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New Zealand Hake, Hoki, Ling and Southern Blue Whiting

Surveillance Review of Information

Conformity Assessment Body (CAB)	LRQA
Assessment team	Jo Akroyd and André Punt
Fishery client	Deepwater Group Limited
Assessment type	Fourth Surveillance
Date	October 2023

Assessment Data Sheet

CAB details		**LRQA**
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	Principle 1	André Punt
	Principle 2	Jo Akroyd
	Principle 3	Jo Akroyd

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1. Executive Summary

In 2018, after an MSC reassessment process was undertaken for the NZ Hoki, Hake, Ling and Southern Blue Whiting trawl fisheries and the NZ Ling longline fisheries, using the MSC Certification Requirements (CR) version (v) 1.3 (MSC 2013) default assessment tree, these fisheries were MSC certified with no conditions.

This report is a review of information for the fourth offsite audit that took place remotely during the week of 14 August 2023 involving the CAB auditors, the client group, National Institute of Water and Atmospheric Research (NIWA) scientists, and the Fisheries New Zealand (FNZ) staff. No stakeholders wished to be involved nor wrote any submissions.

The client provided excellent situation reports for all fisheries and delivered relevant papers and documents via links. As there were no conditions on the fisheries there was no reporting for this. However, information was provided for two non–binding recommendations raised at the previous audit

No Conditions were placed on these fisheries at this Year 4 audit. A recommendation was raised to conduct a stock assessment for HAK4, which was planned to have been assessed during 2023.

There were no material changes to the circumstances and practices affecting the original complying assessment of the fishery.

These fisheries continue to meet the MSC Standard and they remain certified.

2. Audit details

2.1 Surveillance information

Table 1: Surveillance information

1	Fishery name
New Zealand Hake, Hoki, Ling and Southern Blue Whiting	
2	**Unit(s) of Assessment (UoA)**

New Zealand Hoki, Hake and Ling Trawl Fishery- Certified

Fishing Method	Species	Management Areas	Stock	UoC
Trawl	Hoki (*Macruronus novaezelandiae*)	HOK 1	Eastern	1
		HOK 1	Western	2
	Hake (*Merluccius australis*)	HAK 1	Sub-Antarctic	3
		HAK 4	Chatham Rise	4
	Ling (*Genypterus blacodes*)	LIN 3	Chatham Rise (LIN 3 & 4)	6
		LIN 4	Chatham Rise (LIN 3 & 4)	7
		LIN 5	Sub-Antarctic (LIN 5 & 6)	8
		LIN 6	Sub-Antarctic (LIN 5 & 6)	9
		LIN 7	West Coast South Island (LIN 7WC)	10

New Zealand Hoki, Hake and Ling Trawl Fishery- Suspended

Fishing Method	Species	Management Areas	Stock	UoC
Trawl	Hake (*Merluccius australis*)	HAK 7	West Coast South Island	5

New Zealand Southern Blue Whiting Trawl Fishery- Certified

Fishing Method	Species	Management Areas	Stock	UoC
Trawl	Southern blue whiting (*Micromesistius australis*)	SBW 6B	Bounty Platform	1
		SBW 6I	Campbell Rise	2

New Zealand Ling Longline Fishery- Certified

Fishing Method	Species	Management Areas	Stock	UoC
Longline	Ling (*Genypterus blacodes*)	LIN 3	Chatham Rise (LIN 3 & 4)	1
		LIN 4	Chatham Rise (LIN 3 & 4)	2

		LIN 5	Sub-Antarctic (LIN 5 & 6)	3
		LIN 6	Sub-Antarctic (LIN 5 & 6)	4
		LIN 7	West Coast South Island (LIN 7WC)	5

3	Date certified	Date of expiry
	12th September 2018	26th February 2024

4	Surveillance type, level and number
Level 1- Review of Information	

6	Surveillance team leader

Jo Akroyd- Team Lead, P2 and P3 Expert
Jo has over 30 years' experience in marine fisheries policy, research, management and governance. She has extensive international and Pacific experience and has worked at senior levels in both the public and private sectors in these roles. Jo was with the Ministry of Agriculture and Fisheries in New Zealand for 20 years. Starting as a fisheries scientist, she was promoted to senior chief fisheries scientist, then Assistant Director, Marine Research. She was awarded a Commemoration Medal in 1990 in recognition of her pioneering work in establishing New Zealand's fisheries quota management system. As well as carrying out general fisheries consultancy since1994 she has undertaken all facets of MSC work as a lead assessor, expert team member and peer reviewer across a wide range of fisheries. Jo has completed the MSC v1.3, v2.0, v2.1 and v2.2 training modules including for enhanced fisheries, Risk based framework and traceability. She is a member of the MSC's Peer Review College. MSC projects include Team Leader and Fisheries Management expert for New Zealand fisheries, (hoki, hake, ling, southern blue whiting, albacore and skipjack), Fiji (albacore, yellowfin and bigeye tuna), Japan (scallops, skipjack and yellowfin), China (scallops, flounder and snowcrab), Maldives (skipjack), Ross Sea (toothfish), West Papua (skipjack and yellowfin). She has conducted multi species pre-assessments in Japan, China, Viet Nam and New Zealand and provided independent Peer review reports for tuna, scallops and prawn fisheries in various countries.

7	Surveillance team members

André Punt- P1 and P2 Expert
André E. Punt is a Professor in the School of Aquatic and Fishery Sciences at the University Washington, Seattle, USA and currently the Director of the School. He received his B.Sc., M.Sc. and Ph.D. in Applied Mathematics at the University of Cape Town, South Africa. Before joining the University of Washington, Dr Punt was a Principal Research Scientist with the CSIRO Division of Marine and Atmospheric Research in Australia. Dr. Punt has been involved in stock assessment and fisheries management for over 30 years and has been recognized for his contributions in this area with awards from CSIRO, the University of Washington, the Australian Society for Fish Biology, and the American Fisheries Society. The research undertaken by Dr. Punt and the MPAM (Marine Population and Management) group at the University of Washington relates broadly to the development and application of fisheries stock assessment techniques, bioeconomic modelling, and the evaluation of the performance of stock assessment methods and harvest control rules using the Management Strategy Evaluation approach. Currently, projects that Dr. Punt is undertaking with his research group include ecosystem modelling, assessment and management methods for data-poor methods, and understanding the impact of climate change and environmental variation on the performance of assessment and management methods. Dr. Punt has conducted stock assessments for a wide range of species, ranging from anchovies and sardines, to groundfish, tunas, and cetaceans. Dr. Punt has published over 400 papers in the peer-reviewed literature, along with over 400 technical reports. He was a member of a National Research Council panel on evaluating the effectiveness of fish stock rebuilding in the United States. Dr Punt is currently a member of the Scientific and Statistical Committee of the Pacific Fishery Management Council, the advisory committee for the Center for the Advancement of Population Assessment Methodology, the Crab Plan Team of the North Pacific Fishery Management Council, and the Scientific Committee of the International Whaling Commission.

8	Audit time and location
Surveillance Audit 4 took place remotely during the week commencing 14 August 2023	

9	Assessment and review activities
All relevant information, any changes to the fishery, and any updates on the 2 non-binding recommendations.	

