L.; O'Driscoll, R.L.; Saunders, R.J. (2022). Catch-at-age for hake (*Merluccius australis*) and ling (*Genypterus blacodes*) for 2020–21 and from research trawl surveys in 2021–22, and a summary of the available data sets from the New Zealand EEZ. *New Zealand Fisheries Assessment Report 2022/56.* 94 p.
FAR2022/64	Mormede, S.; Dunn, A.; Webber, D.N. (2022). Descriptive analysis of ling (*Genypterus blacodes*) on the Chatham Rise (LIN 3&4) up to 2020-21 and inputs for the 2022 stock assessment. *New Zealand Fisheries Assessment Report 2022/64*. 81 p.
FAR2022/65	Holmes, S.J.; McKenzie, A.; Ballara, S.L.; MacGibbon, D.J.; Bian, R.; Dunn, M.R.; Jones, E.G. (2022). Using trawl surveys to provide partial quantitative assessments for rough skate (*Zearaja nasuta*) and smooth skate (*Dipturus innominatus*). *New Zealand Fisheries Assessment Report 2022/65.* 71 p.
FAR2023/13	Mormede, S.; Dunn, A.; Webber, D.N. (2023). Spatial-temporal standardisation of commercial longline and trawl survey catches of ling on the Chatham Rise (LIN 3&4) up to 2020–21. *New Zealand Fisheries Assessment Report 2023/13*. 10 p.
FAR2023/14	Mormede, S.; Dunn, A.; Webber, D.N. (2023). Stock assessment of ling (*Genypterus blacodes*) on the Chatham Rise (LIN3&4) for the 2021–22 fishing year. *New Zealand Fisheries Assessment Report 2023/14*. 39 p.
FAR2023/15	Middleton, D.A.J.; Neubauer, P.; Thompson, F.N. (2023). Characterisation and CPUE for the gemfish fishery in SKI 1 and SKI 2 from 1990 to 2022. *New Zealand Fisheries Assessment Report 2023/15*. 211 p.

FAR2023/22	Devine, J.A.; Sutton, C.; Hart, A.; Saunders, R.J. (2023). Catch-at-age for barracouta (*Thrysites atun*) in BAR 4 and BAR 5 and gemfish (*Rexea solandri*) in SKI 3 and SKI 7 for the 2019–20 and 2020–21 fishing years. *New Zealand Fisheries Assessment Report 2023/22.* 12 p.
FAR2023/24	Stevens, D.W.; Ballara, S.L.; Escobar-Flores, P.C.; O'Driscoll, R.L. (2023). Trawl survey of hoki and middle depth species on the Chatham Rise, January 2022 (TAN2201). *New Zealand Fisheries Assessment Report 2023/24.* 122 p.
FAR2023/31	Moore, B.R; Ó Maolagáin, C.; Spong, K.; Saunders, R.J. (2023). Commercial catch sampling for species proportion, sex, length, and age of jack mackerels in JMA 7 in the 2020–21 fishing year, with a summary of all available data sets. *New Zealand Fisheries Assessment Report 2023/31.* 32 p.
Conservation Services Programme (Department of Conservation) reports[16]	
INT2022-06	Richard, Y. and Berkenbusch, K. (2024). Sightings of marine mammals in New Zealand waters by government fisheries observers. Technical report prepared the Department of Conservation
POP2021-03	Frost PGH. (2023) Nesting success of Northern Royal Albatross Toroa *Diomedea sanfordi* on the Chatham Islands: 2023 Breeding Season. Report to the Conservation Services Programme, Department of Conservation. Science Support Service, Whanganui. 16 p.
MIT2021-03B	Goad, D. & Olsen Z. (2023). Reducing sink times to depth in the small vessel manual baiting demersal longline fishery targeting species such as ling and bluenose. MIT2021-03B final report prepared by Vita Maris for the New Zealand Department of Conservation, Wellington. 22 p.
MIT2022-02	Turner, P. (2023). Understanding drivers and barriers to seabird bycatch mitigation uptake in small vessel bottom longline fisheries. MIT2022-02 final report prepared by The Navigators Ltd for the Department of Conservation. 123 p.
INT2021-02	Meyer, S. (2023). Characterisation of protected coral interactions. INT2021-02 final report prepared by Proteus for Conservation Services Programme, Department of Conservation 173 p.
POP2022-04	Mills, S., Connell, A., Bilewitch, J., Stewart, R., Marriott, P., Tracey, D. (2023). Deep diving into decades of uncatalogued corals. POP2022-04 final report. Prepared for Conservation Services Programme, Department of Conservation NIWA Client Report 2023211WN. 64 p.
POP2021-02	Anderson, O., Schnabel, K., Bowden, D., Davey, N., Hart, A. (2023) Identification of protected coral hotspots using species distribution modelling. POP2021-02 final report prepared by NIWA for Conservation Services Programme, Department of Conservation. 63 p.
POP2021-04	Ray, S. and Burgin, D. (2023). Flesh-footed shearwater population monitoring and estimate Ohinau Island: 2022/23 season. POP2021-04 final report prepared by Wildlife Management International Limited for the Department of Conservation. 50 p.
POP2021-07	Rexer-Huber, K.; Parker, G.C. (2023). Foveaux shag population census. POP2021-07 final report for the Department of Conservation. Dunedin, Parker Conservation. 22 p.
POP2021-06	Pavanato H, Schattschneider J, Childerhouse S, Briscoe D. (2023). Assessment of New Zealand fur seal / kekeno bycatch by trawlers in the Cook Strait hoki fishery. POP2021-06 final report prepared by Cawthron for Department of Conservation. 45 p.

[16] Full reports and their descriptions can be found on the Conservation Services Programme website, 2022/23 Conservation Services Programme Reports (doc.govt.nz)

POP2022-08	Elliott G, Walker K, Rexer-Huber K, Parker GC. (2023). White-capped albatross population study: Disappointment Island 2023. POP2022-08 final report prepared for the New Zealand Department of Conservation. 26 p.
POP2022-01	Bell, E.A., Lamb, S. & Maclean, C. (2023). Key demographic parameters and population trends of tākoketai/black petrels (*Procellaria parkinsoni*) on Aotea/Great Barrier Island: 2022/23. POP2022-01 final report prepared by Wildlife Management International Ltd for the Conservation Services Programme, Department of Conservation, Wellington. 41 p.
POP2022-05 and POP2022-06	Bell, M. (2023). Motuhara seabird research: field trip report December 2022. Report prepared by Toroa Consulting Limited for the Conservation Services Programme, Department of Conservation. 4 p. Frost, P., Bell, M., Taylor, G. (2023). Trail-camera assessment of the fates of Northern Royal Albatross and Northern Buller's Mollymawk chicks: 2021 breeding season, Motuhara. Report prepared for the Conservation Services Programme, Department of Conservation. 25 p. Bose, S., Bell, M., Taylor, G. (2023). Northern Royal Albatross tracking from Motuhara, Chatham Islands, and Taiaroa Head in 2021. POP2022-06 final report prepared for the Conservation Services Programme, Department of Conservation. 9 p. Fischer, J.H., Bell, M., Frost, P., Sagar, P.M., Thompson, D.R, Middlemiss, K.L., Debski, I., Taylor, G. (2023). Year-round GLS tracking of Northern Buller's albatross and comparison with Southern Buller's albatross. POP2022-05 final report prepared for the Conservation Services Programme, Department of Conservation. 16 p.
POP2019-04	Thompson, D., Sagar, P. (2023). Population studies of southern Buller's albatross on Tini Heke/The Snares. POP2019-04 final report prepared by NIWA for the Department of Conservation. 18 p.
MIT2022-07	Hickox, R.P., Mackenzie, D. (2023). Review of warp strike mitigation methods on <28m commercial trawl vessels in New Zealand. MIT2022-07 final report prepared by Proteus for the Department of Conservation. 72 p.
POP2022-10	Parker G.C., Rexer-Huber K., Walker K., Elliott G. (2023). Antipodean wandering albatross population study 2023 . POP2022-10 final report to the Department of Conservation. Parker Conservation, Dunedin. 21 p. Rexer-Huber K., Parker G.C., Elliott G., Walker K. (2023) Antipodes white-chinned petrel population size and survival study setup. POP2022-10 final report to the Department of Conservation. Parker Conservation, Dunedin. 18 p.
INT2021-04	Bray, R. 2023. Annual report 2022/23 - Collection and curation of tissue samples from protected fishes and turtles. INT2021-04 final report prepared for Conservation Services Programme, Department of Conservation. 13 p.
POP2022-09	Manno KL, Young MJ. (2023) New Zealand sea lion/pakake/whakahao field research report Auckland Islands 2022/23. Dunedin: Department of Conservation, 27 p.
MIT2022-06	Goad, D., Middlemiss, K., Cieraad, E., Duke, K., Bell, H., Le Lec, Marc., Le Lec, Marissa., Fischer, J., Taylor, G. (2023). Light mitigation: reducing vessel interactions with seabirds. MIT2022-06 final report prepared for Conservation Services Programme, Department of Conservation. 16 p.
POP2022-11	Mischler, C. and Wickes, C. (2023). Campbell Island/Motu Ihupuku Seabird Research & Operation Endurance February 2023. POP2022-11 final report prepared for Conservation Services Programme, Department of Conservation. 15 p.

MIT2022-04	Meyer, S., Hickcox, R. (2023). Bait retention as a driver to mitigation use in the surface longline fishery. MIT2022-04 final report prepared by Proteus for Conservation Services Programme, Department of Conservation. 50 p.

3.3 Cost recovery levies

Research, compliance activities, observers, and registry services are funded, at least partially, by levies recovered from the fishing industry.

The cost recovery regime, which is legislated under Part 14 of the Fisheries Act 1996, enables the Crown to recover its costs in respect of the provision of fisheries and conservation services, as far as practicable, from those people who have requested services, who benefit from the provision of those services or cause the adverse effects that the services are designed to avoid, remedy, or mitigate.

MPI uses the Fisheries (Cost Recovery) Rules 2001 to calculate the levies to be applied to each fish stock, based on the total amount to be cost recovered from the commercial fishing industry and the under or over-recovery of levies in the previous year. The proposed levies are consulted on with industry as per statutory requirements.

Table 16 shows the total amount levied from deepwater stocks for the 2022/23 fishing year and Figure 4 shows the total amount levied for both deepwater, and all, stocks between the 2006/07 and 2022/23 fishing years. Species specific cost recovery levies are provided in Appendix IV.

Table 16: The total levied for the 2022/23 financial year from stocks managed under the National Deepwater Plan 2019 as well as the total levied across all New Zealand fisheries.

		Total levied ($M) for stocks managed in the National Deepwater Plan	Total levied ($M) for all New Zealand fisheries
Compliance		5.3	12.0
Registry		1.6	3.6
Observers	MPI	4.2	6.3
	DOC	0.9	2.5
Research	MPI	8.9	12.9
	DOC	0.8	1.6
Under & Overs	MPI	-0.6	-0.2
	DOC	-0.05	0
Total		**21.0**	**38.6**

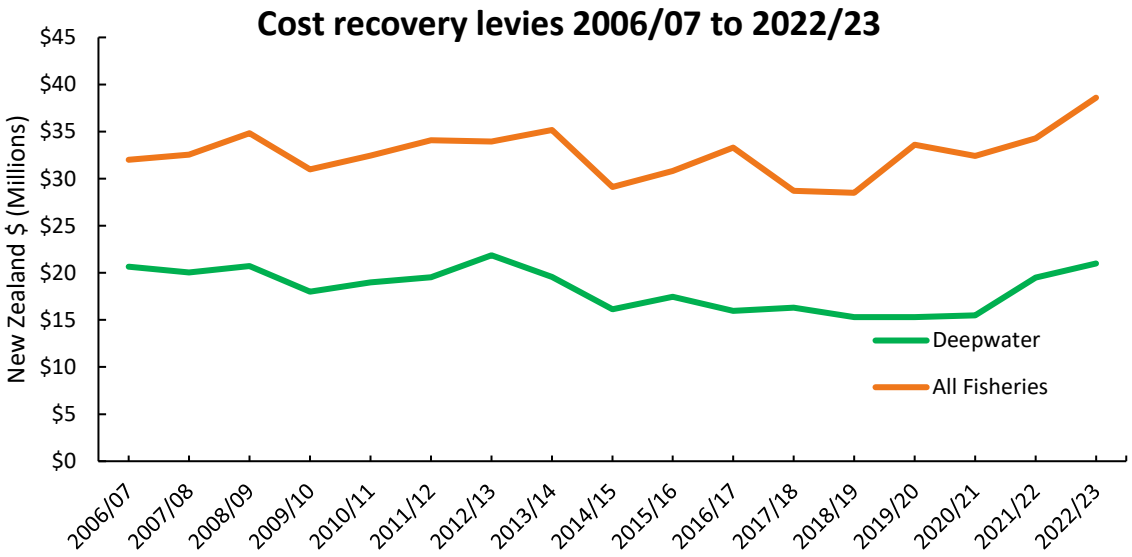

Figure 4: Total amount recovered by cost recovery levies between 2006/07 and 2022/23. Separate totals are shown for deepwater species, and all species combined.

4 General environmental reporting and adherence to non-regulatory management measures

This part of the ARR summarises the overall impacts of deepwater fishing on the marine environment, and reports adherence to non-regulatory environmental mitigation measures for the 2022/23 fishing year. Fisheries-specific environmental interactions are reported in Appendix I.

In the tables throughout this section, 'core deepwater fleet' refers to all bottom longline vessels > 34 m in length, all trawl vessels > 28 m in length that are regularly used to target deepwater species, and all vessels used to target scampi (regardless of length).

4.1 Environmental reporting

New Zealand's deepwater fisheries are known to interact with the marine environment including protected species, the benthic habitat, and other bycatch species. To achieve Management Objectives 5, 6, 7 and 8, DWC and FNZ work together to monitor adherence to non-regulatory management measures and environmental interactions. Non-regulatory measures include vessel-specific vessel management plans (VMPs) for mitigating incidental seabird captures, Marine Mammal Operational Procedures (MMOP), and notification requirements for certain numbers of seabird or mammal captures (trigger points).

Vessel operators are required to report all captures of protected species to FNZ as part of their obligations under the Fisheries (Reporting) Regulations 2017.

Where required, observers from each observed trip on deepwater vessels are debriefed by the Deepwater Fisheries Management team to determine the vessel's adherence to all non-regulatory measures. Feedback on performance for every trip is provided to Deepwater Council Ltd (DWC). In any instance where issues were reported by observers, further follow up action is taken by DWC (discussed below).

Table 17 and Figure 5 summarise results of observer VMP audits on trawl vessels >28 m in length (during which Tier 1 species were targeted) and scampi trawlers (regardless of length) completed between the 2014/15 and 2022/23 fishing years.

Table 17: Summary of FNZ observer audits of adherence to non-regulatory measures.

Fishing year	Observed trawl trips	No. of trawl vessel VMP audits sent to and reviewed by DWC	Trips with no issues raised	Trips followed up	Percentage of reviewed trips followed up
2014/15	162	160	132	28	18
2015/16	162	160	140	20	13
2016/17	151	149	128	21	14
2017/18	156	150	134	16	11
2018/19	179	174[17]	159	15	9
2019/20	146	142	120	18	13
2020/21	141	141	120	21	18
2021/22	135	133	132	25	15
2022/23	133	133	119	14	11

[17] Observed trips on trawlers >28 m in length for which reviews of adherence to non-regulatory measures were not provided to DWG were mostly those trips where inshore species only were targeted.

