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New Zealand Orange Roughy
2nd Surveillance Report

Conformity Assessment Body (CAB)	MRAG Americas, Inc.
Assessment team	Amanda Stern-Pirlot and Andre Punt
Fishery client	Deepwater Group, Ltd.
Assessment type	Second Surveillance Audit
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1. Contents

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2. List of Abbreviations

ACAP	Agreement on Conservation of Albatross and Petrels
ACE	Annual Catch Entitlement
ACCOBAMS	Agreement on the Conservation of Small Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area
AEEF	Assessment of the Environmental Effects of Fishing
AEWA	African-Eurasian Migratory Waterbird Agreement
ALC	Automatic Location Communicator
AOP	Annual Operational Plan
ARR	Annual Review Report
B0	Unfished Equilibrium Biomass
BMA	Benthic Management Areas
BPA	Benthic Protection Area
BRT	Boosted Regression Tree

CAY	Current Annual Yield
CITES	Convention on International Trade in Endangered Species
CLR	Catch Landing Return
CMM	Conservation Management Measures
CMS	Convention on Migratory Species
CPUE	Catch Per Unit Effort
CSP	Conservation Services Programme
CV	Coefficient of Variation
DFAWG	Deepwater Fisheries Assessment Working Group
DOC	New Zealand Department of Conservation
DSCC	Deep Sea Conservation Coalition
DWG	Deepwater Group Limited
DWWG	Deep Water Working Group
ECO	Environment an Conservation Organisations
ELO	Environmental Liaison Officer
ESCR	East and South Chatham Rise
EEZ	Exclusive Economic Zone
ELR	Electronic Reporting
ETP	Endangered, Threatened, Protected Species
FARs	Fishery Assessment Reports
FAWGs	Fishery Assessment Working Groups
FCV	Foreign Charter Vessel
FMA	Fishery Management Areas
FPAG	Fish Plan Advisory Group
FNZ	Fisheries New Zealand-entity within MPI responsible for fisheries science and management
GPR	Geospatial Position Reporting
HCR	Harvest Control Rule
HSS	Harvest Strategy Standard for New Zealand Fisheries
IQANZ	Independent Quality Assurance New Zealand
IQF	Individual Quick Freezing
IUCN	International Union for Conservation of Nature
LFR	Licensed Fish Receiver
LMA	Large Marine Reserve
M	Natural mortality
MLS	Minimum Legal Size
MPA	Marine Protected Area
MPSA	Monitor, Pause, Survey and Assess (Benthic Management framework)
MPI	Ministry for Primary Industries (representing the Crown and its statutory obligations to the public). Formerly the Ministry of Agriculture and Forestry and before that the Ministry of Fisheries.
MSE	Management Strategy Evaluation
MSY	Maximum Sustainable Yield
MTRP	Medium Term Research Plan (Deepwater Fisheries
NGO	Non-Governmental Organisation
NIWA	National Institute of Water and Atmospheric Research
nm	Nautical MileNPOA National Plan of Actions
NWCR	North West Chatham Rise
NZ	New Zealand
ORH3B	ESCR UoA The UoA within the ORH3B QMA within the designated area known as the East and South Chatham Rise management area east of 179^{o} 30’ W on the southern Chatham Rise (see **Error! Reference source not found.**)

ORH3B	NWCR UoA The UoA within the ORH3B QMA managed as a separate stock unit within the designated area known as the North West Chatham Rise
ORH7A	The UoA including the orange roughy 7A QMA along with that area known as the Westpac Bank immediately adjacent to and outside of the New Zealand EEZ boundary – recognised as a straddling stock under UNCLOS
PST	Population Sustainability Threshold
QMA	Quota Management Area
QMS	Quota Management System
RCP	Regions of Common Profile
RF	Random Forest
SCA	Seamount Closure Area
SEFRA	Spatially Explicit Fisheries Risk Assessment
SMART	Seafloor Monitoring, Automated Recording of Trawls
SPRFMO	South Pacific Regional Fisheries Management Organisation
TAC	Total Allowable Catch
TACC	Total Allowable Commercial Catch
TCEPR	Trawl Catch Effort and Processing Returns
TCER	Trawl Catch Effort Returns
TOKM	Te Ohu Kai Moana
UoA	Unit of Assessment (see MSC-MSCI Vocabulary for MSC defined terms)
UoC	Unit of Certification
UNCLOS	United Nations Convention on the Law of the Sea
UTF	Underwater Topographic Features (including hills, knolls, and seamounts)
VADE	Voluntary, Assisted, Directed and Enforced Compliance operating model
VME	Vulnerable Marine Ecosystem
VMP	Vessel Management Plan
VMS	Vessel Monitoring System
WCPFC	West & Central Pacific Fisheries Commission