2.1 Version details

Table 2: Fisheries program documents versions

Document/Assessment Tree	Version number/Type
MSC Fisheries Certification Process	Version 2.3
MSC Fisheries Standard	Version 2.01
Assessment tree	Default
MSC General Certification Requirements	Version 2.5
MSC Surveillance Review of Information Template	Version 2.1

2.3 Update on the fishery

Background

The client Group, Deepwater Group Limited (DWG) http://deepwatergroup.org, was established in September 2005. This non-profit organisation is an amalgamation of New Zealand Exclusive Economic Zone (EEZ) deepwater fisheries quota owners. Species targeted by DWG are usually fished at depths between 400 and 1,200 m within the New Zealand EEZ. These include hoki, hake, ling, southern blue whiting, orange roughy, oreo dory, squid and jack mackerel. The client group catches about 95% of the recorded hoki, hake, ling and southern blue whiting landings.

The NZ hoki, hake, ling and southern blue whiting trawl fisheries, along with the ling longline fishery were reassessed and recertified in 2018. These fisheries were previously assessed against the MSC standard and certified separately at different times. The re-assessment was conducted using the MSC Certification Requirements (CR) version (v) 1.3 (MSC 2013) default assessment tree with no changes made to the text of any default Performance Indicator (PI). The assessment followed CR v 2.0 process (MSC 2014). At reassessment, no Performance Indicators scored < 80 and so no conditions of certification were applied to the fishery.

Surveillance audits were held in 2019, 2021 and last year 2022. No conditions were placed on these fisheries but two non–binding recommendations were raised.

Information was provided for two non–binding recommendations raised at the previous audit:
Recommendation 1 (P2.1 and P2.2) requests an updated analysis of retained and bycatch species should be conducted, and the results linked to information on trends and status relative to reference points. No update analysis has been conducted. However, Edwards and Mormede (2023) have developed a framework to estimate removals on a species-specific basis that integrate across fishing effort and sampling data from multiple fisheries, operating in different locations and with different gear types provide a more holistic evaluation of fisheries bycatch.

Recommendation 2 (P3.2.4) requests an updated external review of the management system is conducted. The review has not yet been completed. However, the client has met with FNZ and have outlined the need for an independent review of the management system. DWG are working with FNZ to agree on terms of reference to complete the review.

This, the fourth audit was a Review of Information and took place during the week 14 August 2023.

No stakeholders wished to be involved nor wrote any submissions. The client provided excellent situation reports for all fisheries and delivered relevant papers and documents via dropbox. These were discussed at the off-site Zoom Meeting. Information was also provided related to recommendations 1 and 2 above.

2.4 Changes in the management system and/or relevant regulations

None of significance at this stage. The passing of the Fisheries Amendment Act 2022, means that by 2026 discarding of all QMS species (unless expressly provided for) will be illegal. This change won't come in until 2026.

2.5 Changes to personnel in science management of industry

There have been a few changes in personnel, but these changes are not anticipated to make any fundamental differences to the way in which the client operates or engages with the MSC certification of the fishery.

2.6 Developments or changes that impact on Traceability

No changes and no issues encountered.

2.7 Inseparable or practicably inseparable (IPI) stock status

There are no IPI species

3. Total Allowable Catch (TAC) and catch data

Table 3: Total Allowable Catch (TAC) and catch data

UoC 1 & UoC 2 – HOK 1 East & HOK 1 West

TACC 2022-23	110,000 t (agreed catch limit split: East 65,000 t; West 45,000 t)[1]
TACC 2021-22	110,000 t (agreed catch limit split: East 55,000 t; West 45,000 t)[2]
TACC 2020-21	105,000 t (agreed catch limit split: East 60,000 t; West 45,000 t)[3]
TACC 2019-20	115,000 t (agreed catch limit split: East 60,000 t; West 55,000 t)
UoA share of TACC	100%
UoC share of TACC	93%
HOK 1 catch 2022-23	50,656 t (HOK 1 East 36,545 t, HOK 1 West 14,111 t)
HOK 1 catch 2021-22	91.719 t (HOK 1 East 48,946 t, HOK 1 West 42,773 t)
HOK 1 catch 2020-21	101,124 t (HOK 1 East 54,786 t, HOK 1 West 46,338 t)
HOK 1 catch 2019-20	107,709 t (HOK 1 East 55,070 t, HOK 1 West 53,030 t)

UoC 3 – HAK 1

TACC 2022-23	3,071 t
TACC 2021-22	3,701 t
TACC 2020-21	3,701 t
TACC 2019-20	3,701 t
UoA share of TACC	100%
UoC share of TACC	94%
HAK 1 catch 2022-23	947 t
HAK 1 catch 2021-22	1,692 t
HAK 1 catch 2020-21	1,503 t
HAK 1 catch 2019-20	1,062 t

[1] During the 2022-23 fishing year quota owners have agreed to an overall catch of 100,000 t with catch limits of 60,000 t for East and 40,000 t for West – delivered through shelving of ACE.
[2] During the 2021-22 fishing year quota owners have agreed to an overall catch of 100,000 t with catch limits of 55,000 t for East and 45,000 t for West – delivered through shelving of ACE.
[3] During the 2020-21 fishing year quota owners agreed to an overall catch of 95,000 t with catch limits of 50,000 t for East and 45,000 t for West – delivered through shelving of ACE.

UoC 4 – HAK 4

TACC 2022-23	1,800 t
TACC 2021-22	1,800 t
TACC 2020-21	1,800 t
TACC 2019-20	1,800 t
UoA share of TACC	100%
UoC share of TACC	94%
HAK 4 catch 2022-23	116 t
HAK 4 catch 2021-22	137 t
HAK 4 catch 2020-21	207 t
HAK 4 catch 2019-20	137 t

UoC 6 – LIN 3 Trawl and Longline

TACC 2022-23	2,060 t
TACC 2021-22	2,060 t
TACC 2020-21	2,060 t
TACC 2019-20	2,060 t
LIN 3 catch 2021-22	1,019 t (Total reported catch)
	521 t (Estimated catch trawl)
	240 t (Estimated catch bottom longline)
	258 t (Estimated catch other methods)
LIN 3 catch 2020-21	1,489 t (Total reported catch)
	489 t (Estimated catch trawl)
	406 t (Estimated catch bottom longline)
	594 t (Estimated catch other methods)
LIN 3 catch 2019-20	778 t (Total reported catch)
	6 t (Estimated catch trawl)
	554 t (Estimated catch bottom longline)
	218 t (Estimated catch other methods)
UoA share of TACC and total LIN catch	100% of TACC and 44% of total LIN catch (based on average estimated trawl catch over the last two years)
UoC share of TACC and total LIN catch	93% of TACC and 40% of total LIN catch (based on average estimated trawl catch over the last two years)

UoC 7 – LIN 4

TACC 2022-23	4,200 t
TACC 2021-22	4,200 t
TACC 2020-21	4,200 t
TACC 2019-20	4,200 t
UoA share of TACC and total LIN catch	100% of TACC and 32% of total LIN catch (based on average estimated trawl catch over the last two years)
UoC share of TACC and total LIN catch	94% of TACC and 30% of total LIN catch (based on average estimated trawl catch over the last two years)
LIN 4 catch 2021-22	2,324 t (Total reported catch) 352 t (Estimated catch for all target trawl) 1,745 t (Estimated catch for bottom longline) 227 t (Estimated catch other methods).
LIN 4 catch 2020-21	2,103 t (Total reported catch) 656 t (Estimated catch for all target trawl) 1,447 t (Estimated catch for bottom longline) 0 t (Estimated catch other methods).
LIN 4 catch 2019-20	1,207 t (Total reported catch) 230 t (Estimated catch for all target trawl) 1,048 t (Estimated catch for bottom longline) 159 t (Estimated catch other methods).