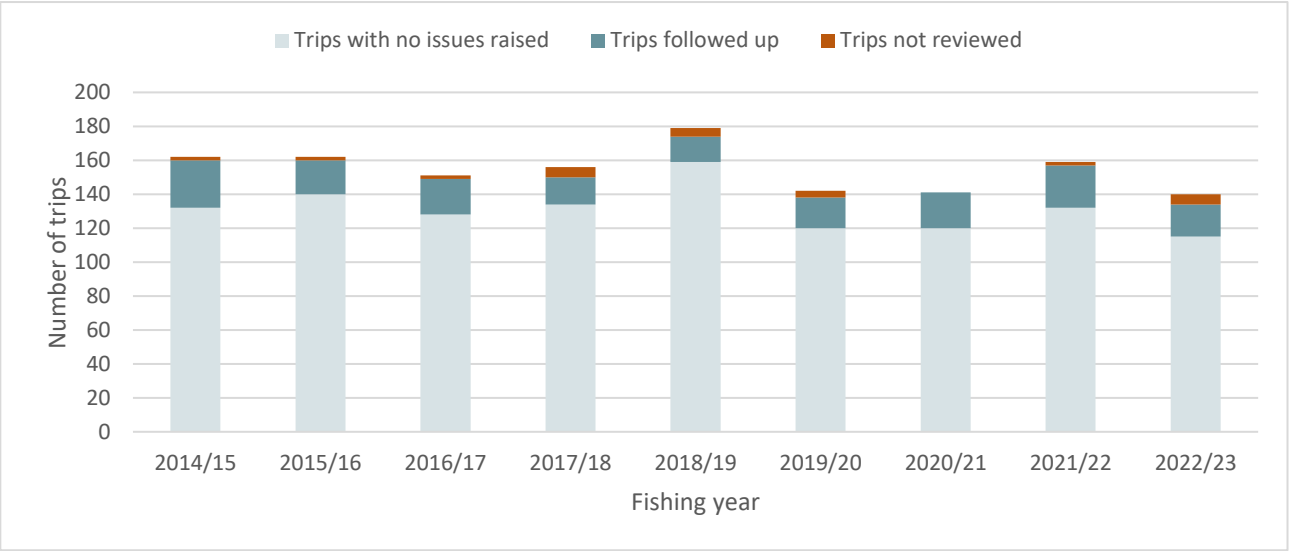

Figure 5. Summary of observer audits of adherence to non-regulatory measures

4.1.1 Vessel management plans

The following section summarises information provided through observer audits of >28 m trawl and scampi trawl vessel performance in relation to measures within VMPs/PSRMPs. Measures within VMPs that vessels are audited include the use of bird mitigation devices, the removal of fish 'stickers' from the net before shooting, avoiding shooting gear near congregations of marine mammals, and employing appropriate fish waste management techniques. Fish waste management is intended to reduce the amount of 'food' in the water for seabirds and marine mammals while fishing gear may pose a risk to those animals.

During 2022/23, VMP-related issues that required follow-up by DWC were identified following 14 trips on >28 m or scampi trawl vessels. VMP issues were classed as being in one of four general categories listed below (Table 17 and Figure 6). Fish waste management issues were followed up after 6 trips.

- Administrative – Relating to misunderstandings about requirements i.e. the need for observers to be shown live seabirds prior to release;
- Seabird trigger reporting – relating to the reporting of trigger points;
- Seabird mitigation – relating to the need to employ an additional seabird mitigation device when experiencing seabird captures, or when mitigation devices need to be replaced or repaired; or
- Fish waste management issues – see below.

Table 18: Breakdown of reviews with VMP-related referrals between the 2014/15 and 2022/23 fishing years

Type of referral	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Administrative	-	2	2	2	3	4	6	6
Seabird trigger not reported	1	-	2	-	-	-	2	0
Seabird scaring devices	5	6	3	2	3	6	4	2
Fish waste management	12	13	9	11	12	13	13	6
Total	18	21	16	15	18	23	25	14

4.1.2 Fish waste management

The management of offal is a contributing factor to both seabird and marine mammal captures. Therefore, issues with fish waste management on board vessels are considered relevant to both VMPs and MMOPs. During the 2022/23 fishing year there were 6 trips that required follow up in relation to fish waste management related issues (Table 18). Issues are divided into four broad categories: general fish waste management, net cleaning or leaving the net in the water longer than desirable, floor wash, and breakdown procedures.

Table 19: Breakdown of fish waste management/food attractant related reviews for VMP/MMOP issues between the 2015/16 and 2022/23 fishing years

Type of issue	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
General fish waste management	9	4	6	7	6	9	8	4
Net cleaning/ time in water	0	1	2	2	4	1	1	0
Floor wash	1	4	1	2	2	2	2	2

Type of issue	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Breakdown procedures	2	4	0	0	0	1	2	0
Total	12	13	9	11	12	13	13	6

4.2 Bottom longline operational procedures

During the 2022/23 fishing year, FNZ observers audited the performance of vessels against the Ling Bottom Longline (LIN 2-7) Operational Procedures for 8 trips. The procedures stipulate the non-regulatory management measures agreed between Deepwater Council Ltd (DWC) shareholders owning LIN 2-7 quota and Fisheries New Zealand to mitigate seabird captures. They are implemented and administered by DWC. Follow up actions were required after two trips in 2022/23 in relation to the sink rate and the aerial extent of the tori line.

4.3 Seabird captures

Total seabird captures in deepwater fisheries are estimated using statistical models that are informed by data on observed captures, fishing effort location data, and seabird species distribution data. Estimated captures provide an estimate of the total number of captures that would be observed if all effort was observed. They do not take into account any seabird mortalities that may take place due to interactions with fishing gear but are not observed (cryptic mortalities). Cryptic mortalities are considered in the seabird risk assessment, which informs the management of seabird risk in New Zealand.

Information regarding observed captures of seabirds (excludes deck strikes) is available for each fishing year, whereas modelled total capture estimates take some time to process. Information presented here represents the best available information at the time of publication. Table 19 reports all observed seabird captures from deepwater fisheries for the 2022/23 fishing year and Figure 7 shows the top ten species caught. Note that Table 19 and Figure 7 use raw data from Fisheries New Zealand observers. Species identifications have not yet been verified may be subject to change after specimens are necropsied or observer photos are formally identified by the Department of Conservation.

Table 20: Observed seabird captures for the 2022/23 fishing year from deepwater fisheries. 18 Captures that were recorded as deck strikes or where a bird rode the codend before release are not included.

Seabird species		Alive	Dead[19]	Total
Common name	Species Code			
Albatrosses (Unidentified)	XAL	4	6	10
Black petrel	XBP	1	1	2
Black-bellied storm petrel	XFT	1		1
Buller's albatross	XBM	1	6	7
Buller's and Pacific albatross	XPB	1	22	23
Campbell albatross	XCM		1	1
Cape petrels	XCP		2	2
Chatham Island albatross	XCI		1	1
Giant petrels (unidentified)	XTP		1	1
Great albatrosses	XGA	1	2	3
Mid-sized petrels & shearwaters	XPM	1	3	4

[18] Data includes >28m trawlers, scampi trawlers, and BLL vessels targeting LIN.

[19] Seabird captures recorded as 'decomposing' have not been included in this table.

Seabird species		Alive	Dead[19]	Total
Common name	Species Code			
Petrel (unidentified)	XPE	1	11	12
Petrels, prions, and shearwaters	XXP	1		1
Prions (unidentified)	XPN	1		1
Procellaria petrels	XPC	8	11	19
Royal albatrosses	XRU	1	1	2
Salvin's albatross	XSA	8	28	36
Shearwaters	XSW	1	2	3
Smaller albatrosses	XMA	2	3	5
Sooty shearwater	XSH	5	26	31
Storm petrels	XST		1	1
Westland petrel	XWP		11	11
White-capped albatross	XWM	30	26	56
White-chinned petrel	XWC	24	54	78
Total		**92**	**219**	**311**

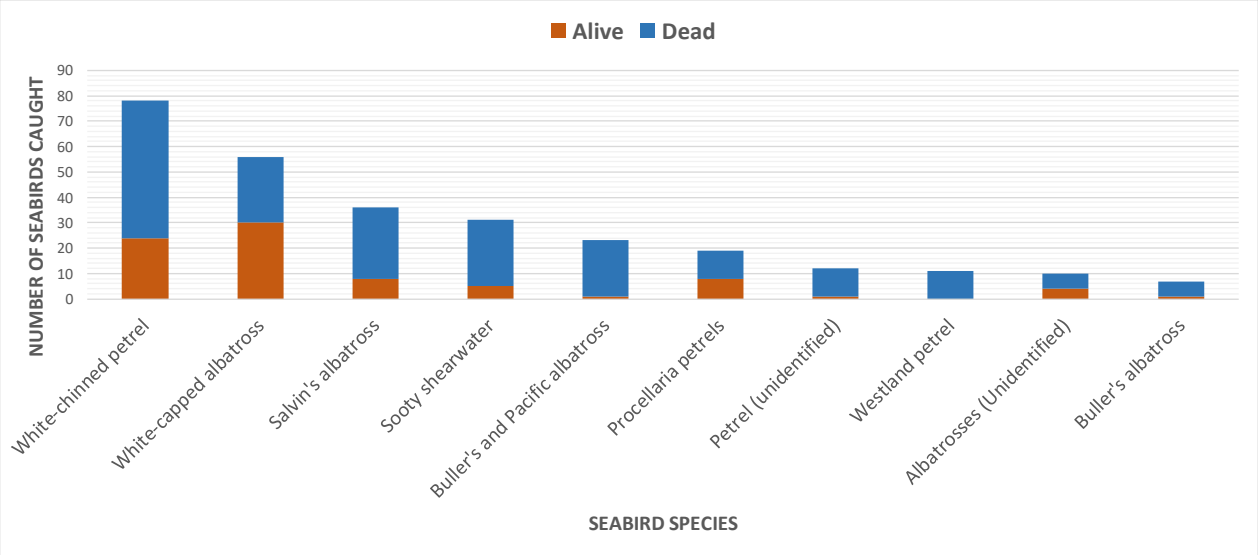

Figure 7. Top ten seabird species caught in 2022/23.

Table 20 and figures 8 and 9 summarise the capture locations of observed seabird captures on deepwater trawl vessels between the 2014/15 and 2022/23 fishing years.

Table 21: Number of observed seabird captures on deepwater trawl vessels between 2014/15 and 2022/23.

Fishing year	Net captures			Warp captures			Other		
	Dead	Alive	Unknown	Dead	Alive	Unknown	Dead	Alive	Unknown
2014/15	257	297	1	21	1	1	17	9	-
2015/16	259	116	1	43	1	3	16	3	-
2016/17	282	99	-	22	1	-	8	5	-
2017/18	268	158	5	33	1	-	8	23	-
2018/19	294	128	-	60	-	-	8	4	-
2019/20	334	141	6	29	-	-	14	4	-
2020/21	194	84	-	41	-	-	5	-	-
2021/22	274[20]	65	-	36	5	-	35	26	5
2022/23	171	88	2	28	1	-	8	3	-

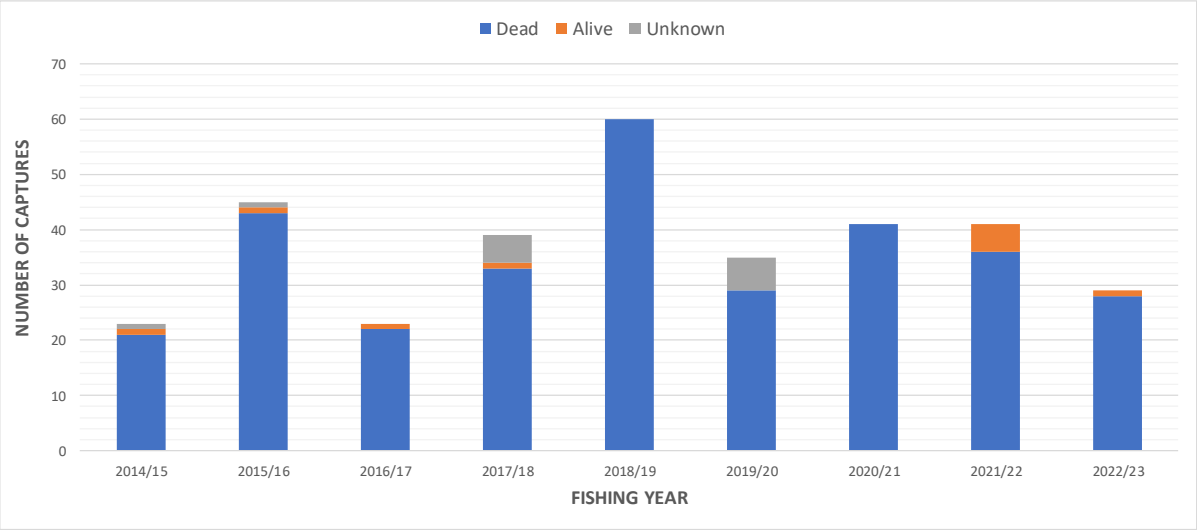

Figure 8. Number of observed seabird warp captures on deepwater trawl vessels between 2014/15 and 2022/23

[20] Of these captures, 11 were reported as 'decomposing'.

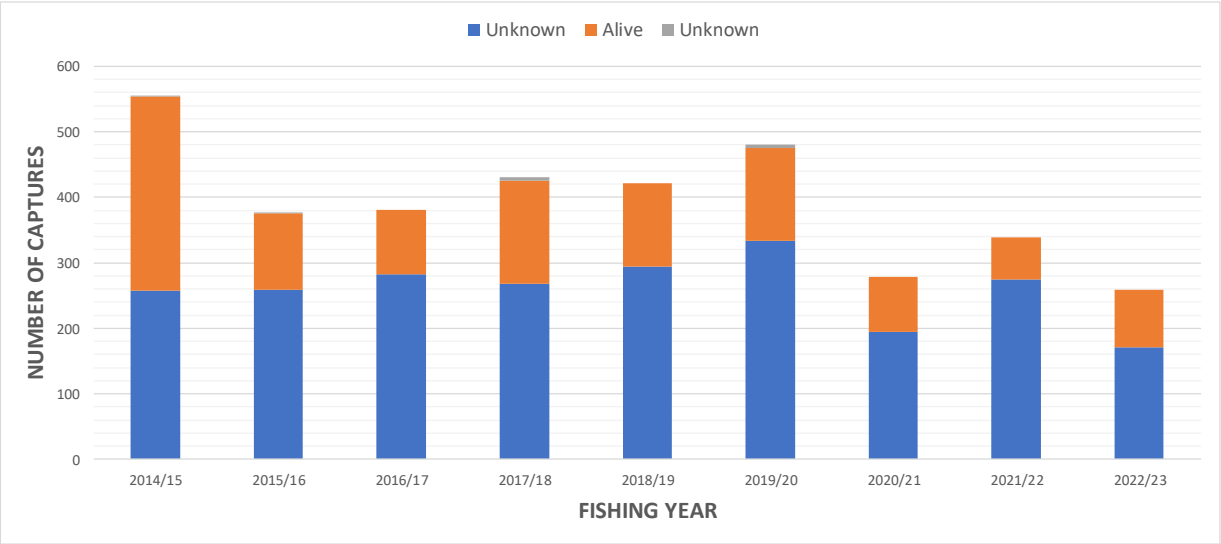

Figure 9. Number of observed seabird net captures on deepwater trawl vessels between 2014/15 and 2022/23

Table 22 and figure 10 show industry-reported seabird captures between the 2014/15 and 2022/23 fishing years.

Table 22: Industry-reported seabird interactions between the 2014/15 and 2022/23 fishing years from the core deepwater fleet[21]

Fishing year	Large seabirds			Small seabirds			Total
	Alive	**Dead**	**Total**	**Alive**	**Dead**	**Total**	
2014/15	114	221	335	281	380	661	996
2015/16	95	279	374	109	341	450	1,028
2016/17	85	176	261	86	327	413	674
2017/18	126	218	344	164	278	442	786
2018/19	89	272	361	140	308	448	809
2019/20	115	216	331	163	441	604	935
2020/21	104	189	293	76	277	353	646
2021/22	77	161	239	608	266	874	1,113
2022/23	118	193	311	169	182	181	370

[21] Large seabirds constitute albatross and giant petrels; small seabirds constitute petrels, shearwaters, prions, and shags.