UoC 8 – LIN 5 Trawl and Longline

TACC 2022-23	5,208 t
TACC 2021-22	5,208 t
TACC 2020-21	4,735 t
TACC 2019-20	4,735 t
UoA share of TACC and total LIN catch	100% of TACC and 90% of total LIN catch (based on average estimated trawl catch over the last two years)
UoC share of TACC and total LIN catch	95% of TACC and 85% of total LIN catch (based on average estimated trawl catch over the last two years)
LIN 5 catch 2021-22	4,822 t (Total reported catch) 4,306 t (Estimated catch for all target trawl) 505 t (Estimated catch for bottom longline) 11 t (Estimated catch for other methods)

LIN 5 catch 2020-21	4,950 t (Total reported catch) 4,380 t (Estimated catch for all target trawl) 567 t (Estimated catch for bottom longline) 3 t (Estimated catch for other methods)
LIN 5 catch 2019-20	3,508 t (Total reported catch) 3,111 t (Estimated catch for all target trawl) 387 t (Estimated catch for bottom longline) 11 t (Estimated catch for other methods)

UoC 9 – LIN 6 Trawl and Longline

TACC 2022-23	8,505 t
TACC 2021-22	8,505 t
TACC 2020-21	8,505 t
TACC 2019-20	8,505 t
UoA share of TACC and total LIN catch	100% of TACC and 61% of total LIN catch (based on average estimated trawl catch over the last two years)
UoC share of TACC and total LIN catch	61% of TACC and 57% of total LIN catch (based on average estimated trawl catch over the last two years)
LIN 6 catch 2021-22	3,807 t (Total reported catch) 2,833 t (Estimated catch trawl) 970 t (Estimated catch bottom longline) 4 t (Estimated catch other methods
LIN 6 catch 2020-21	3,916 t (Total reported catch) 2,567 t (Estimated catch trawl) 1,349 t (Estimated catch bottom longline) 0 t (Estimated catch other methods
LIN 6 catch 2019-20	3,266 t (Total reported catch) 1,742 t (Estimated catch trawl) 1,524 t (Estimated catch bottom longline) 0 t (Estimated catch other methods)

UoC 10 – LIN 7 Trawl and Longline

TACC 2022-23	3,387 t

TACC 2021-22	3,387 t
TACC 2020-21	3,387 t
TACC 2019-20	3,287 t
UoA share of TACC and total LIN catch	100% of TACC and 50% of total LIN catch (based on average estimated trawl catch over the last two years)
UoC share of TACC and total LIN catch	73% of TACC and 46% of total LIN catch (based on average estimated trawl catch over the last two years)
LIN 7 catch 2021-22	2,917 t (Total reported catch)
	823 t (Estimated catch trawl)
	1,479 t (Estimated catch bottom longline)
	615 t (Estimated catch other methods)
LIN 7 catch 2020-21	3,308 t (Total reported catch)
	1,414 t (Estimated catch trawl)
	1,780 t (Estimated catch bottom longline)
	114 t (Estimated catch other methods)
LIN 7 catch 2019-20	1,686 t (Total reported catch)
	348 t (Estimated catch trawl)
	1313 t (Estimated catch bottom longline)
	25 t (Estimated catch other methods)

UoC 11 – SBW 6B Trawl

TACC 2023-24	2,264 t
TACC 2022-23	2,264 t
TACC 2021-22	2,830 t
TACC 2020-21	3,145 t
TACC 2019-20	3,145 t
UoA share of TACC	100%
UoC share of TACC	87%
SBW 6B catch 2022-23	125 t
SBW 6B catch 2021-22	801 t
SBW 6B catch 2020-21	1,100 t
SBW 6B catch 2019-20	788 t

UoC 12– SBW 6I Trawl

TACC 2023-24	39,200 t
TACC 2022-23	39,200 t
TACC 2021-22	39,200 t
TACC 2020-21	39,200 t
TACC 2019-20	39,200 t
UoA share of TACC	100%
UoC share of TACC	87%
SBW 6I catch 2022-23	22,985 t
SBW 6I catch 2021-22	19,514 t
SBW 6I catch 2020-21	11,982 t
SBW 6I catch 2019-20	26,517 t

4. Changes which impact traceability systems

Table 4: Changes affecting traceability and segregation

Are there any developments or changes within the fishery that affect traceability and the ability to segregate MSC from non-MSC products?
No

4.1 Traceability within the fishery description

Existing fisheries management requirements include the clear identification of species, quantity, fishing method and area of capture by all vessels landing fish from the fishery. All catches are reported in logbooks and in catch and effort landing returns. On-board observer coverage also monitors, cross checks and verifies catches and landings with the vessels logbook.

There is cross referencing of VMS data with logbooks. Observer and aerial and at-sea surveillance reports also ensure that fish are reported from the correct area of capture. All landings are monitored by a dockside monitoring program. Vessels have to advise the Ministry before landing and maybe subject to monitoring by enforcement officers

The point of change of ownership of product is after delivery of product to the processor, auction of fish or sales agent.

CoC is required on change of ownership and the first CoC holder would be the processor or buyer through the auction

4.2 Traceability within the fishery description

No Change

4.3 Eligibility to enter further chains of custody

No Change

To be eligible to carry the MSC logo, product from the certified fishery, must enter into separate Chain of Custody certifications after the first point of sale.

The main points of landing for this fishery are all major New Zealand ports. The scope of this certification ends at the points of landing. Downstream certification of the product would require appropriate certification of storage and handling facilities at these locations.

The CAB determined that the systems in place for tracking and tracing are sufficient, fish and fish products from the fishery may enter into further certified chains of custody and be eligible to carry the MSC ecolabel.
The eligible parties to use the fisheries certificate are shareholders of the Deepwater Group. Currently 94.8% of total hoki quota is held by DWG shareholders. Anyone who owns hoki quota has the opportunity to become a DWG

5. Surveillance results

5.1 Principle 1 : Changes to scientific base of information including stock assessment

5.1.1 Management strategies, reference points, and management changes

5.1.1.HOK 1

The TAC for the 2021-22 fishing year was 111,140t, which includes a 110,000t TACC (split into 65,000t for the eastern stock and 45,000t for the western stock). FNZ (2023a) noted five-year projections, assuming catch at the current catch limits, implied that a decline in the biomass of the eastern stock would take place after two years and that the western stock biomass was predicted not to rebuild to the lower bound of the management target range (0.35 B_0) over the next five years. FNZ (2023a) proposed consideration of a reduction in the TAC to 106,090t (with a TACC of 105,000t split 65,000t for the eastern stock and 45,000t for the western stock) (FNZ, 2023a). The proposal for a change in TAC was consulted on and 17 submissions were received (three in favor of the reduction in TAC, 14 opposed). The Minister decided to keep the TACC for HOK 1 at 110,000t, with catch limits for HOK 1 West and HOK 1 East of again 45,000t and 65,000t, respectively (FNZ, 2023a; Minister of Fisheries, 2021).

In 2023, a Management Strategy Evaluation (MSE) was undertaken for hoki (FNZ, 2023b). The operating model for the MSE was based on the 2022 base case stock assessment model and assumed eastern and western recruitments equivalent to those for 2001–2020. The MSE evaluated a range of HCRs, including alternative target biomass levels and corresponding catch levels. The HCRs specified a base level of catch for the eastern and western fisheries when the respective stock units were assessed to be within the target biomass range and varied the level of catch proportionally when the stock was below or above the target biomass range. The initial set of HCRs reaffirmed the current target biomass range of 0.35–0.5 B_0; the lower bound ensuring the stock had a very low risk of declining below the soft limit (0.20 B_0). A range of other performance indicators were derived to evaluate the HCRs, including average annual fishery catches, variability in annual catches, magnitude and frequency of catch adjustments, relative CPUE, and average fish weight by fishery. FNZ (2023b) noted that the 2023 Plenary did not adopt an HCR for hoki. Instead, the results of the MSE were considered useful to inform managers regarding the likely level of yields available from the hoki fishery and the scale of management response required to maintain the stock at the optimal target biomass levels. It noted that the adoption of a specific HCR would require wider consultation to fully evaluate the relative trade-offs. Implementation of a specific set of HCRs would also require the specification of a set of breakout rules for managing the stock beyond the scope of the current operating model, e.g., in response to a sustained period of low recruitments.

5.1.1.2 *SBW 6B* (Bounty Platform)

This stock is managed using a harvest control rule. This harvest control rule was updated during 2022 to account for the possibility that an acoustic survey is not completed for the stock. This involves adjusting the TAC based on a series of multiplicative factors that relate to how many years it has been since a survey was conducted and an estimate of biomass obtained (Table 19 of FNZ [2023c]).

5.1.2 Stock status and projections

Table 5 Summaries stock status (biomass relative to B_0) and the probability of being below the limit and target reference points.

Table 5. Summary of the stock status of the UoC based on the base model runs

Stock	Most recent assessment	Depletion [Year]	P < Limit	P < Target
HOK 1 East*	2023	54 (41-70) [2022]	0.00	0.01+
HOK 1 West*	2023	37 (31-45) [2023]	0.01	0.38+
HAK 1	2021	62 (50-75) [2021]	< 1%	< 10%
HAK 4	2020	55 (46-66) [2020]	< 1%	< 10%
LIN 3 & 4	2022	56 (47-66) [2022]	< 1%	< 1%
LIN 5 & 6	2021	71 (63-79) [2021]	0.00	0.00
LIN 7WC	2023	51 (38-64) [2023]	<1%	0.05

SBW 6B	Managed using an HCR			
SBW 6I	2020	58 (42-76) [2020]	< 1%	<10%

*Detailed assessment report not available
+ Lower limit of the target range

5.1.2.1 Hoki

5.1.2.1.1 Catches

The TACC for the 2021-22 fishing year was set at 110,000t but the hoki quota owners agreed to voluntarily reduce the HOK 1 catch limit, by reducing the HOK 1 East catch limit from 65,000t to 55,000t, for an effective TACC of 100,000t. The reported catch was 91,668t (FNZ, 2023b), a reduction of 9,151t from the catch for the 2020-21 fishing year. The largest reductions in catch occurred in the West Coast South Island (WCSI) and Cook Strait spawning fisheries (10% and 19% respectively). Catches in the Puysegur and East Coast South Island (ECSI) spawning fisheries were larger during the 2021-22 fishing year than during the 2020-21 fishing year.

5.1.2.1.2 Stock assessment

The 2023 assessment was based on Casal 2 (Doonan et al., 2016) and updated the 2022 assessment (McGregor et al., 2022), being again based on 10 model fisheries (Table 6). The stock assessment did not attempt to estimate the size of the 2020 recruitment due to high levels of uncertainty in estimating fish younger than 3 years old in the Sub-Antarctic summer trawl survey.

Table 6: The division of annual catches by area and months into the 10 model fisheries. (Source: FNZ, 2023b).

Fishery	Description	Areas/months
CR_deep	Chatham Rise deep (effort depth ≥475m), non-spawning	CR, CS (Oct-May), ECNI, ECSI (Oct-May)
CR_shallow	Chatham Rise shallow (effort depth <475m), non-spawning	CR, CS (Oct-May), ECNI, ECSI (Oct-May)
CS	Cook Strait spawning	CS (Jun-Sep), ECSI (Jun-Sep)
SA_auck	Sub-Antarctic Auckland Islands, non-spawning	Sub-Antarctic Auckland Islands
SA_snares	Sub-Antarctic Snares shelf, non-spawning	Sub-Antarctic Snares, Puysegur (Oct-May)
SA_suba	Sub-Antarctic excluding Auckland Islands and Snares shelf, non-spawning	Sub-Antarctic
PUY_spn	Puysegur spawning fishery	Puysegur (Jun-Sep)
WC_inside	West coast, spawning, inside 25nmile line	West coast
WC_north	West coast north spawning fishery	West coast north
WC_south	West coast south fishery	West coast south

The assessment was based four model configurations:

- **2023A: Base2023**: Two spawning stocks, which spawn in Cook Strait and off the West Coast of the South Island. Recruits from both stocks reside on the Chatham Rise as juveniles. Western-spawned fish migrate to the Sub-Antarctic. Mature West Coast-stock fish migrate from the Sub-Antarctic to the West Coast to spawn and mature Chatham Rise-stock fish migrate from the Chatham Rise to Cook Strait to spawn. After spawning, all mature fish return (West Coast to the Sub-Antarctic and Cook Strait to the Chatham Rise). Natural mortality for males and females was set to $0.3yr^{-1}$ and $0.25yr^{-1}$ respectively, with stock-recruitment steepness set to 0.75.
- **2023B: Base2023 with female *M* set to 0.225 yr^{-1}**: As for Base 2023 but with higher female *M*.
- **2023C**: **SepMature:** Two spawning stocks, which spawn on the Chatham Rise and West Coast. Recruits from both stocks reside on Chatham Rise as juveniles. Western-spawned fish migrate to Sub-Antarctic with the movement ogive estimated. Estimated West Coast-stock fish migrate from Sub-Antarctic to the West Coast to spawn and estimated Chatham Rise-stock fish migrate from the Chatham Rise to Cook Strait to spawn. After spawning, all mature fish return (West Coast to Sub-Antarctic and Cook Strait to the Chatham

Rise). This model separates maturity from migration to the spawning grounds by estimating logistic ogives to determine movement of fish to the spawning grounds. Hence 'maturity' only relates to spawning stock recruitment dynamics, and not movement or availability to the spawning fishing grounds.

- **2023D: SingleStock**: One spawning stock, that spawns on the Cook Strait and the West Coast. Recruits from both spawning grounds reside on the Chatham Rise as juveniles. Estimated ogives determine fish by sex that migrate to the Sub-Antarctic. These fish effectively become 'western stock' fish as they never return to the Chatham Rise. Estimated fish migrate from the Sub-Antarctic to the West Coast to spawn and similarly from the Chatham Rise to Cook Strait to spawn. After spawning, all mature fish return (West Coast to the Sub-Antarctic and Cook Strait to the Chatham Rise).