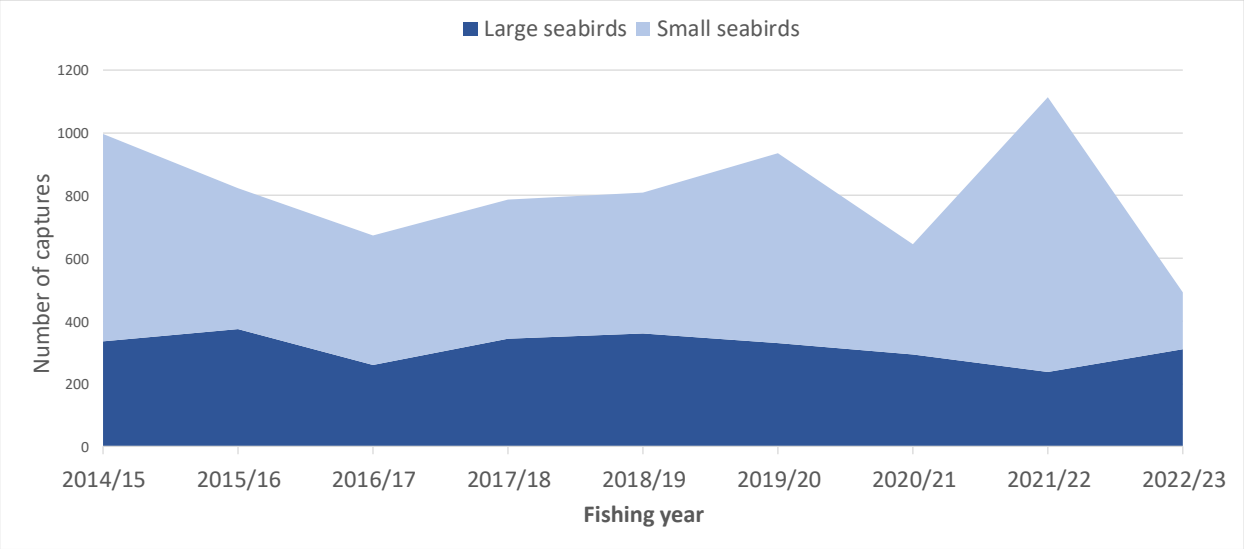

Figure 10. Industry-reported seabird interactions between the 2014/15 and 2022/23 fishing years.

Table 23: Observed seabird captures for New Zealand deepwater and middle-depth trawl fisheries for the 2022/23 fishing year

Target species	Tows	Tows observed	% of tows observed	Observed captures	Observed capture rate (per 100 tows)
Hoki	9,920	3,493	35.21	118	3.38
Hake	259	193	74.52	1	0.52
Ling (LIN 3 – 7)	6,979	911	13.05	44	4.83
Squid	2,217	1,623	73.21	143	8.81
Southern blue whiting	618	597	96.60	7	1.17
Jack mackerel	1,924	1,105	57.43	4	0.36
Scampi	4,817	696	14.45	18	2.59
Deepwater (ORH/OEO/CDL/BYX)	4,627	1,010	21.82	3	0.30
Barracouta	1,120	154	13.75	13	8.44
Warehou species	351	20	5.70	4	20.00
Total	32,832	9,802	29.86	**355**	3.62

Table 24: Observed and estimated seabird captures from deepwater ling bottom longline fisheries (LIN 3 – LIN 7) between 2014/15 and 2022/23.

Fishing year	Hooks set	Observed				Estimated	
		Hooks observed	% of hooks observed	Observed seabird captures	Capture rate (per 1,000 hooks)	Estimated total captures	95% confidence interval
2014/15	16,957,923	636,486	4	16	0.025	570	293 – 1,026
2015/16	21,228,063	2,059,615	10	88	0.043	690	412 – 1,106
2016/17	23,786,799	3,800,948	16	31	0.008	633	328 – 1,169
2017/18	19,232,211	5,109,103	27	23	0.005	353	191 – 644
2018/19	20,442,735	2,247,100	11	21	0.009	545	187 – 632
2019/20	19,213,033	3,402,393	16	91	0.027	805	502 – 1,304
2020/21	20,826,896	1,144,639	6	31	0.026	602	337 – 1,037
2021/22	23,874,471	4,697,419	20	50	0.011	-	-
2022/23	16,553,509	4,512,238	27	10	0.002	-	-

4.3.1 Seabird bycatch trigger point notifications

All trawl vessels >28 m, those trawl vessels targeting scampi, and bottom longline vessels targeting ling stocks LIN 2 – LIN 7 are required to notify DWC any time they capture more than a given number of seabirds (or marine mammals) within a defined time period. These are known as trigger point notifications. When a trigger point is reached, the vessels report the event to DWC within 24 hours. The DWC Environmental Liaison Officer (ELO) then contacts the vessel to determine if there was any particular factor (such as a mitigation measure failure, mechanical breakdown, or weather conditions) that may have contributed to the trigger event. The DWC ELO will determine what additional mitigation measures the vessel should take (if any). Through electronic reporting (ER), Fisheries Management can independently monitor trigger points and identify discrepancies between the ER data and what was notified to DWC.

Trigger points are summarised in Table 24 below. There were five trigger point activations for seabird captures in the 2022/23 fishing year. Most seabird trigger point activations are a result of net captures.

FNZ monitors trigger point alerts closely and is notified by DWC of the subsequent mitigation actions taken by the vessel. FNZ observers on board deepwater vessels audit performance against the DWC Operational Procedures and VMPs.

Table 25: Number of seabird trigger point activations (as reported by DWC) between the 2015/16 and 2022/23 fishing years.

Seabirds	Trigger points		2015 /16	2016 /17	2017 /18	2018 /19	2019 /20	2020 /21	2021 /22	2022 /23
	Captures in any 24-hr period	Captures in any 7-day period								
Large	3 +	10 +	8	3	6	6	4	2	2	2
Small	5 +	10 +	3	8	7	1	15	7	6	3

4 Marine mammals

Total marine mammal interactions and captures in deepwater fisheries are estimated using statistical models that are informed by data on observed interactions, fishing effort location data from each deepwater fishery and marine mammal distribution data. The estimates of total captures do not include any estimates of cryptic mortality, although this will be included in the risk assessment modelling.

Information regarding observed captures of marine mammals is available shortly after the completion of each fishing year, whereas modelled total capture estimates take some time to process. Table 25 reports all observed marine mammal captures in deepwater fisheries between the 2018/19 and 2022/23 fishing years while Table 26 reports all fisher reported marine mammal captures in deepwater fisheries between the 2018/19 and 2022/23 fishing years. Table 27 and Figure 12 show observed New Zealand fur seal capture data from fishing activity targeting deepwater species. Marine mammal interactions by fishery are reported in Appendix I.

Table 26: Observed captures (core deepwater fleet) of marine mammals between the 2018/19 and 2022/23 fishing years

Species	Observed captures									
	Alive					Dead				
	18/19	19/20	20/21	21/22	22/23	18/19	19/20	20/21	21/22	22/23
Common dolphin	-	-	-	-	-	-	-	-	-	1
Dusky dolphin	-	-	-	-	-	-	2	-	1	-
NZ fur seal	7	2	1	5	2	56	52	58	36	56
NZ sea lion	-	1	2	-	-	9	-	7	2	3
Pilot whale	-	-	-	-	-	-	1	-	-	-
Orca	-	-	-	-	-	-	-	-	-	-
Whale (unidentified)	-	-	-	-	-	-	-	-	2[22]	-

Table 27: Industry reported captures (core deepwater fleet) of marine mammals between the 2018/19 and 2022/23 fishing years.

Species	Fisher-reported captures									
	Alive					Dead				
	18/19	19/20	20/21	21/22	22/23	18/19	19/20	20/21	21/22	22/23
Common dolphin	-	-	5	-	-	-	5	-	5	2
Dusky dolphin	-	-	-	-	-	2	2	-	6	1
NZ fur seal	12	12	15	15	11	81	105	98	117	136
NZ sea lion	-	1	2	-	1	9	2	7	4	3
Seals and sea lions	-	-	1	-	-	1	-	2	-	-
Pilot whale	-	-	-	-	-	-	1	1	-	-
Orca	-	-	-	-	-	-	-	-	-	-
Baleen whales	-	-	-	-	-	1	-	-	-	-

[22] Decomposing remains

Southern right whale	-	-	-	-	-	-	1[23]	-	-	-
Dolphin and toothed whales (unidentified)	-	-	-	-		-	-	1	-	

Table 28: Observed NZ fur seal captures from deepwater and middle-depth trawl fisheries for the 2022/23 fishing year

Target species	Tows	Observed tows	% of tows observed	Captures[24]	Observed captures
Hoki	9,920	3,493	35.21	101	27
Hake	259	193	74.52	-	-
Ling (LIN 3 – 7)	6,979	911	13.05	4	-
Squid	2,217	1,623	73.21	11	27
Southern blue whiting	618	597	96.60	9	3
Jack mackerel	1,924	1,105	57.43	2	3
Scampi	4,817	696	14.45	-	-
Deepwater complex (ORH/OEO/CDL/BYX)	4,627	1,010	21.82	-	-
Barracouta	1,120	154	13.75	7	2
Warehou species	351	20	5.70	2	1
Total	32,832	9,802	29.86	136	63

4.1 Marine mammal operational procedures

The Marine Mammal Operational Procedures (MMOPs) aim to reduce the risk of incidental captures of marine mammals during deepwater fishing activity. Measures included in the MMOPs include minimising the amount of time the trawl gear is on the surface, removing stickers from the net before shooting it, moving away from large congregations of marine mammals before shooting if possible, and always being on the lookout for marine mammals around fishing gear. Specific measures are included to minimise the risk of dolphin captures including information on the time of day and areas where the risk of dolphin captures is highest. It also includes trigger points which should be reported to DWC within 24 hours.

4.2 Marine mammal trigger point notifications

All trawl vessels >28 m are required to notify DWC any time they capture more than a given number of marine mammals within a defined time period. There were 22 trigger point activations for marine mammal captures during the 2022/23 fishing year. These are summarised in Table 29.

[23] Decomposing remains

[24] Records of decomposing remains have not been included

Table 29: Marine mammal trigger point notifications reached between 2016/17 and 2022/23 fishing years

Species	Trigger points		2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/2
	Captures in any 24-hr period	Captures in any 7-day period							
NZ fur seal	2	5	5	6	8	6	11	21	13
Common dolphin	1	-	0	1	0	1	1	1	5
NZ sea lion	1	-	3	8	9	2	9	4	4
Other[25]	1	-	1	2[26]	2[27]	4[28]	0	4[29]	0

5 Sharks

Management Objectives 6 and 8 in the National Deepwater Plan address the need to manage and monitor shark interactions with deepwater fishing activity. The management of sharks in New Zealand is guided by the National Plan of Action for the Conservation and Management of Sharks (NPOA-Sharks 2013), which was reviewed and updated in 2021 and 2022 and a new draft consulted on in 2022. The NPOA-Sharks sets out goals and objectives to guide the conservation and management of sharks.

On 1 October 2014 it became illegal for commercial fishers to remove the fins from any shark and discard the body of that shark at sea (shark finning). Fishers are still able to land shark fins, however conditions apply depending on the species concerned (summarised in the Table 29 below). It also became possible for fishers to return dead mako, porbeagle and blue sharks to the sea and balance catch against Annual Catch Entitlement (ACE). Fishers were already able to return these species, as well as rig and school shark, to the sea if they were alive and likely to survive.

Table 30: Summary of conditions that apply if fishers wish to land shark fins.

Approach	Description	Applicable species
Ratio	Fins must be stored and landed separately by species. The weight of fins landed must not exceed a specified percentage of the greenweight of the shark. Weight of fins must be reported on landing returns. The ratio applies to landings on a trip-by-trip basis.	Elephant fish
		Dark ghost shark
		Mako shark
		Pale ghost shark
		Porbeagle shark
		Rig
		School shark
Fins artificially attached	After being processed to the dressed state, fins must be re-attached to the shark by some artificial means. Landings to be reported with landed state of SFA (shark fins attached)	Blue shark
Fins naturally attached	After being processed to the headed and gutted state, the fins must remain attached to the body by some portion of uncut skin. Landings to be reported with landed state of SFA (shark fins attached).	Spiny dogfish All non-QMS species

In 2013, a trigger point was added to the Deepwater Fisheries Operational Procedures that requires vessels to report any basking shark captures to DWC within 24 hours. Three basking shark triggers were reported

[25] All cetaceans other than common dolphin and all pinnipeds other than New Zealand fur seal and New Zealand sea lion.

[26] One orca and one unidentified dolphin.

[27] One capture event involving the capture of two dusky dolphins (both dead at the time of capture) and one involving the capture of a neonate Risso's dolphin.

[28] Four capture events, two involving two dusky dolphins, one involving two unidentified dolphins and one involving a pilot whale

[29] All trigger points in this category relate to dusky dolphin captures

during the 2022/23 fishing year. Table 31 shows the number of observed and industry reported protected shark captures in deepwater fisheries between the 2016/17 and 2022/23 fishing years.

Table 31: Observed and industry reported captures of protected shark species from the core deepwater fishing fleet between the 2016/17 and 2022/23 fishing years.

Species		2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Basking shark	Observed	5	1	7	11	3	2	3
	Fisher-reported	8	1	7	11	4	2	3
Small tooth sandtiger shark	Observed	-	-	-	-	1	-	-
	Fisher-reported	-	-	-	-	1	-	-
White pointer shark	Observed	3	5	3	9	4	4	4
	Fisher-reported	4	5	3	9	4	11	4

In New Zealand, sharks are defined under the Fisheries (Commercial Fishing) Regulations 2001 "shark means a fish of the class Chondrichthyes but excludes [superorder] Batoidea" so includes all true sharks as well as Order Chimaeriformes (includes pale ghost shark, dark ghost shark and elephant fish), but exclude superorder Batoidea (skates and rays). NPOA-Sharks defines sharks more broadly than the regulations, encompassing all species of cartilaginous fish (Class Chondrichthyes) including harvested and protected species. The NPOA has no legal standing. Within both definitions, some species are protected, some are managed under the QMS, and some are reported using generic codes that do not allow for species determination.

Reporting for sharks in connection with deepwater fisheries includes information on the total interactions with shark species during deepwater fishing activity, interactions with protected shark species, the level of the use of generic reporting codes, and information about the utilisation and processing of sharks in deepwater fisheries. Table 32 shows the reported landings of sharks by the core deepwater fleet during the 2022/23 fishing year.

Table 32: Reported landings of sharks from the core deepwater fishing fleet in 2022/23 (greenweight tonnes).

Species	Chimaeras[30]	Rays & skates	Sharks & dogfish	Total
Generic reporting code	1	4	180	183
QMS species	1,070	341	3,340	4,752
Other	125	7	875	1,008
Total	1,196	353	4,395	5,994

Generic reporting codes make it impossible to accurately quantify the captures of specific shark species. The NPOA-Sharks identified the use of generic reporting codes for shark catches as an area in need of attention from FNZ. Table 33 shows that the use of generic reporting codes has decreased over time. The decline in the use of generic reporting codes will allow improved quantification of shark catches in the future.

Table 33: Use of generic reporting codes from both observer data and reported landings between the 2015/16 and 2022/23 fishing year by the core deepwater fleet.

Year	Percentage of industry-reported landings with generic codes	Percentage of observed shark catches with generic codes

[30] Cartilaginous fish in the order Chimaeriformes (variously known as ghost shark or elephant fish).

2015/16	6	3
2016/17	5	1
2017/18	3	1
2018/19	4	1
2019/20	3	1
2020/21	3	1
2021/22	3	1
2022/23	3	2

Details of QMS shark landings by the core deepwater fleet during 2022/23 are summarised in Table 34. No vessels from the core deepwater fleet reported landing any sharks under the processed state code SFA (shark fins attached).

Table 34: Primary processed state of QMS shark species landed by the core deepwater fleet during the 2022/23 fishing year (tonnes).