The new data included in the 2023 assessment include new catches (2021-22 fishing year), survey index and age-composition data for the December 2022 trawl survey of the Sub-Antarctic, as well as 2022 fishery catch-at-age data (FNZ, 2023b). The model provided an adequate fit to the new index data.

Biomass and recruitment

The biomasses of both stocks were at their lowest points from about 2004 to 2006 (~0.3 B_0 for the eastern stock and ~0.2 B_0 for the western stock) for the base model (Fig. 1), after the western stock experienced seven consecutive years of poor recruitment from 1995 to 2001 inclusive, and the eastern stock had below average recruitment over the same period (Fig. 2). Both stocks then increased to above the target range of 0.35-0.5 B_0, then declined, with the eastern stock now near the top of the target range and the western stock near the lower limit of the target range. Recruitment to the western stock following the 1995–2001 period of poor recruitment remained low for two more years then was estimated to have been above average for about five years before dropping again, with recruitment below average for 2011-2019. The recruitment patterns were similar for the eastern stock over these years, except for two strong year classes in 2011 and 2015 (Fig. 2).

The 2023 depletion (biomass relative to B_0) of the eastern stock was estimated to be 0.54 (95% confidence interval 0.41-0.70), 0.48 (95% confidence interval 0.36-0.62), or 0.46 (95% confidence interval 0.35-0.60) [models 2023A, 2023B, and 2022C respectively] while the 2023 depletion of western stock was estimated to be 0.37 (95% confidence interval 0.31-0.45; Model 2023A), 0.35 (95% confidence interval 0.29-0.43; Model 2023B) or 0.35 (95% confidence interval 0.29-0.43; Model 2023C). The 2023 depletion of HOK1 in total is 0.44,0.40,0.39 or 0.39 (models 2023A-2023D) (Table 5). Model 2023B is less optimistic than model 2023A but was not selected by the NZ Stock Assessment Plenary pending further investigation of the plausibility of the differences in *M* between the sexes. The NZ Stock Assessment Plenary noted that further work should be conducted for Model203C to better understand the estimated selectivity patterns. The probability of 2023 biomass being below the soft limit is estimated to be < 0.01 for the HOK 1 East and 0.01 for HOK 1 west, with the probability of being below the lower limit of management target range of 0.01 for HOK 1 East and 0.38 for HOK 1 West (FNZ, 2023b).

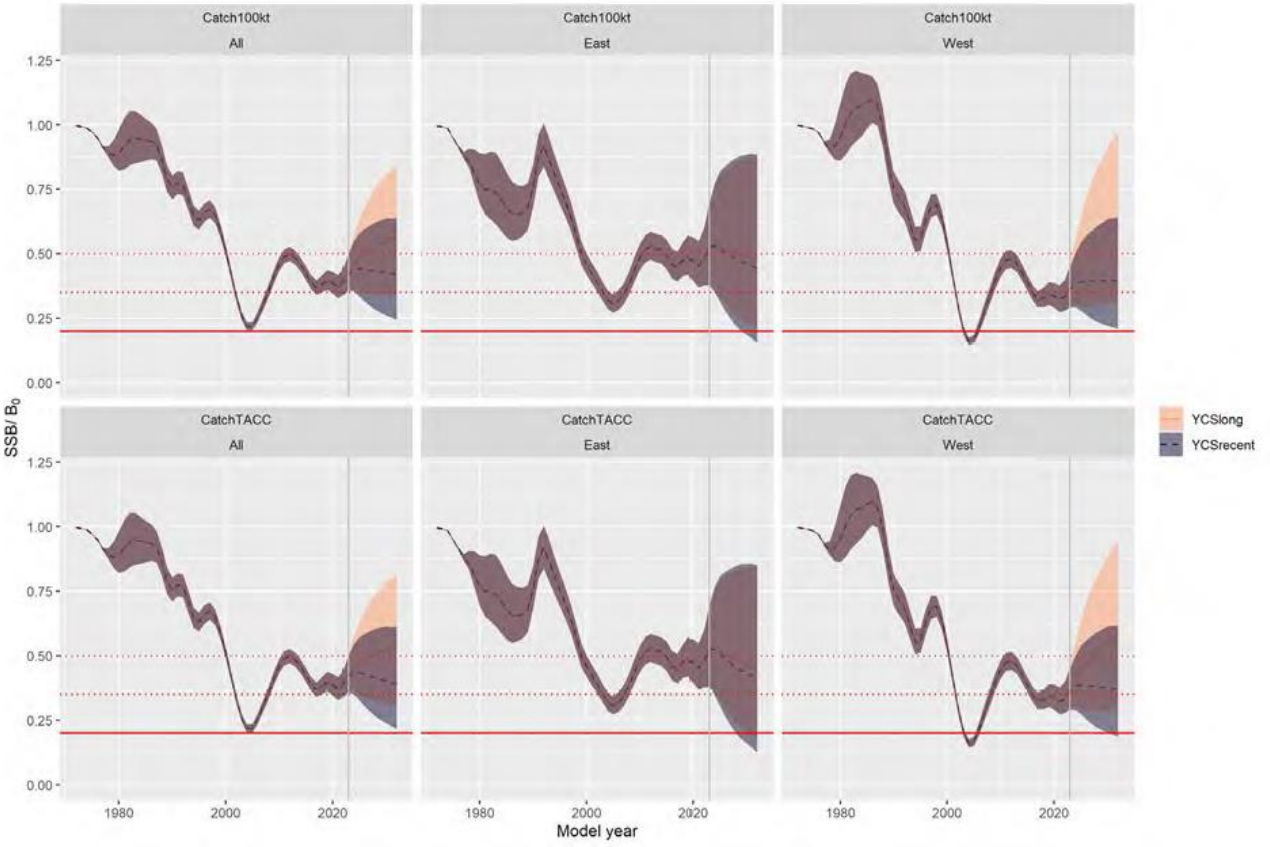

Figure 1: Projected spawning biomass (as a proportion of B_0) for HOK 1 from the base model (2023A) under two recruitment scenarios: recent (2010–2019) (grey); long-term (1975–2019) (peach), for eastern stock (middle), western stock (right), and summarised over both stocks ('All', left) for two catch scenarios: 100,000t (top) and the TACC (110,000t) (bottom). The horizontal dashed red lines represent the target management range of 0.35–0.50 B_0. The horizontal red lines show 0.2 B_0 (solid line). Shaded areas give 95% CIs, and central line gives median *SSB/B0*. (Source: FNZ, 2023b).

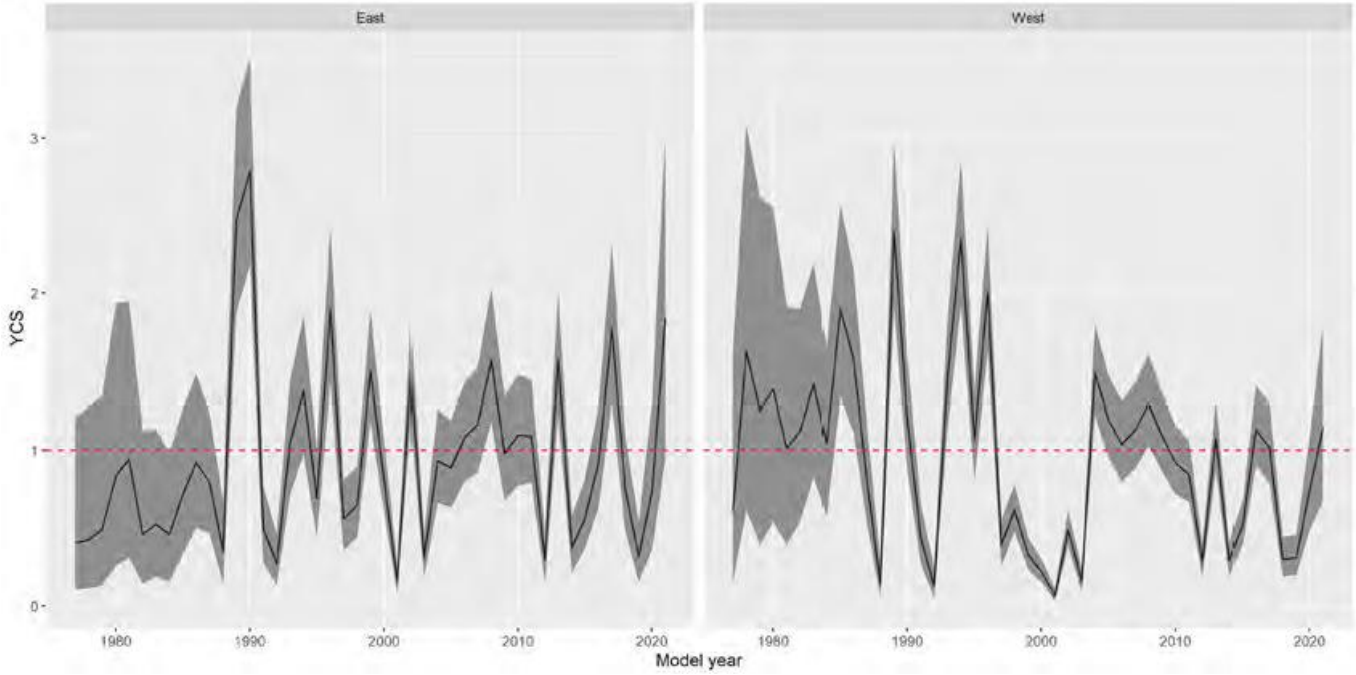

Figure 2 : Year-class strengths (YCS) for the eastern (left) and western (right) stocks from models 2023A from MCMC samples. Years are model years (1990 = 1989–90). (Source: FNZ, 2023b).

Table 7 : Bayesian median estimates (95% credible intervals) (MCMC) of B_0, B_{2023}, and B_{2023} as a percentage of B_0 for two HOK 1 models. "E" denotes the east stock, "W" denotes the west stock, and "T" denotes the total. (Source: FNZ, 2023b).

Model	B_0 ('000t)			B_{2023} ('000t)			B_{2023}/B_0		
	E	W	T	E	W	T	E	W	T
2023A	683 [633,738]	1223 [1169, 1284]	967 [640,1274]	370 [267, 503]	418 [280, 557]	457 [363,576]	54 [41, 70]	37 [31,45]	44 32, 67]
2023B	693 [647,741]	1218 [1174, 1268]	965 [645, 1259]	333 [239, 453]	430 [342,537]	386 [252, 519]	48 [36,62]	35 [29,43]	40 [30,59]
2023C	635 [586, 686]	1143 [1073, 1221]	887 [593, 1208]	292 [208, 402]	400 [315, 507]	350 [220,489]	46 [35,60]	35 [29,43]	39 [30,57]
2023D			1828 [1767,1894]			713 [591,859]			39 [33,46]

Projections

Five-year projections were conducted for the Model2023A by randomly selecting future recruitments based on two scenarios: (i) recruitments estimated for 2010–2019 (recent recruitment), and (ii) recruitments estimated for 1975–2019 (long-term recruitment). Two future annual catch scenarios were assumed, (i) constant at the TACC of 110,000t (45,000t western stock, 65,000t eastern stock) or (ii) at the TACC minus current agreed shelved value (100,000t with a 40,000:60,000 tonnes eastern: western split). The projections indicated that the eastern biomass would decline over the next 5 years but would likely remain within the target range. The western biomass was projected to increase under long-term recruitment and remain constant and at the lower end of the target range under recent recruitment (FNZ, 2023b).

5.1.2.2 Hake

5.1.2.2.1 HAK 1

No assessment of the Sub-Antarctic area (HAK 1 south of Otago Peninsula) was undertaken during 2023, the last assessment having taken place in 2021. The next stock assessment for HAK1 is planned to take place in 2024 (FNZ, 2023d).

5..1.2.2.2 HAK 4

No assessment of the Chatham Rise area (HAK 4 plus HAK 1 north of Otago Peninsula) was undertaken during 2023, the last assessment having taken place in 2020. The next stock assessment for HAK4 is planned to take place in 2023 (FNZ, 2023d). The plenary noted that "*'future stock assessments will only be conducted in HAK 4 when the catch reaches certain threshold values. These thresholds will be two consecutive fishing years with a catch greater than 360 tonnes or a single fishing year with a catch greater than of 720 tonnes.'".*

5.1.2.3 Ling

5.1.2.3.1 LIN3 & LIN 4 (Chatham Rise)

No assessment of the Chatham Rise area (LIN 3 & LIN 4) was undertaken during 2023, the last assessment having taken place in 2022. The next stock assessment for LIN 3 & LIN 4 is planned to take place in 2025 (FNZ, 2023e).

5.1.2.3.2 LIN 5 & LIN 6

No assessment of the Sub-Antarctic area (less the Bounty Plateau) was undertaken during 2023, the last assessment having taken place in 2021. The next stock assessment for LIN 5 & LIN 6 is planned to take place in 2024 (FNZ, 2023e).

5.1.2.3.3 LIN 7W

The assessment of ling on the South Island was updated during 2023 (FNZ, 2023e). The specifications of the 2023 assessment were generally the same as those for the previous (2020) assessment, but the previous specification of separate mature and immature fish partitions (Kienzle, 2021) was dropped for the 2023 assessment because immature selectivity was poorly estimated. The various model runs explored the effects of assumptions about the indices of abundance and how they are fitted, changes to how aging error is modelled and natural mortality values, assumptions related to fishery and survey selectivity and to data weighting. Bayesian model results were presented for five model runs: (a) a base model, (b) a model in which the trawl CPUE data were omitted, (c) a model with a lower value for steepness (h), (d) a model with set to 0.15yr^{-1} and (e) a model with M set to 0.21 yr^{-1}.

Compared to the 2020 assessment, the 2023 assessment includes a new index of abundance from *Tangaroa* (2021), new survey age-frequency data for 2021, updated CPUE indices, and new fishery proportion-at-age data for 2021 (longline) and 2019-2021 (trawl). The fits to the biomass indices and age data were reasonable, although the selectivity patterns were somewhat unexpected because the survey was estimated to select older fish than the commercial trawl fishery.

Biomass and recruitment

The trend in biomass is downward but the stock is estimated to continue to be larger than 0.4 B_0, with recruitment relatively constant throughout the period of the assessment (Figs, 3 and 4; Table 8).