Species	Total landings[31]	Discarded under observer approval (J)	Returned dead (exceptions notice) (X)	Returned alive (exceptions notice) (Z)	Accidental loss (A)
Blue shark	<1	N/A	1.8	4.5	<1
Elephant fish	13.4	<1	N/A	N/A	-
Dark ghost shark	372.8	111.3	N/A	N/A	<1
Pale ghost shark	765	28.9	N/A	N/A	<1
Mako shark	<1	N/A	N/A	21.5	<1
Porbeagle shark	<1	N/A	9.8	37.8	<1
Rig	6	17	N/A	N/A	2.2
Rough skate	111.6	11.8	40.4	N/A	<1
School shark	173.9	14.5	8	N/A	<1
Smooth skate	185	10.4	120.1	N/A	3
Spiny dogfish	1,163	13	2,112[32]		<1
Total	**2,792.7**	**206.2**	**180.1[33]**	**63.8**	**8.2**

6 Reptiles

There were no observed reptile capture events in the 2022/23 fishing year.

[31] Total landings may not equal the sum of fish landed, returned or accidentally lost due to rounding errors and/or fish that were reported using other landed destination types (e.g. consumed on board, used as bait or retained by an observer as a specimen).

[32] Disposal code M

[33] Excludes spiny dogfish discards

7 Benthic interactions

8 Benthic bycatch

Many deepwater species are targeted using fishing methods that result in regular contact between fishing gear and the seabed. This can lead to bycatch of benthic organisms including corals, sponges, and sea anemones. In New Zealand all black corals, gorgonian corals, stony corals, and hydrocorals are protected under the Wildlife Act 1953. Details of observed and industry-reported benthic bycatch between 2018/19 and 2022/23 are shown in Table 35.

Table 35: Observed (O) and industry reported (IR) catch of benthic species (kg) by the core deepwater fleet between the 2018/19 and 2022/23 fishing years

Species	2018/19		2019/20		2020/21		2021/22		2022/23	
	O	IR	O	IR	O	IR	O	IR	O	IR
Anemones	7,773	4,275	5,064	9,249	7,852	14,312	8,467	7,859	6,815	9,634
Corals	631	163	2,656	35	3,860	20	1,936	24	4,910	31
generic codes[34])	8,141	27,928	1,024	1,488	938	5,350	104	9,763	1,718	6,113
Hydroids	18	-	65	-	10		40	-	27	-
Sea pens	104	-	125	-	95		194	-	215	-
Sponges	18,752	78,622	30,639	57,909	33,772	49,936	15,204	34,291	21,023	60,535

9 Trawl footprint

The most recent iteration of the deepwater trawl footprint[35] estimated the extent of bottom contact by trawl vessels targeting Tier 1 and Tier 2 species between 1990 and 2021.[36] The reporting is based on all relevant reporting data and is reviewed each year through the Aquatic Environment Working Group. The TCER[37], TCEPR[38], and ERS[39] data provide tow-by-tow information that can be used to generate annual trawl footprints that represent the area of the seafloor contacted by trawl gear. Trawled area is reported against the 'fishable area', which is defined as the area shallower than 1600 m and not closed to bottom trawling (by BPAs, seamount closures or marine reserves).

The Tier 1 and Tier 2 target fish stock trawl footprint between 1990 and 2021 was 355,701km^2. This represents almost 9% of the seafloor between the coastline and the outer boundary of the EEZ and 25% of the seafloor that is open to bottom trawling and within fishable depths (shallower than 1600m).

In 2021, the trawl footprint for both tier 1 and tier 2 species was 43,633 km^2. The most recent three years represent the lowest annual footprints for the past 30 years.

During 2021, hoki trawls contacted 38% of the cells[40] making up the deepwater trawl footprint, while orange roughy trawls contacted 22%. Trawling for scampi, squid, and jack mackerels accounted for 11%, 10%, and 7% of the 2021 footprint area, respectively.

[34] Corals (COU) + corals, sponges, bryozoans (CSB)

[35] MacGibbon, D.J.; Mules, R. (2023). Extent and intensity of bottom contact by commercial trawling and shellfish dredging in New Zealand waters, 1990–2021. New Zealand Aquatic Environment and Biodiversity Report No. 316. 174 p

[36] The latest trawl footprint (between 2018/19 and 2020/21 fishing years) utilises ERS data as it allows for more precision in locating start and end positions

[37] Trawl Catch Effort Return

[38] Trawl Catch Effort Processing Return

[39] Electronic Reporting System

[40] 25 km^2 cells are used as reference points. A cell is considered 'contacted' if any part of the cell is trawled.

The spatial distribution analysis of where the footprint contacted the seafloor in one year but not in the next suggests that over recent years there has been very little expansion beyond the regularly fished areas, other than in the Challenger area off the west coast of the South Island.

Appendix I: Summaries of deepwater fisheries for 2022/23

Alfonsino (BYX) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
BYX 1	23.1	304	300	2	2	-
BYX 2	1,561	1,575	1,575	-	-	-
BYX 3	264	1,010	1,010	-	-	-
BYX 7	3.9	80.5	80.5	-	-	-
BYX 8	<1	20	20	-	-	-
BYX 10	0	10	10	-	-	-

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	B_{MSY} (30-50% B_0)	BYX 1	B_{2010} 'Likely' (>60%) to be at or above the target
	40%	All other stocks	Unknown
Soft Limit	20% B_0	BYX 1	B_{2010} 'Very Unlikely' (<10%) to be below the soft limit
		All other stocks	Unknown
Hard Limit	10% B_0	BYX 1	B_{2010} 'Very Unlikely' (<10%) to be below the hard limit
		All other stocks	Unknown

2022/23 Deemed value rates (per kg) and invoices								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
BYX 1 and BYX3-8	$1.98	$2.20	$2.64	$3.08	$3.52	$3.96	$4.40	$0
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-110%	110-130%	130-150%	150-170%	170-190%	190%+	
BYX 2	2.16	$2.40	$2.88	$3.36	$3.84	$4.32	$4.80	$0

Environmental indicators and observer coverage		
Seabirds	2021/22: 2 observed captures	2022/23: 0 observed captures
Fur seals	2021/22: 0 observed captures	2022/23: 3 observed captures
Dolphins	2021/22: 0 observed captures	2022/23: 0 observed captures
Benthic interactions[41] (fishable area trawled)	2020/21: 310.0 km (7.40%)	1990-2021: 4,188 km^2

Economic indicators (calendar year)			
Quota value 2019	NZ $86.9 M	Export earnings 2023[42]	NZ $8.4 M FOB[43] (includes catch taken outside the EEZ)

[41] Trawl footprint statistics include all tows when the species is targeted only. MacGibbon, D.J.; Mules, R. (2023)

[42] All export earnings are for the calendar year from January 2023 to December 2023. They are provisional only and are subject to change.

[43] Free on board. The value of export goods, including raw material, processing, packaging, storage, and transportation up to the point where the goods are about to leave the country as exports. FOB does not include storage, export transport or insurance cost to get the goods to the export market. Note that since export data presented in these tables is for the calendar year, it does not completely align with fishing effort and landings data, which are reported for the fishing year.

Barracouta (BAR) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
BAR 4	493	3,019	3,019	-	-	-
BAR 5	6,975	8,370	8,200	3	2	165
BAR 7	1,596	11,173	11,173	-	-	-

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	BAR 4	Unknown (2021)
		BAR 5	Unknown (2021)
		BAR 7	Unknown (2020)
Soft Limit	20% B_0	BAR 4	Unknown (2021)
		BAR 5	B_{2021} is 'Unlikely' (<40%) to be below the soft limit
		BAR 7	Unknown (2020)
Hard Limit	10% B_0	BAR 4	Unknown (2021)
		BAR 5	B_{2021} is 'Very Unlikely' (<10%) to be below the hard limit
		BAR 7	Unknown (2020)

2022/23 Deemed value rates (per kg) and invoices								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
BAR 7	$0.22	$0.24	$0.29	$0.34	$0.38	$0.43	$0.48	< $1
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-110%		110-120%		120%+		
BAR 4 BAR 5	$0.23	$0.25		$0.50		$1.00		$ $0

Environmental indicators and observer coverage[44]			
Observer coverage		2022/23: 90% of target tows observed	
Seabirds		2021/22: 33 observed captures	2022/23: 12 observed captures
Marine mammals	Fur seals	2021/22: 5 observed captures	2022/23: 6 observed captures
	Dolphins	2021/22: 4 observed captures	2022/23: 0 observed captures
Benthic interactions (fishable area trawled)		2020/21: 2,934.4 km^2 (7.79%)	1990 to 2021: 37,662.9 km^2

Economic indicators (calendar years)	
Quota value 2019	NZ $83.3 M (includes BAR 1 holdings)
Export earnings 2023	NZ $30.5 M FOB[45]

[44] Trawl vessels greater than 28 m in length targeting all barracouta stocks.

[45] Includes all BAR stocks

Black cardinalfish (CDL) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
CDL 1	1.6	176	160	0	0	16
CDL 2	179	460	440	0	0	20
CDL 3	67	196	196	0	0	0
CDL 4	4.5	66	66	0	0	0
CDL 5	1.4	34	33	0	0	1
CDL 6	<1	1	1	0	0	0
CDL 7	5	39	39	0	0	0
CDL 9	2.7	4	4	0	0	0

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	CDL 2, 3 & 4	B_{2009} estimated to be 12% B_0. 'Very Unlikely' (<10%) to be at or above target
		All other stocks	Unknown
Soft Limit	20% B_0	CDL 2, 3 & 4	B_{2009} 'Likely' (>60%) to be below the soft limit
		All other stocks	Unknown
Hard Limit	10% B_0	CDL 2, 3 & 4	B_{2009} 'About as Likely as Not' (40-60%) to be below the hard limit
		All other stocks	Unknown

2022/23 Deemed value rates (per kg) and invoices				
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)		2022/23 Actual
		100%+		
CDL 5 CDL 6 CDL 7 CDL 9	$0.27	$0.30		$0 $6.60 $0 $11.10
Stock	Interim rate	100-120%	120%+	2022/23 Actual
CDL 1 & 2	$0.54	$0.60	$0.69	$0
CDL 3 & 4	$0.47	$0.52	$0.60	$0

Environmental indicators and observer coverage		
Observer coverage	2022/23: 29% of CDL 2 target tows observed	
Seabirds	2021/22: 1 observed capture	2022/23: 0 observed captures
Marine mammals	2021/22: 0 observed captures	2022/23: 0 Observed captures
Benthic interactions (fishable area trawled)	2020/21: 62.9 km^2 (2.81%)	1990 to 2021: 2,235.6 km^2

Economic indicators (calendar year)	
Quota value 2019	NZ $5.9 M
Export earnings 2023	NZ $424,783 FOB

Dark ghost shark (GSH) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing-related mortality
GSH 4	137	370	370	-	-	-
GSH 5	47	109	109	-	-	-
GSH 6	78	95	95	-	-	-

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	GSH 4, GSH 5 & GSH 6	Unknown (2016)
Soft Limit	20% B_0	GSH 4, GSH 5 & GSH 6	Unknown (2016)
Hard Limit	10% B_0	GSH 4, GSH 5 & GSH 6	Unknown (2016)

2022/23 Deemed value rates (per kg) and invoices								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
GSH 4 GSH 5 GSH 6	$0.36	$0.40	$0.48	$0.56	$0.64	$0.72	$0.80	$0 $58 $0

Environmental indicators	
Benthic interactions (fishable area trawled)	1990 to 2021: 90.6 km^2

Economic indicators (calendar year)	
Quota value 2019	NZ $7.9 M (includes GSH 1, GSH 2, GSH 3, GSH 7, GSH 8 & GSH 9 holdings)
Export earnings 2023	NZ $387,351 FOB (includes both pale and dark ghost shark, export statistics are not provided for individual ghost shark species)

Deepwater crab species (KIC/GSC/CHC) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing-related mortality
KIC 3	8	10	10	0	0	0
KIC 5	< 1	10	10	0	0	0
KIC 6	1.2	10	10	0	0	0
GSC 3	< 1	20	19	0	0	1
GSC 5	54	20	19	0	0	1
GSC 6A	42	187	170	0	0	17
GSC 6B	< 1	250	237	0	0	13
CHC 1	1.9	10	10	0	0	1

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	All CHC, GSC & KIC stocks	Unknown
Soft Limit	20% B_0	All CHC, GSC & KIC stocks	Unknown
Hard Limit	10% B_0	All CHC, GSC & KIC stocks	Unknown

2020/21 Deemed value rates (per kg) and invoices [46]								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
KIC 3 KIC 5 KIC 6	$1.62	$1.80	$2.16	$2.52	$2.88	$3.24	$3.60	$0
GSC 3 GSC 5 GSC 6A GSC 6B	$0.09	$0.10	$0.12	$0.14	$0.16	$0.18	$0.20	$0
CHC 1	$1.62	$1.80	$2.16	$2.52	$2.88	$3.24	$3.60	$0

Economic indicators (calendar year)	
Quota value 2019	NZ $400,000 (GSC only)
Export earnings 2023	No export information specific to deepwater crabs is currently available

Blue (English) mackerel (EMA) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
EMA 3	3.8	392	390	1	1	0
EMA 7	3,282	3,352	3,350	1	1	0

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B0	EMA 3 & EMA 7	Unknown (2020)
Soft Limit	20% B_0	EMA 3 & EMA 7	Unknown (2020)
Hard Limit	10% B_0	EMA 3 & EMA 7	Unknown (2020)

2022/23 Deemed value rates (per kg) and invoices								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
EMA3 EMA 7	$0.23	$0.26	$0.31	$0.36	$0.42	$0.47	$0.52	$0 $6

Environmental indicators		
Benthic interactions (fishable area trawled)	2021/22: 10.8 km^2 (1.9%)	1990 to 2021: 566.2 km^2

Economic indicators (calendar year)	
Quota value 2019	NZ $26.3 M (includes EMA 1 & EMA 2 holdings)
Export earnings 2023	NZ $15.8 M FOB (includes all stocks)

[46] only shown for stocks where catches > 0.1 t were taken

Frostfish (FRO) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
FRO 3	18	82	80	1	1	-
FRO 4	32	126	124	1	1	-
FRO 5	62	135	135	-	-	-
FRO 6	< 1	11	11	-	-	-
FRO 7	1,137	2,154	2,110	1	1	42
FRO 8	650	919	900	-	1	18
FRO 9	25	410	400	1	1	8

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	FRO 3 – FRO 9	Unknown
Soft Limit	20% B_0	FRO 3 – FRO 9	Unknown
Hard Limit	10% B_0	FRO 3 – FRO 9	Unknown

2022/23 Deemed value rates (per kg) and invoices			
Stock	Interim rate	Annual rate for catch in excess of ACE[47]	2022/23 Actual
FRO 3	$0.31	$0.34	$0
FRO 4	$0.22	$0.24	$0
FRO 5 to 9	$0.14	$0.15	< $1

Environmental indicators		
Benthic interactions (fishable area trawled)	2020/21: 8.5 km^2 (<1%)	1990 to 2021: 1,042.1 km^2

Economic indicators (calendar year)	
Quota value 2019	NZ $6.4 M (includes FRO 1 & FRO 2 holdings)
Export earnings 2023	No export information specific to frostfish is currently available

Gemfish (SKI) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
SKI 3	1,318	1,103	1,091	-	1	11
SKI 7	1,078	1,103	1,091	-	1	11

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	SKI 3 & SKI 7	Unknown (2021)
Soft Limit	20% B_0	SKI 3 & SKI 7	Unknown (2021)
Hard Limit	10% B_0	SKI 3 & SKI 7	B_{2021} unlikely (<40%) to be below the hard limit

2022/23 Deemed value rates (per kg) and invoices

[47] Differential deemed value rates are not set for frostfish stocks.

Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
SKI 3 SKI 7	$0.65	$0.72	$0.86	$1.01	$1.15	$1.30	$1.44	$158,218 $1,138
Environmental indicators								
Benthic interactions (fishable area trawled)		2020/21: 14.4 km^2 (<1%)				1990 to 2021: 2,524.9 km^2		
Economic indicators (calendar year)								
Quota value 2019		NZ $19.1 M (includes SKI 1 & SKI 2 holdings)						
Export earnings 2023		NZ $5.4 M FOB (includes all stocks)						

Hake (HAK) Tier 1

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
HAK 1	1,083	-	3,701	-	-	-
HAK 4	124	1,818	1,800	-	-	18
HAK 7	1,696	2,300	2,272	-	5	23

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	HAK 1 Sub-Antarctic[48]	B_{2021} estimated to be 62% B_0. 'Very Likely' (>90%) to be at or above the target
		HAK 4 Chatham Rise[49]	B_{2020} estimated to be 55% B_0. 'Very Likely' (>90%) to be at or above the target
		HAK 7	B_{2019} estimated to be 17% B_0. 'Exceptionally Unlikely' (<1%) to be at or above the target.
Soft limit	20% B_0	HAK 1 Sub-Antarctic	B_{2021} 'Exceptionally Unlikely' (<1%) to be below the soft limit
		HAK 4 Chatham Rise	B_{2020} 'Exceptionally Unlikely' (<1%) to be below the soft limit
		HAK 7	B_{2019} 'About as Likely as Not' (40%-60%) to be below the soft limit.
Hard limit	10% B_0	HAK 1 Sub-Antarctic	B_{2021} 'Exceptionally Unlikely' (<1%) to be below the hard limit
		HAK 4 Chatham Rise	B_{2020} 'Exceptionally Unlikely' (<1%) to be below the hard limit
		HAK 7	B_{2019} 'Very Unlikely' (<10%) to be below the hard limit

2022/23 Deemed value rates (per kg) and invoices								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
HAK 1 HAK 4 HAK 7	$1.44	$1.60	$1.92	$2.24	2.56	2.88	3.20	$0 $0 $0
Environmental indicators and observer coverage[50]								
Observer coverage		2022/23: 95% of target tows observed						

[48] HAK Sub-Antarctic is defined as all of HAK 1 south of the Otago Peninsula.

[49] HAK Chatham Rise is defined as all of HAK 4 plus that part of HAK 1 north of the Otago Peninsula

[50] Trawl vessels >28 m in length.

Seabirds		2021/22: 1 observed capture	2022/23: 1 observed capture
Marine mammals	Fur seals	2021/22: 1 observed capture	2022/23: 0 observed captures
	Dolphins	2021/22: 0 observed captures	2022/23: 0 observed captures
Protected fish		2021/22: 0 observed captures	2022/23: 1 observed capture
Benthic interactions (fishable area trawled)		2020/21: 733.5 km^2	1990-2021: 94,951 km^2
Economic indicators (calendar year)			
Quota value 2019		NZ $75.3 M	
Export earnings 2023		NZ $9.7 M FOB	

Hoki (HOK)Tier 1

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
HOK1	105,555	111, 140	110,000	20	20	1,100

Reference points and current status			
Target range	35-50% B_0	Eastern stock[51]	B_{2023} was estimated to be 54% B_0. Very Likely (> 90 %) to be above the lower end of the target range. About as Likely as Not (40–60%) to be above the upper end of the range.
		Western stock[52]	B_{2023} was estimated to be 37% B_0. About as Likely as Not (40–60%) to be above the lower end of the target range. Exceptionally Unlikely (< 1%) to be above the upper end of the target range
Soft and Hard limits	10% B_0 Hard 20% B_0 Soft	Eastern stock	B_{2023} is Exceptionally Unlikely (< 1%) to be below both the Soft and Hard Limits.
		Western stock	$B_{2023}$is Very Unlikely (< 10%) to be below the Soft Limit and Exceptionally Unlikely (< 1%) to be below the Hard Limit.

2022/23 Deemed value rates (per kg) and invoices				
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)		2022/23 Actual
		100-102%	102%+	
HOK 1	$0.81	$0.90	$1.30	$9

Environmental indicators and observer coverage			
Observer coverage		2022/23: 44% of target tows observed	
Seabirds		2021/22: 99 observed captures	2022/23: 118 observed captures
Protected fish		2021/22: 1 observed capture	2022/23: 0 observed captures
Marine mammals	NZ fur seal	2022/23: 65 observed captures	2022/23: 35 observed captures
	Dolphins	2022/23: 0 observed captures	2022/23: 1 observed capture
Benthic interactions (fishable area trawled)		2020/21: 20,497.9km^2 (1.75%)	1990 to 2021: 1,872,060 km^2
Economic indicators (calendar year)			
Quota value 2019		NZ $1,251 M	
Export earnings 2023		NZ $246 M FOB	

51 The Eastern stock is taken to be the east coast of the North and South Islands, Mernoo Bank, Chatham Rise and Cook Strait.

52 The Western stock is taken to be the west coast of the North and South Islands and the area south of New Zealand including Puysegur, Snares and the Sub-Antarctic.

Eastern and Western catch limit reporting

The hoki fishery is considered to consist of two biological stocks: an eastern stock and western stock. Agreements between the Minister and the fishing industry have seen separate catch limits apply to each stock since 2001/02. For the 2022/23 fishing year, owners of the majority of hoki quota had formally entered into the catch limit agreement requested by the Minister. The east/west catch limit regime is administered by FishServe and monitored by DWC.

Table 36 provides details on the catch limits and catch amounts for the 2022/23 fishing year.

Table 36: Catch limits and actual catch estimates for 2022/23 fishing year (tonnes).

Stock	Catch limit	Catch within agreement (from FishServe)	Estimated catch (all fishers)
Eastern stock	65,000	60,069	60,432
Western stock	45,000	45,556	42,125

Hoki Operational Procedures

Hoki Operational Procedures stipulate the non-regulatory management measures agreed between HOK 1 quota owners, HOK 1 ACE holders and FNZ. The purpose of the Hoki Operational Procedures is to monitor and manage fishing effort for hoki within agreed hoki management areas (HMAs). Hoki Operational Procedures are monitored and administered by DWC.

HMAs are areas where there is information to demonstrate the presence of a high abundance of juvenile hoki (for these purposes hoki <55 cm in total length). Trawlers > 28 m in length are strongly advised not to target hoki within HMAs. FNZ provides DWC summaries of fishing effort, estimated catch and hoki length frequency information from within, and the immediate vicinity of HMAs on a quarterly basis. Table 37 summaries fishing activity within HMAs between the 2012/13 and 2022/23 fishing years.

Table 37: Summary of HMA fishing activity by trawl vessels >28 m in length between the 2016/17 and 2022/23 fishing years.

Fishing year	Number of vessels that fished in HMA	Number of HOK target tows[53]	Number of non-HOK target tows	Reported estimated catch of HOK (t)	Estimated catch of all species (t)
Canterbury Banks					
2016/17	20	33	454	1,028	7,380
2017/18	21	47	638	1,347	9,975
2018/19	18	18	143	303	1,795
2019/20	16	2	262	257	3,441
2020/21	19	1	520	433	8,219
2021/22	15	1	490	364	8,390
2022/23	14	4	397	142	9,196
Mernoo Bank					
2016/17	18	3	157	853	2,405
2017/18	20	16	263	581	2,577
2018/19	24	4	1,112	429	12,523
2019/20	20	0	495	217	3,582
2020/21	22	1	824	403	6,482
2021/22	25	0	825	73	8,305

[53] The majority of tows targeting hoki inside an HMA were undertaken very close to HMA boundaries.

Fishing year	Number of vessels that fished in HMA	Number of HOK target tows[53]	Number of non-HOK target tows	Reported estimated catch of HOK (t)	Estimated catch of all species (t)
2022/23	25	0	583	141	2,681
Puysegur Bank					
2016/17	10	0	98	150	1,033
2017/18	10	0	66	203	808
2018/19	10	0	65	188	1,087
2019/20	11	0	92	99	908
2020/21	11	0	109	66	1,122
2021/22	8	0	120	56	967
2022/23	8	0	126	77	1,126
Cook Strait					
2016/17	4	3	1	39	40
2017/18	1	1	0	<1	<1
2018/19	0	0	0	0	0
2019/20	0	0	0	0	0
2020/21	2	1	2	25	28
2021/22	0	0	0	0	0
2022/23	0	0	0	0	0

Jack mackerel (JMA) Tier 1

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
JMA 3	5,300	9,000	8,780	20	20	180
JMA 7[54]	34,549	-	32,537	-	-	-

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	JMA 3 & JMA 7	Unknown
Soft Limit	20% B_0	JMA 3 & JMA 7 (2020)	Unknown
Hard Limit	10% B_0	JMA 3 & JMA 7 (2020)	Unknown

2022/23 Deemed value rates (per kg) and invoices								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
JMA 3	$0.08	$0.09	$0.11	$0.13	$0.14	$0.16	$0.18	$0
JMA 7	Interim rate	100-105%	105-120%	120%+				$21.12
	$0.18	$0.20	$0.25	$0.30				

Environmental indicators and observer coverage	
Observer coverage	2022/23: 72% of target tows observed

[54] TAC and allowances not set

Seabirds		2021/22: 3 observed captures	2022/23: 4 observed captures
Marine mammals	NZ fur seal	2021/22: 4 observed captures	2022/23: 2 observed captures
	Common dolphin	2021/22: 0 observed captures	2022/23: 0 observed captures
Protected fish	White pointer shark	2021/22: 1 observed capture	2022/23: 0 observed captures
Protected reptiles	Leatherback turtle	2021/22: 1 observed capture	2022/23: 0 observed captures
Benthic interactions (fishable area trawled)		2020/21: 2 818.9km^2	1990 to 2021: 210,927 km^2
Economic indicators (calendar year)			
Quota value 2019		NZ $153 M (includes JMA 1 holdings)	
Export earnings 2023		NZ $84.3 M FOB (for all stocks)	

Ling (LIN) Tier 1

2022/23 Landings, catch limits and allowances (tonnes)							
Stock		2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
LIN 3		1,366	2,060	2,060	0	0	0
LIN 4		1,892	4,200	4,200	0	0	0
LIN 5		4,906	5,314	5,208	1	1	104
LIN 6		4,780	8,590	8,505	0	0	85
LIN 7		3,540	3,458	3,387	1	2	68
Reference points and current status							
Target	40% B_0	LIN 3 & 4	B_{2019} estimated to be 57% B_0. 'Very Likely' (>90%) to be above the target				
		LIN 5 & 6[55]	B_{2021} estimated to be 71% B_0. 'Virtually Certain' (>99%) to be above the target				
		LIN 6B[56]	B_{2006} estimated to be 61% B_0. 'Very Likely' (>90%) to be at or above the target.				
		LIN 7[57]	B_{2020} estimated to be 47% B_0. 'Very Likely' (>90%) to be at or above the target.				
		LIN CS[58]	B_{2010} estimated to be 54% B_0. 'Likely' (>60%) to be at or above the target				
Soft limit	20% B_0	LIN 3 & 4	B_{2019} 'Exceptionally Unlikely' (<1%) to be below the soft limit				
		LIN 5 & 6	B_{2021} 'Exceptionally Unlikely' (<1%) to be below the soft limit				
		LIN 6B	B_{2006} 'Very Unlikely' (<10%) to be below the soft limit				
		LIN 7	B_{2020} 'Very Unlikely' (<10%) to be below the soft limit				
		LIN CS	B_{2010} 'Exceptionally Unlikely' (<1%) to be below the soft limit				
Hard limit	10% B_0	LIN 3 & 4	B_{2019} 'Exceptionally Unlikely' (<1%) to be below the hard limit				
		LIN 5 & 6	B_{2021} 'Exceptionally Unlikely' (<1%) to be below the hard limit				
		LIN 6B	B_{2006} 'Exceptionally Unlikely' (<1%) to be below the hard limit				
		LIN 7	B_{2020} 'Exceptionally Unlikely' (<1%) to be below the hard limit				
		LIN CS	B_{2010} 'Exceptionally Unlikely' (<1%) to be below the soft limit				

[55] Excluding the Bounty Plateau.

[56] Bounty Plateau.

[57] Excluding Cook Strait

[58] Cook Strait.

2022/23 Deemed value rates (per kg) and charges					
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)			2022/23 Actual
		100-102%	102-120%	Annual 120%+	
LIN 3 LIN 4 LIN 5 LIN 6 LIN 7	$2.14	$2.38	$3.40	$6.00	$17 $0 $161 $0 $3,069

Environmental indicators and observer coverage (LIN 3 – LIN 7 only)			
Observer coverage	Trawl (>28 m)	2022/23: 65% of target tows observed	
	Longline (LIN3-7) 2022/23: 27% hooks observed		
Protected fish	Trawl	2021/22: 1 observed capture	2022/23: 0 observed captures
	Longline	2021/22: 0 observed captures	2022/23: 0 observed captures
Seabirds	Trawl (>28 m)	2021/22: 9 observed captures	2022/23:31 observed captures
	Longline	2021/22: 49 observed captures	2022/23: 14 observed captures
NZ fur seals	Trawl (>28 m)	2021/22: 0 observed captures	2022/23: 0 observed captures
	Longline	2021/22: 1 observed capture	2022/23: 0 observed captures
Benthic interactions (fishable area trawled)		2020/21: 1 600.6 km^2	1990 to 2021: 73,114 km^2

Economic indicators (calendar year)	
Quota value 2019	NZ $763.2 M (includes LIN 1 & LIN 2 holdings)
Export earnings 2023	NZ $61.9 M FOB (includes all stocks)

Lookdown dory (LDO) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
LDO 1	175	168	168	0	0	0
LDO 3	312	614	614	0	0	0

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	All stocks (2013)	Unknown
Soft Limit	20% B_0	All stocks (2013)	Unknown
Hard Limit	10% B_0	All stocks (2013)	'Unlikely' (<40%) to be below the hard limit

2022/23 Deemed value rates (per kg) and invoices			
Stock	Interim rate	Annual rate for catch in excess of ACE	2022/23 Actual
LDO 1	$0.38	$0.42	$0
LDO 3			$8

Environmental indicators		
Benthic interactions (fishable area trawled)	2020/21: 135.4 km^2 (11.11%)	1990 to 2021: 1,218.6 km^2

Economic indicators (calendar year)	
Quota value 2019	NZ $2.6 M

Export earnings 2022	This species is not individually listed in export statistics

Oreo (OEO) Tier 1

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
OEO1	549	2,500	2,500	0	0	168
OEO3A	3,233	3,518	3,350	0	0	-
OEO4	3,432	3,780	3,600	0	0	-
OEO6	2,374	6,000	6,000	0	0	-

Reference points and current status (as per Harvest Strategy Standard defaults)				
Target	40% B_0	OEO 1 Southland	SSO	B_{2007} estimated to be 27% B_0. 'Unlikely'(<40%) to be at or above the target
		OEO 3A	BOE	Unknown (2013)
			SSO	B_{2009} estimated to be 36% B_0. 'About as Likely as Not' (40-60%) to be at or above the target
		OEO 4	BOE	Unknown (2009)
			SSO	B_{2018} estimated to be 40% B_0. 'About as Likely as Not' (40-60%) to be at or above the target
		OEO 6 Pukaki rise	BOE	Unknown (2009)
			SSO	Unknown (2006)
		OEO 6 Bounty Plateau	SSO	B_{2008} estimated to be 33% B_0. 'Unlikely' (<40%) to be at or above the target
Soft Limit	20% B_0	OEO 1 Southland	SSO	B_{2007} is 'Unlikely' (<40%) to be below the soft limit
		OEO 3A	BOE	Unknown (2013)
			SSO	B_{2009} is 'Unlikely' (<40%) to be below the soft limit
		OEO 4	BOE	Unknown (2009)
			SSO	B_{2018} is 'Very Unlikely' (<10%) to be below the soft limit
		OEO 6 Pukaki rise	BOE	Unknown (2009)
			SSO	Unknown (2006)
		OEO 6 Bounty Plateau	SSO	B_{2008} is 'Unlikely' (<40%) to be below the soft limit
Hard Limit	10% B_0	OEO 1 Southland	SSO	B_{2007} is 'Very Unlikely' (<10%) to be below the hard limit
		OEO 3A	BOE	Unknown (2013)
			SSO	B_{2009} is 'Very Unlikely' (<10%) to be below the hard limit
		OEO 4	BOE	Unknown (2009)
			SSO	B_{2018} is 'Exceptionally Unlikely' (<1%) to be below the hard limit
		OEO 6 Pukaki rise	BOE	Unknown (2009)
			SSO	Unknown (2006)
		OEO 6 Bounty Plateau	SSO	B2008 is 'Very Unlikely' (<10%) to be below the hard limit

2022/23 Deemed value rates (per kg) and charges			
Stock		Annual differential rate for excess catch (% of ACE)	2022/23 Actual