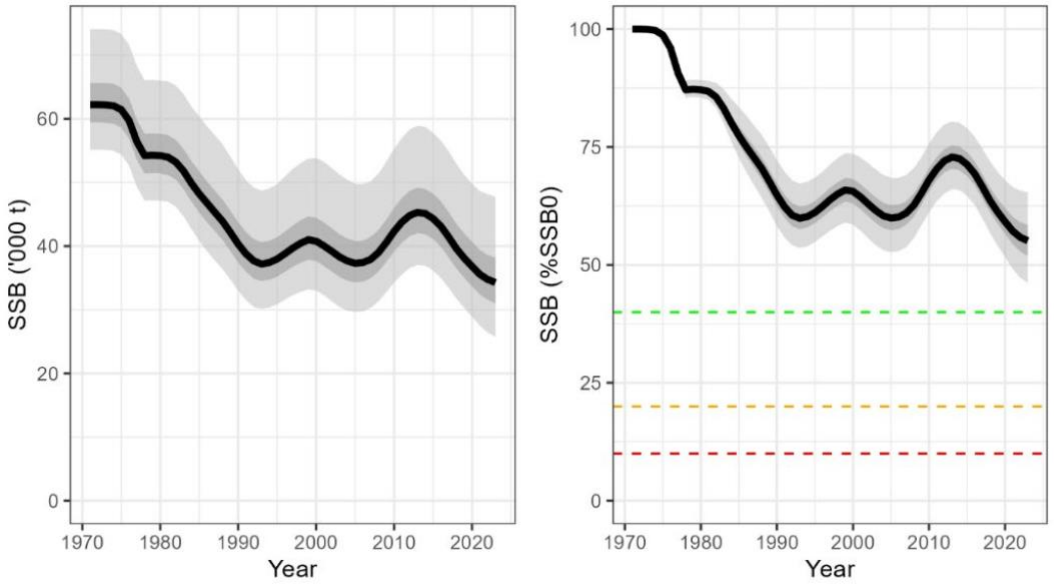

Figure 3. Estimated posterior distribution of the spawning stock biomass (*SSB* in tonnes, left) for the LIN 7WC base case and of the proportion of initial spawning biomass (% B_0, right) trajectory and estimated virgin spawning stock biomass reference points (0.4, 0.2, and 0.1 B_0) for the base case model. The solid black line represents the median values and the dark grey shading interquartile range and light shading 95% credible interval.

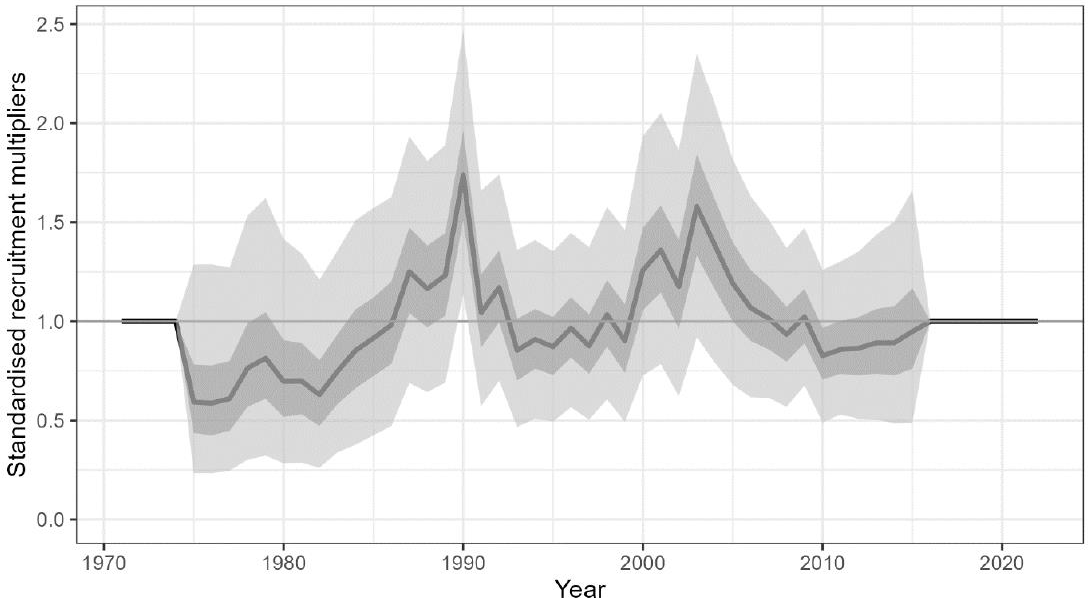

Figure 4 Estimated posterior distributions for standardised recruitment multipliers from the base case run for LIN 7WC, with median (line), the interquartile range (dark grey), and 95% credible interval (light grey). The horizontal line indicates a recruitment multiplier value of one.

Table 8 : Bayesian median (95% credible intervals) (MCMC) of B_0 and B_{2023} (t), and B_{2023} as a percentage of B_0 for LIN 7WC for the five model runs (source: FNZ, 2023e).

Case	B_0	B_{2023}	B_{2023} (%B_0)	P(>40%B_0)	P(<20% B_0)
Base case	62,168 [55,007-74,122]	34,265 [25,711-47,751]	51 [38-64]	0.95	<0.01
No Trawl CPUE	59,725 [53,183-70,139]	30,970 [23,237-42,440]	52 [43-62]	>0.99	<0.01
h=0.6	66,716 [59,468-78,689]	34,803 [26,105-48,449]	52 [44-62]	>0.99	<0.01
M=0.15	58,067 [54,568-62,211]	20,776 [17,255-24,804]	36 [32-40]	0.03	<0.01
M=0.21	72,175 [59,611-96,155]	47,907 [31,186-72,670]	66 [56-78]	>0.99	<0.01

Projections

Five-year projections (2024-2028) were undertaken with catches equal to the average catch in 2020-2022 (3,269t). Biomass was estimated to remain about 0.4 B_0 in 2018 with high probability.

5.1.2.4 Southern blue whiting

4.1.2.4.2 SBW 6B (Bounty Platform)

No assessment of the Bounty Platform area has been undertaken since the 2017 recertification. Attempts to conduct acoustic surveys of this stock were unsuccessful during 2018-2022 and there are no new estimates of biomass since 2017, which was one motivation for the modifications to the HCR.

5..1.2.4.2 SBW 6I (Campbell Island Rise)

No stock assessment for Campbell Island stock (SBW 6I) was conducted during 2021. The most recent assessment was conducted in 2020 (FNZ, 2023c; Doonan, 2020). The base model estimate of B_0 was 329,000t), with a 2020 depletion (biomass relative to B_0) of 0.58 (95% credibility interval 0.42-0.76).

5.1.3 Recommendations

An assessment for HAK 4 should be conducted soon to ensure that estimates of stock status are based on recent data.

5.2 Principal 2: Overview

5.2.1 Observer coverage

Fisheries New Zealand (FNZ) observers are deployed on commercial fishing vessels to carry out biological sampling, monitor environmental interactions, and observe and record compliance with a range of regulatory and non-regulatory management measures. An important function is to collect data on incidental catches and mortalities of endangered, threatened and protected (ETP) species. The monitoring of ETP captures is administered and funded by the Department of Conservation (DOC) through levies recovered from quota owners.

Observer coverage of deepwater fisheries is planned by financial year and is based on biological information requirements, international requirements, percentage-level coverage targets and observer programme capacity

Fisheries New Zealand (FNZ) considers that 30% coverage is sufficient for most fisheries/sectors but implements high (80-100%) coverage for fisheries where there may be what are deemed by management to be high-risk ETP species

Table 9 : Observer coverage obtained within deepwater fisheries from 2018/19 to 2022/23.