	Interim rate	100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
OEO 1 OEO 6	$0.70	$0.78	$0.94	$1.09	$1.25	$1.40	$1.56	$0 $0
OEO 3A	$0.68	$0.76	$0.91	$1.06	$1.22	$1.37	$1.52	$0
OEO 4	$0.81	$0.90	$1.08	$1.26	$1.44	$1.62	$1.80	$0

Environmental indicators and observer coverage		
Observer coverage	2022/23: 69% tows observed	
Seabirds	2021/22: 0 observed capture	2022/23: 1 observed capture
Marine mammals	2021/22: 0 observed captures	2022/23: 0 observed captures
Benthic interactions (fishable area trawled)	2020/21: 285 km^2	1990 to 2021: 42,762 km^2

Economic indicators (calendar year)	
Quota value 2019	NZ $106.7 M (includes all species)
Export earnings 2022	Black Oreo: NZ $2.6 M FOB Smooth Oreo: NZ $3.3 M FOB Oreo, other: NZ $4.7 M FOB (this category includes black and/or smooth oreo that has not been reported by individual species)

Orange roughy (ORH) Tier 1

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
ORH 1	332	1,470	1,400	-	-	70
ORH 2A	495	512	488	-	-	24
ORH 2B	61	63	60	-	-	3
ORH 3A	85	186	177	-	-	9
ORH 3B	6,764	8,355	7,967	-	5	383
ORH 7A	2,193	1,771	2,058	-	2	103
ORH 7B	<1	1	1	-	-	-

Reference points and current status			
Target	30-40% B_0	ORH 1	Unknown
	30% B_0	ORH 2A (North)	B_{2003} estimated to be 24% B_0. 'Unlikely' (<40%) to be at or above the target
	30-40% B_0	ORH 2A (South), 2B & 3A[59]	B_{2014} estimated to be 14% B_0. 'Very Unlikely' (<10%) to be at or above the lower end of the target range.
	30-50% B_0	ORH 3B NW Chatham Rise	B_{2017} estimated to be 38% B_0. Based on the 2018 evaluation B_{2017} was Unlikely to be below the Soft and Hard Limits based on the 2022 acoustic survey results
		ORH 3B E&S Chatham Rise	B_{2020} estimated to be 36% B_0. 'Likely' (>60%) to be at or above the lower end of the target range.
		ORH 3B Puysegur	B_{2017} estimated to be 49% B_0. 'Very Likely' (>90%) to be at or above the lower end of the target range.

[59] Collectively known as the Mid-East Coast stock (MEC).

	30-40% B_0	ORH 7A[60]	B_{2019} estimated to be 47% B_0. 'Very Likely' (>90%) to be at or above the lower end of the target range and 'About as Likely as Not' (40-60%) to be at or above the upper end of the target range.
	30% B_0	ORH 7B	B_{2020}[61] Unknown
Soft limit	20% B_0	ORH 1	Unknown
		ORH 2A (North)	B_{2003} 'Unlikely' (<40%) to be below the soft limit
		ORH 2A (South), 2B & 3A	B_{2014} 'Likely' (>60%) to be below the soft limit
		ORH 3B NW Chatham Rise	Based on 2023 evaluation B_{2017} is Unlikely (< 40%) to be below the Soft Limit.
		ORH 3B E&S Chatham Rise	B_{2020} 'Very Unlikely' (<10%) to be below the soft limit
		ORH 3B Puysegur	B2017 'Exceptionally Unlikely' (<1%) to be below the soft limit
		ORH 7A	B_{2019} 'Exceptionally Unlikely' (<1%) to be below the soft limit
		ORH 7B	B_{2020} Unknown
Hard limit	10% B_0	ORH 1	Unknown
		ORH 2A (North)	B_{2003} 'Very Unlikely' (<10%) to be below the hard limit
		ORH 2A (South), 2B & 3A	B_{2014} 'Unlikely' (<40%) to be below the hard limit
		ORH 3B NW Chatham Rise	Based on 2023 evaluation B_{2017} is Unlikely (< 40%) to be below the Hard Limit
		ORH 3B E&S Chatham Rise	B_{2020} 'Exceptionally Unlikely' (<1%) to be below the hard limit
		ORH 3B Puysegur	$B2_{017}$ 'Exceptionally Unlikely' (<1%) to be below the hard limit
		ORH 7A	B_{2019} 'Exceptionally Unlikely' (<1%) to be below the hard limit
		ORH 7B	B_{2020} Unknown

Harvest strategy	
Harvest Control Rule for: ORH 3B NW Chatham Rise, ORH 3B E&S Chatham Rise & ORH 7A	Based on an F_{mid} of 4.5%.[62] This is increased slightly above the midpoint of the target range and decreased slightly below the midpoint. If a stock is below the target range, *F* is decreased more substantially, and the subsequent *F* is also rescaled to ensure that biomass returns to the target range.
Exploitation rate (F): All other stocks	4.5% of current biomass if in target range. *F* is reduced if biomass is below the target range

2022/23 Deemed value rates (per kg) and invoices

Stock	Interim rate	Annual differential rate for excess catch (% of ACE)		2022/23 Actual
		100-110%	110%+	
ORH 1	$3.06	$3.40	$5.00	$0

Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	

[60] Includes the Westpac Bank.

[61] Preliminary

[62] *F* refers to a fishing exploitation rate calculated using the harvest control rule

ORH 2A ORH 2B ORH 3A ORH 3B ORH 7A	$4.50	$5.00	$6.00	$7.00	$8.00	$9.00	$10.00	$0

Stock	Interim rate	100-110%	110%+	2022/23 Actual
ORH 7B	$2.88	$3.20	$5.00	$0

Environmental indicators and observer coverage			
Observer coverage		2022/23: 34 % tows observed	
Seabirds		2021/22: 8 observed captures	2022/23: 10 observed captures
Marine mammals	NZ fur seal	2021/22: 0 observed capture	2022/23: 0 observed captures
Benthic impacts (fishable area trawled)		2020/21: 5,427.4 km^2	1990 to 2021: 138,411 km2

Economic indicators (calendar year)	
Quota value 2019	NZ $547.5 M
Export earnings 2022	NZ $42.6 M FOB (includes catch from outside the EEZ)

Table 38: 2022/23 sub-area catch limits and estimated catch for orange roughy stocks (tonnes).

Stock	Sub-area	Agreed catch limit	Industry reported catch	2022/23 Catch (reported via ERS)
ORH 1	Area A	530	15	14
	Area B	530	286	290
	Area C	470	0.2	0
	Area D	470 (incl. 30 t bycatch limit in the MC Box)	33	32
ORH 2A	ORH 2A North	200	198	199
	ORH 2A South	288	297	284
ORH 3B	NW Chatham Rise	1,150	176	63
	E&S Chatham Rise	5,970	6,123	5,518
	Puysegur	347	394	348
	Sub-Antarctic	500	70	57

Pale ghost shark (GSP) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
GSP 1	532	1,208	1,150	0	0	58
GSP 5	215	477	454	0	0	23
GSP 7	19	176	176	0	0	0
Reference points and current status (as per Harvest Strategy Standard defaults)						

Target	40% B_0	All stocks	Unknown
Soft Limit	20% B_0	GSP 1 & GSP 5	'Unlikely' (<40%) to be below soft limit
		GSP 7	Unknown
Hard Limit	10% B_0	GSP 1 & GSP 5	'Very Unlikely' (<10%) to be below hard limit
		GSP 7	Unknown

2022/23 Deemed value rates (per kg) and invoices			
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)	2022/23 Actual
		100%+	
GSP 1 GSP 5	$0.14	$0.15	$0 $0
GSP 7	$0.31	$0.34	$8.84

Economic indicators (calendar year)	
Quota value 2019	NZ $2.3 m
Export earnings 2023	NZ $387,351 FOB (includes both pale and dark ghost shark, export statistics are not provided for individual ghost shark species)

Patagonian toothfish (PTO) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
PTO 1	<1	50	49.5	0	0	0.5

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	PTO 1	Unknown
Soft Limit	20% B_0	PTO 1	Unknown
Hard Limit	10% B_0	PTO 1	Unknown

2022/23 Deemed value rates (per kg) and invoices				
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)		2022/23 Actual
		100-110%	110%+	
PTO 1	$13.50	$15.00	$25.00	$0

Economic indicators (calendar year)	
Quota value 2019	Not available
Export earnings 2023	NZ $15.7 M FOB[63]

Prawn killer (PRK) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
PRK 1	<1	25.7	24.5	0	0	1.2
PRK 2	0	3.7	3.5	0	0	0.2
PRK 3	0	1	1	0	0	0
PRK 4A	0	1	1	0	0	0
PRK 5	0	1	1	0	0	0

[63] Likely that most of this was fish caught in other jurisdictions

PRK 6A	0	1	1	0	0	0
PRK 6B	0	1	1	0	0	0
PRK 7	0	1	1	0	0	0
PRK 8	0	1	1	0	0	0
PRK 9	0	1	1	0	0	0

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	All stocks	Unknown
Soft Limit	20% B_0	All stocks	Unknown
Hard Limit	10% B_0	All stocks	Unknown

2022/23 Deemed value rates (per kg) and invoices			
Stock	Interim rate	Annual differential rate for excess catch[64]	2022/23 Actual
PRK 1-9	$0.18	$0.20	$0

Economic indicators (calendar year)	
Quota value 2019	Not available
Export earnings 2023	Prawn killer does not feature as an individual species in export statistics; any exports are likely to be reported under the category 'Other Crustacea'.

Redbait (RBT) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
RBT 1	<1	20	19	0	0	1
RBT 3	1,890	2,305	2,190	0	0	115
RBT 7	6	2,991	2,841	0	0	150

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	All stocks	Unknown
Soft Limit	20% B_0	All stocks	Unknown
Hard Limit	10% B_0	All stocks	Unknown

2022/23 Deemed value rates (per kg) and invoices								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
RBT 1	$0.45	$0.50	$0.60	$0.70	$0.80	$0.90	$1.00	$0
RBT 7	$0.25	$0.30	$0.40	$0.50	$0.60	$0.70	$0.80	$0
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-105%		105-150%		150%+		
RBT 3	$0.45	$0.50		0.60		$0.70		$0

Environmental indicators

[64] Differential deemed value rates do not apply to prawn killer stocks.

Benthic impacts (fishable area trawled)	2020/21: (unknown)	1990 to 2021: 446.3 km^2
Economic indicators (calendar year)		
Quota value 2019	NZ $ 11.2 M	
Export earnings 2023	Redbait does not feature as an individual species in export statistics; any exports are likely to be reported under the category 'Finfish-Product State-Other'.	

Ribaldo (RIB) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
RIB 3	92	394	394	0	0	0
RIB 4	124	357	357	0	0	0
RIB 5	25	52	52	0	0	0
RIB 6	238	231	231	0	0	0
RIB 7	267	330	330	0	0	0
RIB 8	<1	1	1	0	0	0

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	RIB 3 & 4 (2014)	Unknown
		RIB 5 & 6 (2014)	Unknown
		RIB 7 & 8	Unknown
Soft Limit	20% B_0	RIB 3 & 4 (2014)	Unlikely (<40%) to be below soft limit
		RIB 5 & 6 (2014)	Unlikely (<40%) to be below soft limit
		RIB 7 & 8	Unknown
Hard Limit	10% B_0	RIB 3 & 4 (2014)	Unlikely (<40%) to be below hard limit
		RIB 5 & 6 (2014)	Unlikely (<40%) to be below hard limit
		RIB 7 & 8	Unknown

2022/23 Deemed value rates (per kg) and invoices								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
RIB 3 RIB 5 RIB 4 RIB 8	$0.27	$0.30	$0.36	$0.42	$0.48	$0.54	$0.60	$0 $0 $0 $0
RIB 6 RIB 7	$0.72	$0.80	$0.96	$1.12	$1.28	$1.44	$1.60	$0 $0
Environmental indicators								

Benthic impacts (fishable area trawled)	2020/21: unknown	1990 to 2021: 104 km^2
Economic indicators (calendar year)		
Quota value 2019	NZ $3.3 m (includes RIB 1, RIB 2 & RIB 9 holdings)	
Export earnings 2022	No export information specific to ribaldo is currently available. Any exports are likely to be reported under the category 'Finfish Product State Other'	

Rubyfish (RBY) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)

Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
RBY1	124	318	300	1	2	15
RBY2	125	435	433	1	1	0
RBY3	1	32	30	0	0	2
RBY4	4	19	18	0	0	1
RBY5	<1	2	2	0	0	0
RBY6	<1	1	1	0	0	0
RBY7	4	33	33	0	0	0
RBY8	<1	6	6	0	0	0
RBY9	3	19	19	0	0	0

Reference points and current status (as per Harvest Strategy Standard defaults)

Target	40% B_0	All stocks	Unknown
Soft Limit	20% B_0	All stocks	Unknown
Hard Limit	10% B_0	All stocks	Unknown

2022/23 Deemed value rates (per kg) and invoices

Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
RBY 1 RBY 2 RBY 3 RBY 4 RBY 5 RBY 6 RBY 8 RBY 9	$0.25	$0.28	$0.34	$0.39	$0.45	$0.50	$0.56	$0 $0 $2 $0 $1 $0 $0 $0
Stock	Interim rate	100%+						2022/23 Actual
RBY 7	$0.38	$0.42						$0

Environmental indicators		
Observer coverage	2022/23: 15% of target tows observed	
Benthic impacts (fishable area trawled)	2020/21: 35.3 km^2 (2.25%)	1990 to 2021: 1,567 km^2
Economic indicators (calendar year)		
Quota value 2019	NZ $1.9 M	

Export earnings 2022	Rubyfish does not feature as an individual species in export statistics; any exports are likely to be reported under the category 'Finfish Product State Other'

Scampi (SCI) Tier 1

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
SCI 1	141	153	145	0	0	8
SCI 2	160	161	153	0	0	8
SCI 3	403	428	408	0	0	20
SCI 4A	118	126	120	0	0	6
SCI 5	<1	42	40	0	0	2
SCI 6A	296	321	306	0	0	15
SCI 6B	<1	53	50	0	0	3
SCI 7	5.6	79	75	0	0	4
SCI 8	0	5	5	0	0	0
SCI 9	0	37	35	0	0	2

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	SCI 1	B_{2022} estimated to be 'Very Likely' (>90%) to be at or above the target
		SCI 2	B_{2022} 'Very Likely' (>90%) to be at or above the target
		SCI 3	B_{2021} 'Very Likely' (>90%) to be at or above the target
		SCI 4A	B_{2019} Unknown
		SCI 6A	B_{2020} 'Very Likely' (>90%) to be at or above the target
		All other stocks	Unknown
Soft Limit	20% B_0	SCI 1	B_{2022} 'Exceptionally Unlikely' (<1%) to be below the soft limit
		SCI 2	B_{2022} 'Very Unlikely' (<10%) to be below the soft limit
		SCI 3	B_{2021} Exceptionally Unlikely' (<1%) to be below the soft limit
		SCI 4A	B_{2019} Unknown
		SCI 6A	B_{2020} 'Exceptionally Unlikely' (<1%) to be below the soft limit
		All other stocks	Unknown
Hard Limit	10% B_0	SCI 1	B_{2022} 'Exceptionally Unlikely' (<1%) to be below the hard limit
		SCI 2	B_{2022} 'Very Unlikely' (<10%) to be below the hard limit
		SCI 3	B_{2021} 'Exceptionally Unlikely' (<1%) to be below the soft limit
		SCI 4A	B_{2019} Unknown
		SCI 6A	B_{2020} 'Exceptionally Unlikely' (<1%) to be below the hard limit
		All other stocks	Unknown

2022/23 Deemed value rates (per kg) and invoices								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
All stocks	$ 46.17	$ 51.30	$ 61.56	$ 71.82	$ 82.08	$ 92.34	$ 102.60	$0

Environmental indicators and observer coverage

Observer coverage		2022/23: 15% tows observed	
Seabirds		2021/22: 18 observed captures	2022/23: 16 observed captures
Marine mammals	NZ fur seal	2021/22: 0 observed captures	2022/23: 0 observed captures
	NZ sea lion	2021/22: 0 observed captures	2022/23: 0 observed captures
Benthic interactions (fishable area trawled)		2020/21: 4,610 km^2	1990 to 2021: 227,101 km^2
Economic Indicators (calendar year)			
Quota value 2019		NZ $547.2 M	
Export earnings 2023		NZ $103 M[65]	

Sea perch (SPE) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
SPE 3	250	1022	1000	11	11	-
SPE 4	411	956	910	0	0	46
SPE 5	15	38	36	1	1	-
SPE 6	3	9	9	0	0	-
SPE 7	72	98	82	8	8	-

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	SPE 3 – SPE 7	Unknown
Soft Limit	20% B_0	SPE 3 – SPE 7	Unknown
Hard Limit	10% B_0	SPE 3 – SPE 7	Unknown

[65] Estimating the precise value of scampi exports is difficult as scampi export figures are not recorded by Statistics New Zealand using a unique species code. The figure includes exports reported as 'Shrimps & Prawns cold-water', 'Norway Lobster', 'Shrimps & Prawns other (frozen)' and 'Other Crustacea (frozen)

2022/23 Deemed value rates (per kg) and invoices								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
SPE 3 SPE 7	$0.50	$0.55	$0.66	$0.77	$0.88	$0.99	$1.10	$14 $<1
SPE 4 SPE 5 SPE 6	$0.36	$0.40	$0.48	$0.56	$0.64	$0.72	$0.80	$4 $5 $0
Environmental indicators								
Benthic interactions (fishable area trawled)		2020/21: 103 km^2 (2.08%)			1990 to 2021: 4,991 km^2			
Economic indicators (calendar year)								
Quota value 2019		NZ $7.6 M (includes SPE 1 & SPE 2 holdings)						
Export earnings 2023		NZ $1.1 M FOB (includes all stocks)						

Silver warehou (SWA) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
SWA 1	236	3,003	3,000	2	1	0
SWA 3	4,402	3,646	3,610	0	0	0
SWA 4	4,857	4,545	4,500	0	0	0
Reference points and current status (as per Harvest Strategy Standard defaults)						
Target	40% B_0	All stocks		Unknown		
Soft Limit	20% B_0	All stocks		Unknown		
Hard Limit	10% B_0	All stocks unknown apart from SWA 3 and SWA 4		SWA 3 and 4 (2020) Very Unlikely (<10%) to be below		

2022/23 Deemed value rates (per kg) and invoices					
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)			2022/23 Actual
		100-110%	110-130%	130%+	
SWA 1	$0.50	$1.22	$1.74	$3.00	$0
SWA 3 SWA 4	$0.63	$0.70	$0.70	$2.00	$1.1M $591
Environmental indicators and observer coverage					
Observer coverage		2022/23: 68% observed			
Seabirds		2021/22: 3 observed captures		2022/23: 2 observed captures	
NZ fur seal		2021/22: 0 observed captures		2022/23: 0 observed captures	
Benthic interactions (fishable area trawled)		2020/21: 767 km^2		1990 to 2021: 26,316 km^2	

Economic indicators (calendar year)

Quota value 2019	NZ $195.7 M
Export earnings 2022	NZ $22.4 M FOB

Southern blue whiting (SBW) Tier 1

2023/24 Landings, catch limits and allowances (tonnes)						
Stock	2023/24 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
SBW 1	37	100	98	0	0	2
SBW 6A	106	1,640	1,640	0	0	0
SBW 6B	2,010	2,309	2,264	0	0	58
SBW 6I	21,583	40,000	39,200	0	0	800
SBW 6R	25	5,500	5,500	0	0	0

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	SBW 1	Unknown
		SBW 6A	Unknown
		SBW 6B	B_{2022} Likely >60% to be below target *F* [66]
		SBW 6I	B_{2020} estimated to be 56% B_0. 'Very Likely' (>90%) to be at or above the target
		SBW 6R	Unknown
Soft limit	20% B_0	SBW 1	Unknown
		SBW 6A	Unknown
		SBW 6B	Unknown
		SBW 6I	B_{2020} 'Exceptionally Unlikely' (<1%) to be below the soft limit
		SBW 6R	Unknown
Hard limit	10% B_0	SBW 1	Unknown
		SBW 6A	Unknown
		SBW 6B	Unknown
		SBW 6I	B_{2020} 'Exceptionally Unlikely' (<1%) to be below the hard limit
		SBW 6R	Unknown

2022/23 Deemed value rates (per kg) and invoices								
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-120%	120-140%	140-160%	160-180%	180-200%	200%+	
SBW 1	$0.41	$0.46	$0.55	$0.64	$0.74	$0.83	$0.92	$0
Stock		Annual differential rate for excess catch (% of ACE)						2022/23 Actual
		100-102%		102-150%			150%+	
SBW 6A – SBW 6R		$0.46		$0.60			$0.92	$0

Environmental indicators and observer coverage	
Observer coverage	2022/23: 100% tows observed

[66] *F* refers to a fishing mortality rate calculated using the harvest control rule.

Seabirds		2021/22: 3 observed captures	2022/23: 7 observed captures
Protected fish		2021/22: 1 observed capture	2022/23: 0 observed captures
Marine mammals	NZ fur seals	2021/22: 1 observed capture	2022/23: 9 observed captures
	NZ sea lion	2021/22: 1 observed capture	2022/23: 2 observed captures
Benthic interactions (fishable area trawled)		2020/21: 547 km^2	1990 to 2021: 42,743 km^2
Economic indicators (calendar year)			
Quota value 2019		NZ $205.1 M	
Export earnings 2023		NZ $23.3 M FOB[67]	

Spiny dogfish (SPD) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
SPD 4	965	1,662	1,626	10	10	20
SPD 5	1,091	3,753	3,700	8	8	37

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	SPD 4 & SPD 5	Unknown
Soft Limit	20% B_0	SPD 4 & SPD 5	Unknown
Hard Limit	10% B_0	SPD 4 & SPD 5	Unknown

2022/23 Deemed value rates (per kg) and invoices			
Stock	Interim	Annual rate for catch in excess of ACE[68]	2022/23 Actual
SPD 4 SPD 5	$0.09	$0.10	$0 $5

Environmental indicators		
Benthic interactions (fishable area trawled)	2020/21: unknown	1990 to 2021: 1,418 km^2

Economic indicators (calendar year)	
Quota value 2019	NZ $12.7 m (includes SPD 1, SPD 3, SPD 7 & SPD 8 holdings)
Export earnings 2023	NZ $124,000 FOB (includes all SPD stocks)

[67] Includes surimi

[68] Differential deemed value rates do not apply to spiny dogfish stocks.

Squid (SQU) Tier 1

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
SQU 1J	0	5,030	5,000	10	10	10
SQU 1T	7,123	44,741	44,741	0	0	0
SQU 6T	3,590	-	32,369	-	-	-

Reference points and current status

Arrow squid live for one year, spawn once then die. No estimates of current and reference biomass are available and there is no proven method available at this time to estimate yields from the squid fishery before the fishing season begins.

2022/23 Deemed value rates (per kg) and invoices

Stock	Interim rate	Annual differential rate for excess catch (% of ACE)			2022/23 Actual
		100-105%	105-130%	130%+	
SQU 1J SQU 1T SQU 6T	$0.79	$0.88	$1.23	$1.76	$10.38 $9.68 $0

Environmental indicators and observer coverage[69]

Observer coverage		2022/23: 88% tows observed	
Seabirds		2021/22: 176 observed captures	2022/23: 141 observed captures
Protected fish	Basking Shark	2021/22: 0 observed captures	2022/23: 1 observed capture
	White pointer	2021/22: 2 observed captures	2022/23: 4 observed captures
Marine mammals	NZ fur seals	2021/22: 22 observed captures	2022/23: 8 observed captures
	NZ sea lions	2021/22: 1 observed capture	2022/23: 1 observed capture
	Whale unspecified	2021/22: 1 observed capture	2022/23: 0 observed captures
Benthic interactions (fishable area trawled)		2020/21: 11,794 km^2	1990 to 2021: 694,740 km^2

Economic indicators (calendar years)

Quota value 2019	NZ $149.4 M
Export earnings 2023	NZ $70.7 M FOB

[69] Trawl vessels greater than 28 m in length.

White warehou (WWA) Tier 2

2022/23 Landings, catch limits and allowances (tonnes)						
Stock	2022/23 Landings	TAC	TACC	Recreational	Customary	Other fishing related mortality
WWA 1	<1	4	4	-	-	-
WWA 2	2	75	73	1	1	-
WWA 3	120	585	583	1	1	-
WWA 4	88	332	330	1	1	-
WWA 5B	413	2,621	2,617	2	2	-
WWA 7	27	129	127	1	1	-
WWA 8	0	1	1	-	-	-
WWA 9	0	1	1	-	-	-

Reference points and current status (as per Harvest Strategy Standard defaults)			
Target	40% B_0	All stocks	Unknown
Soft Limit	20% B_0	All stocks	Unknown
Hard Limit	10% B_0	All stocks	Unknown

2022/23 Deemed value rates (per kg) and invoices				
Stock	Interim rate	Annual differential rate for excess catch (% of ACE)		2022/23 Actual
		100%+		
WWA 1 WWA 2 WWA 8 WWA 9	$0.49	$0.54		$1 $0 $0 $0
Stock	Interim rate	100-110%	110%+	2022/23 Actual
WWA 3 WWA 4 WWA 5B WWA 7	$0.93	$1.03	$2.00	$0 $0 $0 $0

Environmental indicators		
Observer coverage	2022/23: 100% of target tows observed	
Benthic interactions (fishable area trawled)	2020/21: 53 km^2 (1.42%)	1990 to 2021: 3,730 km^2

Economic indicators (calendar year)	
Quota value 2019	NZ $21.6 M
Export earnings 2023	NZ $2.1 M FOB[70]

[70] Information in export statistics for "Warehou, Other" is warehou other than blue or silver and is therefore assumed to be white warehou.

Appendix II: Decisions on sustainability measures

TAC reviews 2022/23

Species	Stock	Pre-1 Oct 2022 TAC (t)	Pre-1 Oct 2022 TACC (t)	1-Oct-2022 TAC (t)	1 Oct 2022 TACC (t)
Hoki	HOK 1	111,140	110,000	111,140	110,000
Gemfish	SKI 3	848	839	1,103	1,091
Gemfish	SKI 7	848	839	1,103	1,091
Scampi	SCI 1	139	132	153	145

TAC reviews 2023/24

Species	Stock	Pre-1 Oct 2023 TAC (t)	Pre-1 Oct 2023 TACC (t)	1-Oct-2023 TAC (t)	1 Oct 2023 TACC (t)
Silver warehou	SWA3	3,646	3,610	4,040	4,000
Orange roughy	ORH 3B	8,355	7,967	4,995	4,752

Appendix III: MSC certified stocks

Important deepwater fisheries are certified by the internationally recognised Marine Stewardship Council (MSC) as meeting high sustainability and environmental standards. New Zealand certified deepwater fisheries include hoki, hake, ling, southern blue whiting, and orange roughy. Certification gives New Zealanders and overseas consumers:

- assurance that these fisheries are being managed sustainably
- access to important international markets for certain species – others can trust our fishing practices.

Tables 39-44 provide some (but not all) of the required statistics for the renewal of the MSC certification.

Table 39: Tows observed, and percentage of tows observed in the 2022/23 fishing year within the relevant stocks of HAK, HOK, LIN and SBW target fisheries

Fishery	QMA	2022/23		
		Observed tows	Total tows	% tows observed
Hake	HAK1	90	85	100%
	HAK4	-	-	-
	HAK7	42	50	84%
Hoki	HOK1	3,865	9,129	42.3%
Ling	LIN3	-	2	0%
	LIN4	-	-	-
	LIN5	221	698	31.7%
	LIN6	208	332	62.7%
	LIN7	16	386	4.1%
Southern blue whiting	SBW6B	3	3	100%
	SBW6I	503	502	100%

There are more observed tows than total fisher-reported tows in SBW 6I and HAK 1 due to recording differences between observers and vessels – on some occasions when fishing gear is deployed but does not reach target fishing depth, this is recorded as a fishing event by observers but not by fishers.

Table 40: Number of observed hooks and percentage of hooks observed in the 2022/23 fishing year for ling bottom longline fishery (LIN 3- 7).

Hooks set	Observed	
	Hooks observed	% of hooks observed
22,471,403	4,697,419	20.90%

Table 41: Industry-reported ETP[71] benthic catch in the 2022/23 fishing year for HOK, HAK, LIN and SBW trawl fishery.

ETP benthic catch	2022/23			
	HOK	HAK	LIN	SBW
Coral catch (kg)	122	4	84	<1
Sponges catch (kg)	43,445	64	2,159	252
Bryozoans catch (kg)	366	-	24	-
Total number of tows	9,129	135	1,418	510
Number of observed tows	3,865	132	445	506
Number of tows with coral	87	4	7	1
% fisher-reported tows with coral	1%	3%	0.5%	0.2%
Number of tows with sponges	869	14	134	22
% fisher-reported tows with sponges	10%	10%	9%	4%
Number of tows with bryozoans	172	-	9	-
% fisher-reported tows with bryozoans	2%	-	0.6%	-
Total catch rate (kg/tow) for corals, sponges, and bryozoans	4.8	0.5	1.5	0.5

Table 42: Total estimated ling catches (tonnes) for LIN3-7 (including LIN6B) by method[72] and target species for the 2022/23 fishing year.

QMA	Trawl		BLL		Other methods[73]		Total	
	Target species		Target species		Target species		Target species	
	All[74]	LIN	All	LIN	All	LIN	All	LIN
LIN 3	683	1	176	171	331	303	1,191	475
LIN 4	435	-	679	696	576	576	1,690	1,252
LIN 5	4,269	3,852	499	489	2	-	4,769	4,341
LIN 6[75]	2,284	1,787	1,134	1,134	1,028	1,027	4,447	3,949
LIN 7	1,366	461	1,028	1,011	777	777	3,171	2,249
Total	9,037	6,101	3,517	3,482	2,713	2,683	15,267	12,266

[71] Endangered, threatened, and protected species

[72] All trawl methods have been combined. BLL also includes dahn line.

[73] Includes potting, setnet, and Danish seine

[74] Includes LIN

[75] Includes LIN 6B catch

Table 43: Fisher-reported incidental capture of non-fish species (excl. benthic) in the HAK, HOK, LIN and SBW trawl fisheries during the 2022/23 fishing year (figures in brackets indicate BLL captures).

Target fishery	2022/23			
	Seabirds	New Zealand sea lion	New Zealand fur seal	Dolphins/whales
HAK	1	0	0	0
HOK	118	0	35	1
LIN (BLL)	14	0	0	0
SBW	7	2	9	0

Table 44: ETP shark captures in the HAK, HOK, LIN and SBW trawl fisheries in the 2022/23 fishing year.