Fishery	QMA	2018-19	2019-20	2020-21	2021-22 (planned)	2022-23 (planned)
Hake	HAK 1	93%	100%	48%*	30-40%*	
	HAK 4	100%	-	48%*		30%
	HAK 7	32%	74%	42%+	50%***	30%
Hoki	HOK 1	29%	44%	42%+	.	
				22%++	20-30**	
				10%+++	50%***	
				46%++++		
				64%+++++		
Ling	LIN 3	8%	9%	48%++++	30-40%*	30%
	LIN 4	0%	0%			30%
	LIN 5	28%	17%	54%**	20-30**	30%
	LIN 6	34%	52%			30%
	LIN 7	5%	10%	42%+	50%***	30%

+ **This is the combined % observer coverage for West Coast South Island (FMA 7)**
++ **This is the combined % observer coverage for WCSI HOK 'inside the line'**
+++ **This is the combined % observer coverage for Cook Strait HOK**
++++ **This is the combined % observer coverage for Chatham Rise Middle depths (FMA 3 & 4) HOK 1 target**
+++++ **This is the combined % observer coverage for Sub-Antarctic middle-depth excl. SQU/SBW (FMA 5/FMA 6) HOK 1 target**
* **This is the % observer coverage target for the Chatham Rise Middle depths (FMA 3 & 4) (HOK 1, HAK 1 & 4, LIN 3 & 4, SWA 3 & 4, JMA 3, BAR 1 & 4).**
** **This is the % observer coverage target for Sub-Antarctic Middle depths (ex. SQU/SBW) (FMA 5 & 6) (HOK 1, HAK 1, LIN 5 & 6, SWA 4, WWA 5B, JMA 3, BAR 5).**

Table 10: Observer coverage in the southern blue whiting fisheries (SBW 6B and 6I).

Fishery	QMA	2018-19	2019-20	2020-21	2021-22 (planned)	2022-23 (planned)
Southern blue whiting	SBW6B	100%	100%	77%	100%	100%
	SBW 6I	100%	100%		100%	100%

Table 11 : Observer coverage in the ling longline fisheries (LIN 3, 4, 5, 6 & 7)

Fishery	QMA	2018-19	2019-20	2020-21	2021-22 (planned)	2022-23 (planned)
Ling	LIN 3	8%	9%	3-7%*	25-30%**	30%
	LIN 4	0%	0%			
	LIN 5	28%	17%		10-15%+	
	LIN 6	34%	52%			
	LIN 7	5%	10%			

*** 7% equates to the % of hooks observed onboard vessels <34 m for LIN 3 – 7, whilst 3% refers to he % of hooks observed onboard vessels >34 m for LIN 3 – 7**
**** the planned % coverage for > 34 m ling bottom longline (LIN 3 – LIN 7)**
+ the planned % coverage for <34 m mixed BLL

5.3.2 Retained and by catch species

There is no new information on the catch composition for the fisheries. The primary retained species for the trawl fisheries for hake, hoki and ling other than hake, hoki and ling are silver warehou and white warehou (FNZ, 2023a) but these species make up less than 5% of the catch of the combined fishery (Anderson et al., 2019). There are no primary retained bycatch species in the fisheries for southern blue whiting other than southern blue whiting (Finucci et al., 2019; FNZ, 2023b)

The primary bycatch species for the trawl fisheries for hake, hoki and ling are rattails, javelinfish and spiny dogfish (FNZ, 2023a). There is a broader set of primary retained and bycatch species in the longline fishery for ling other than ling (spiny dogfish, ribaldo, skates [smooth and rough], black cod, sea perch. Pale ghost shark, red cod, and shovelnose dogfish) (Anderson et al., 2020; FNZ, 2023c).

Edwards and Mormede (2023) have developed a framework to estimate removals on a species-specific basis that integrate across fishing effort and sampling data from multiple fisheries, operating in different locations and with different gear types provide a more holistic evaluation of fisheries bycatch. Ultimately, modelling such as this could be used to assess exploitation rates on retained and bycatch species in total. This analysis begins to address the recommendation from the previous surveillance audit that an updated analysis of retained and bycatch species should be conducted, and the results linked to information on trends and status relative to reference points.

5.3 Principle 3: Overview

Legal and Customary framework.

New Zealand's fisheries management is centred on the Quota Management System (QMS), a system introduced in 1986 based on Individual Transferrable Quota (quota), Total Allowable Catch (TAC) limits and Total Allowable Commercial Catch (TACC) limits

The National Deepwater Plan consists of three parts:

1. Fisheries management framework and objectives:
    a. Part 1A- strategic direction for deep water fisheries
    b. Part 1B - fishery-specific chapters and management objectives at the fishery level
2. Annual Operational Plan (AOP) – detailing the management actions for delivery during the financial year
3. Annual Review Report – reporting on progress towards meeting the five-year plan and on the annual performance of the deepwater fisheries against the AOP.

The deepwater fisheries management system undergoes periodic reviews to ensure it is able to deliver on its objectives and to identify opportunities to maximise its effectiveness. The most recent review was conducted in 2018 (IQANZ, 2018).

Fisheries Change Programme

The programme has three parts:

- Introducing mandatory electronic catch and position reporting to improve the collection and reliability of fisheries information
- Changing fishing rules and policies to make them simpler, fairer and more responsive, while also incentivising better fishing practice
- Improving monitoring and verification capabilities, including the use of on-board cameras, to better observe fishing practice. (https://www.mpi.govt.nz/fishing-aquaculture/commercial- fishing/fisheries-change-programme/)

The Fisheries Amendment Act has been passed into law with the vision that it will encourage better
Strengthening of New Zealand's fisheries management system by clarifying the law with respect to the landing and the returning of fish catch.

Compliance & enforcement
FNZ maintains a comprehensive compliance programme, which includes both encouraging compliance through support and creating effective deterrents. This strategy is underpinned by the VADE model, which focuses on all elements of the compliance spectrum.

MPI Fishery Officers carried out a total of 122 in-port and at-sea inspections for the period 1 January 2019 to 31 December 2021. These inspections relate to both inshore and deep-water vessels that were engaged in the HOK, HAK, LIN and SBW trawl fisheries and the LIN longline fishery. Inspections during 2020 and 2021 were lower than usual due to restricted access to vessels during the Covid epidemic. (G. Lydon FNZ, pers. comm.).

Some minor non-compliance was detected during in-port inspections in relation to ER reporting including the non-reporting of discards and LIN tail cuts greater than 60mm for dressed product. Other compliance issues such as no fishing permit or certificate of registration onboard the vessel was detected and followed up by Fisheries Officers at the time with the skipper and later with the permit holder if required. No major compliance issues were identified.

6. Summary overview

6.1 Summary of conditions update

There are no conditions on this fishery

6.2 New conditions

No new conditions

6.3 Confirming status of the fishery

These fisheries continue to meet the MSC Standard and they remain certified

7. Appendices

7.1 Evaluation processes and techniques

This audit was a Review of Information. It involved seeking the views of the client and identifying whether there were issues requiring further information. The review took place the week of 14 August 2023-it involved telephone calls emails and documents provided by the client and the Ministry of Fisheries. No stakeholders wished to be involved

7.2 Revised surveillance program

This fishery will be reassessed using MSC V3.0, 2022.

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