Fishery	2022/23	
	BSK	WPS
HAK	1	0
HOK	0	0
LIN	0	0
SBW	0	0
SQU	1	4

Appendix IV: Cost recovery levies for deepwater stocks for the 2022/23 financial year

Table 45: Cost recovery levies for deepwater stocks 2022/23

Fish stock	Compliance	Registry	Observers		Research		Under/over recovery		2022/23 total
	MPI	MPI	MPI	DOC	MPI	DOC	MPI	DOC	
BAR 4	9,528.68	3,697.61	3,175.26	589.23	-	449.57	1,767.85	113.46	19,321.66
BAR 5	28,755.37	11,158.55	7,780.92	1,427.74	499.47	5,612.62	6,427.16	122.61	61,784.44
BAR 7	40,486.44	15,710.80	21,947.56	4,101.92	-	5,691.77	8,252.15	-679.47	95,511.17
BYX 1	8,661.68	3,361.17	74.88	-	-	-	457.61	34.64	12,589.98
BYX 10	227.94	88.45	1.97	-	-	-	12.33	-	330.69
BYX 2	47,124.77	18,286.81	40,951.45	4,856.05	-	694.69	2,557.04	210.04	114,680.85
BYX 3	25,511.20	9,899.64	22,124.38	2,625.20	-	3,156.44	1,265.78	252.79	64,835.43
BYX 7	2,324.22	901.91	20.09	-	-	337.31	122.89	-	3,706.42
BYX 8	488.61	189.60	4.22	-	-	-	27.25	-	709.68
CDL 1	2,019.89	783.82	17.46	-	-	-	702.63	-	3,523.80
CDL 10	-	-	-	-	-	-	-	-	-
CDL 2	4,886.08	1,896.05	4,247.27	507.01	-	64.60	266.07	1.78	11,868.86
CDL 3	2,176.52	844.60	18.82	-	-	-	87.76	-	3,127.70
CDL 4	725.20	281.41	6.27	-	-	-	25.73	-	1,038.61
CDL 5	208.30	80.83	1.80	-	-	-	11.39	-	302.32
CDL 6	10.87	4.22	0.09	-	-	0.05	0.59	0.00	15.82
CDL 7	328.23	127.37	2.84	-	-	-	17.64	-	476.08
CDL 8	-	-	-	-	-	-	-	-	-
CDL 9	43.02	16.69	0.37	-	-	-	2.32	-	62.40
CHC 1	23.38	9.07	0.20	-	-	-	1.26	-	33.91
CHC 10	-	-	-	-	-	-	-	-	-
CHC 2	23.38	9.07	0.20	-	-	-	1.26	-	33.91
CHC 3	9.35	3.63	0.08	-	-	-	0.51	-	13.57
CHC 4	9.35	3.63	0.08	-	-	-	0.51	-	13.57
CHC 5	9.35	3.63	0.08	-	-	-	0.51	-	13.57
CHC 6	9.35	3.63	0.08	-	-	-	0.51	-	13.57
CHC 7	9.35	3.63	0.08	-	-		0.51	-	13.57
CHC 8	9.35	3.63	0.08	-	-		0.51	-	13.57
CHC 9	9.35	3.63	0.08	-	-		0.51	-	13.57
EMA 3	2,598.50	1,008.35	22.47	-	-	35.93	103.48	-1.42	3,767.31
EMA 7	30,935.40	12,004.51	16,762.79	3,138.76	-	427.73	3,227.18	-198.11	66,298.26
FRO 3	317.95	123.38	2.75	-	-	-	82.97	-	527.05
FRO 4	492.82	191.24	4.26	-	-	-	25.09	-	713.41
FRO 5	536.53	208.20	4.64	-	-	-	23.12	-	772.49
FRO 6	63.00	24.45	0.54	-	-	-	3.41	-	91.40
FRO 7	8,385.81	3,254.12	72.50	-	-	-	1,200.71	-	12,913.14
FRO 8	3,576.89	1,388.01	30.92	-	-	-	201.50	-	5,197.32
FRO 9	1,589.73	616.90	13.74	-	-	-	80.09	-	2,300.46

Fish stock	Compliance	Registry	Observers		Research		Under/over recovery		2022/23 total
	MPI	MPI	MPI	DOC	MPI	DOC	MPI	DOC	
GSC 1	2.34	0.91	0.02	-	-	-	0.13	-	3.40
GSC 10	-	-	-	-	-	-	-	-	-
GSC 3	44.42	17.24	0.38	-	-	-	2.40	-	64.44
GSC 5	201.05	78.02	1.74	-	-	-	10.88	-	291.69
GSC 6A	59.61	23.13	0.52	-	-	-	-83.26	-	-
GSC 6B	554.07	215.01	4.79	-	-	-	29.98	-	803.85
GSH 4	1,946.25	755.24	16.83	-	-	26.91	107.03	-1.47	2,850.79
GSH 5	496.91	192.83	4.30	-	-	-	15.13	-	709.17
GSH 6	477.50	185.30	4.13	-	-	-	26.15	-	693.08
GSP 1	7,124.55	2,764.69	61.59	-	-	98.51	261.81	-3.59	10,307.56
GSP 5	3,024.92	1,173.82	26.15	-	-	-	95.03	-	4,319.92
GSP 7	1,090.37	423.12	9.43	-	-	15.08	39.21	-0.54	1,576.67
HAK 1	66,192.86	25,686.20	39,380.51	7,376.65	144,231.01	10,511.55	1,323.59	-40.25	294,662.12
HAK 10	137.93	53.52	1.19	-	-	-	7.46	-	200.10
HAK 4	30,298.34	11,757.30	10,087.61	1,869.66	216,648.42	3,190.79	228.37	76.66	274,157.15
HAK 7	33,728.41	13,088.34	10,853.67	2,005.63	193,010.92	3,827.68	595.32	120.19	257,230.16
HOK 1	925,782.65	359,250.76	1,009,601.59	190,387.90	2,559,621.74	241,575.19	-207,843.38	8,622.87	5,086,999.32
HOK 10	93.51	36.29	0.81	-	-	-	5.06	-	135.67
JMA 3	90,315.24	35,046.91	53,727.93	10,062.16	1,568.75	13,910.66	891.50	-12.55	205,510.60
JMA 7	490,623.01	190,386.68	265,915.89	49,744.25	73,472.86	69,794.20	-9,311.36	-1,170.05	1,129,455.48
KIC 1	23.38	9.07	0.20	-	-	-	1.26	-	33.91
KIC 10	-	-	-	-	-	-	-	-	-
KIC 2	23.38	9.07	0.20	-	-	-	1.26	-	33.91
KIC 3	23.38	9.07	0.20	-	-	-	1.26	-	33.91
KIC 4	7.01	2.72	0.06	-	-	-	-7.29	-	2.50
KIC 5	23.38	9.07	0.20	-	-	-	1.26	-	33.91
KIC 6	23.38	9.07	0.20	-	-	-	1.26	-	33.91
KIC 7	23.38	9.07	0.20	-	-	-	1.26	-	33.91
KIC 8	23.38	9.07	0.20	-	-	-	1.26	-	33.91
KIC 9	23.38	9.07	0.20	-	-	-	1.26	-	33.91
LDO 1	3,279.51	1,272.62	28.35	-	-	-	153.56	-	4,734.04
LDO 10	17.53	6.80	0.15	-	-	-	0.95	-	25.43
LDO 3	11,268.13	4,372.61	97.42	-	-	-	-1,613.96	-	14,124.20
LIN 3	72,239.10	28,032.45	60,640.61	4,453.19	207,530.26	29,760.08	-18,788.22	-6,137.60	377,729.87
LIN 4	138,446.59	53,724.32	116,232.11	8,532.44	207,530.26	23,229.74	-2,613.19	-11,538.11	533,544.16
LIN 5	162,542.18	63,074.64	126,350.10	8,101.85	103,662.93	88,602.80	-5,420.59	-11,638.61	535,275.30
LIN 6	266,436.04	103,390.74	207,115.38	13,268.91	132,312.09	67,346.94	-4,059.32	-23,328.40	762,482.38
LIN 7	105,312.69	40,866.68	87,236.82	6,266.19	221,817.38	48,224.29	-2,963.18	-7,606.18	499,154.69
OEO 1	58,445.87	22,679.97	16,614.12	-	-	4,908.78	2,232.15	-334.51	104,546.38
OEO 10	82.99	32.21	0.72	-	-	-	4.51	-	120.43
OEO 3A	27,802.70	10,788.86	24,110.72	-	104,789.78	2,335.10	-1,530.26	281.10	168,578.00
OEO 4	29,877.53	11,594.00	25,917.37	-	145,356.77	2,908.66	-3,976.95	427.82	212,105.20

Fish stock	Compliance	Registry	Observers		Research		Under/over recovery		2022/23 total
	MPI	MPI	MPI	DOC	MPI	DOC	MPI	DOC	
OEO 6	49,795.88	19,323.34	14,154.39	-	-	5,744.13	1,346.77	-75.32	90,289.19
ORH 1	50,731.02	19,686.22	44,089.33	-	-	5,795.51	1,784.88	160.43	122,247.39
ORH 10	289.89	112.49	2.51	-	-		15.68	-	420.57
ORH 2A	18,139.73	7,039.14	15,763.56	-	-	1,792.35	-40,942.43	-3,662.66	-1,870.31
ORH 2B	1,865.59	723.94	1,616.55	-	-	184.34	-4,206.09	-375.87	-191.54
ORH 3A	5,337.98	2,071.41	4,638.21	-	-	519.67	-12,047.60	-1,071.75	-552.08
ORH 3B	255,169.78	99,018.85	291,673.34	-	104,304.70	29,434.71	5,537.73	2,095.10	787,234.21
ORH 7A	71,687.84	27,818.53	120,818.83	-	1,507,306.29	5,749.56	1,119.11	-1,608.96	1,732,891.20
ORH 7B	19.40	7.53	31.55	-	-	1.56	-58.48	-1.56	0.00
PRK 1	979.44	380.07	8.47	-	-	-	53.11	-	1,421.09
PRK 10	-	-	-	-	-	-	-	-	-
PRK 2	139.92	54.30	1.21	-	-	-	7.57	-	203.00
PRK 3	39.98	15.51	0.35	-	-	-	2.16	-	58.00
PRK 4A	39.98	15.51	0.35	-	-	-	2.16	-	58.00
PRK 5	39.98	15.51	0.35	-	-	-	2.16	-	58.00
PRK 6A	39.98	15.51	0.35	-	-	-	2.16	-	58.00
PRK 6B	39.98	15.51	0.35	-	-	-	2.16	-	58.00
PRK 7	6.31	2.45	0.05	-	-	-	0.34	-	9.15
PRK 8	39.98	15.51	0.35	-	-	-	2.16	-	58.00
PRK 9	39.98	15.51	0.35	-	-	-	2.16	-	58.00
PTO 1	5,786.14	2,245.32	50.02	-	-	-	312.80	-	8,394.28
RBT 1	86.62	33.61	0.75	-	-	-	4.69	-	125.67
RBT 10	-	-	-	-	-	-	-	-	-
RBT 3	23,039.36	8,940.45	199.18	-	-	304.63	1,315.28	-	33,798.90
RBT 7	4,161.35	1,614.81	35.98	-	-	-	700.46	-	6,512.60
RBY 1	1,753.38	680.40	15.16	-	-	23.18	280.78	-	2,752.90
RBY 10	-	-	-	-	-	-	-	-	-
RBY 2	1,619.65	628.51	14.00	-	-	21.42	204.57	-	2,488.15
RBY 3	105.20	40.82	0.91	-	-	-	1.14	-	148.07
RBY 4	70.14	27.22	0.61	-	-	-	3.50	-	101.47
RBY5	7.01	2.72	0.06	-	-	-	0.08	-	9.87
RBY6	18.00	6.99	0.16	-	-	-	0.97	-	26.12
RBY7	81.01	31.43	0.70	-	-	-	22.99	-	136.13
RBY8	79.95	31.03	0.69	-	-	-	4.33	-	116.00
RBY9	111.05	43.09	0.96	-	-	-	13.23	-	168.33
RIB3	4,191.04	1,626.34	36.23	-	-	106.74	376.79	-	6,337.14
RIB4	3,129.78	1,214.51	27.06	-	-	79.71	237.46	-	4,688.52
RIB5	419.41	162.75	3.63	-	-	10.68	16.41	-	612.88
RIB6	2,106.16	817.30	18.21	-	-	-	83.90	-	3,025.57
RIB7	2,854.50	1,107.69	24.68	-	-	72.70	125.12	-	4,184.69
RIB8	8.65	3.36	0.07	-	-		0.47	-	505.58
SBW1	343.66	133.36	2.97	-	-	5.69	19.90	-	12,828.26

Fish stock	Compliance	Registry	Observers		Research		Under/over recovery		2022/23 total
	MPI	MPI	MPI	DOC	MPI	DOC	MPI	DOC	
SBW6A	8,051.50	3,124.39	69.61	-	-	1,089.32	465.86	27.58	78,112.62
SBW6B	14,290.72	5,545.53	17,523.61	4,691.14	50,780.21	1,812.78	-13,592.98	-2,938.39	358,354.45
SBW6I	151,211.17	58,677.62	185,428.17	49,585.61	33,523.79	19,181.11	-103,267.11	-35,985.91	56,889.16
SBW6R	36,002.66	13,970.86	311.26	-	-	4,394.89	2,084.97	124.52	206,108.17
SCI1	28,881.61	11,207.54	60,897.44	16,328.35	-	1,495.12	88,518.87	-1,220.76	206,108.17
SCI10	-	-	-	-	-		-	-	-
SCI2	28,793.94	11,173.52	60,707.32	16,283.03	-	2,290.17	112,259.09	-1,336.76	230,170.31
SCI3	85,559.15	33,201.30	180,400.10	48,373.17	779,992.44	9,837.79	-2,263.75	-3,195.87	1,131,904.33
SCI4A	22,695.70	8,807.09	47,851.77	12,838.32	206,509.15	3,139.82	1,239.36	-958.03	302,123.18
SCI5	6,466.45	2,509.31	55.91	-	-	-	358.02	-	9,389.69
SCI6A	54,547.53	21,167.22	170,895.44	45,891.62	192,813.56	20,605.75	2,366.49	-4,930.05	503,357.56
SCI6B	8,083.06	3,136.64	69.88	-	-	284.13	447.46	-5.74	12,015.43
SCI7	5,260.13	2,041.20	45.48	-	-	455.33	286.09	-	8,088.23
SCI8	808.31	313.66	6.99	-	-	-	44.90	-	1,173.86
SCI9	5,658.15	2,195.65	48.92	-	-	-	313.12	-	8,215.84
SPD4	1,710.59	663.80	14.79	-	-	23.65	75.10	-1.32	2,486.61
SPD5	7,352.49	2,853.14	63.57	-	-	3,749.39	99.48	-46.29	14,071.78
SPE3	11,806.07	663.80	102.07	-	-	163.24	-1,611.07	-7.10	11,117.01
SPE4	12,658.21	2,853.14	109.44	-	-	342.39	425.52	-5.83	16,382.87
SPE5	361.90	4,581.35	3.13	-	-	-	6.83	-	4,953.21
SPE6	75.75	4,912.03	0.65	-	-	-	3.93	-	4,992.36
SPE7	891.42	140.43	7.71	-	-	12.33	-21.87	-0.51	1,029.51
SQU10T	133.26	29.39	1.15	-	-	-	7.21	-	171.01
SQU1J	66,628.30	345.91	576.03	-	-	6,296.58	3,608.69	-	77,455.51
SQU1T	721,717.89	51.71	986,387.11	263,939.13	18,036.63	159,160.44	432,800.84	56,220.22	2,638,313.97
SQU6T	465,397.04	25,855.17	636,064.61	170,195.59	3,983.17	229,193.82	285,083.70	11,995.36	1,827,768.46
SWA1	29,456.72	2.72	9,480.70	1,756.35	-	1,687.14	1,623.20	119.46	44,126.29
SWA10	97.02	6.99	0.84	-	-	-	5.25	-	110.10
SWA3	35,024.27	13,591.20	11,653.87	2,152.94	32,381.42	5,561.92	-6,352.28	270.65	94,283.99
SWA4	45,237.11	17,554.30	26,911.99	5,042.41	34,508.73	8,415.05	-246.95	316.12	137,738.76
WWA1	121.57	47.17	1.05	-	-	-	3.57	-	173.36
WWA10	-	-	-	-	-	-	-	-	-
WWA2	1,646.89	639.08	14.24	-	-	22.77	89.20	-1.22	2,410.96
WWA3	14,038.47	5,447.64	121.37	-	-	612.00	668.35	-9.16	20,878.67
WWA4	7,290.54	2,829.10	63.03	-	-	221.43	395.55	-5.42	10,794.23
WWA5B	48,944.91	18,993.12	13,247.02	2,436.22	-	9,104.78	3,343.37	254.83	96,324.25
WWA7	2,523.69	979.32	21.82	-	-	34.89	135.91	-1.87	3,693.76
WWA8	17.65	6.85	0.15	-	-	-	0.95	-	25.60
WWA9	17.53	6.80	0.15	-	-	-	0.95	-	25.43
Grand total	5,184,128.75	2,011,705.66	5,073,726.67	950,840.36	7,276,192.72	1,166,018.14	540,543.62	-38343.05	22,164,866.94