3. Executive summary

This report contains the results of the second annual surveillance audit for the MSC certified New Zealand orange roughy fishery. Two of the original three Units of Certification remain in the MSC program and are reported on in the present report. One unit, Orange Roughy 3B ESCR, was “self-suspended” by Deepwater Group, the fishery client, on 20 December 2023. There is therefore no reporting on this UoC within the current surveillance report.

A remote surveillance audit was carried out on December 16-18, 2024 with the assessment team participating remotely from Seattle, WA USA. At least thirty days beforehand, the assessment site visit was announced to provide stakeholders with an opportunity to express interest or provide written comment. During the site visit, information supplied by industry, managers and scientists was reviewed, and interviews with relevant stakeholders were held.

As mentioned previously, the present report contains the findings of the 2nd surveillance audit for the ORH 3B NWCR and ORH 7A including Westpac Bank Units of Certification. Progress on the single open condition has been made, and no rescoring has occurred nor new conditions raised. MRAG Americas has determined that these two UoCs remain in conformity with the MSC Fishery Standard and should remain certified.

4. Audit details

4.1. Surveillance information

Surveillance information

1	Fishery name
New Zealand orange roughy	
2	Unit(s) of Assessment (UoA)

UoA 1	Description
Species	Orange Roughy (*Hoplostethus atlanticus*)
Stock	ORH7A including Westpac Bank
Fishing gear type(s) and, if relevant, vessel type(s)	Demersal trawl
Client group	Deepwater Group Limited
Other eligible fishers	The three units of assessment represent three of the nine management units of orange roughy in New Zealand. Eligible fishers are DWG shareholders with authorization from the New Zealand government to fish for orange roughy.
Geographical area	FAO Area 81 (Pacific, Southwest), ORH7A, including Westpac Bank which is outside the NZ EEZ.
~~UoA 2~~	~~Description~~
~~Species~~	~~Orange Roughy (*Hoplostethus atlanticus*)~~
~~Stock~~	~~ORH3B East & South Chatham Rise~~
~~Fishing gear type(s) and, if relevant, vessel type(s)~~	~~Demersal trawl~~
~~Client group~~	~~Deepwater Group Limited~~
~~Other eligible fishers~~	~~The three units of assessment represent three of the nine management units of orange roughy in New Zealand. Eligible fishers are DWG shareholders with authorization from the New Zealand government to fish for orange roughy.~~
~~Geographical area~~	~~FAO Area 81 (Pacific, Southwest), ORH3B East and South Chatham Rise (ESCR), east of 179° 30' W~~
UoA 3	Description

Species	Orange Roughy (*Hoplostethus atlanticus*)
Stock	ORH3B Northwest Chatham Rise
Fishing gear type(s) and, if relevant, vessel type(s)	Demersal trawl
Client group	Deepwater Group Limited
Other eligible fishers	The three units of assessment represent three of the nine management units of orange roughy in New Zealand. Eligible fishers are DWG shareholders with authorization from the New Zealand government to fish for orange roughy.
Geographical area	FAO Area 81 (Pacific, Southwest), ORH3B Northwest Chatham Rise (NWCR)

3	Date certified	Date of expiry
02 August 2022		01 August 2027

4	Audit type and number
second surveillance audit	

5	Surveillance level
Level 4, remote	

6	Surveillance team leader

Ms. Amanda Stern-Pirlot serves as team leader for the assessment. Amanda is an M.Sc. graduate in Marine Ecology and Fisheries Biology from the University of Bremen, Center for Marine Tropical Ecology (ZMT). She joined MRAG Americas Inc. in 2014 and now serves as Vice President—Science, providing technical oversight of all projects, ensuring MRAG Americas maintains a strong science- and evidence-based ethos. She also oversees our growing portfolio of fisheries certification projects under the MSC, RFM, and FISH Standard for Crew standards. Throughout her career, she has worked with many scientists, conservationists, fisheries managers, and producer groups on international fisheries sustainability issues. With the Institute for Marine Research (IFM-GEOMAR) in Kiel, Germany, she led a work package on simple indicators for sustainability within the EU-funded international cooperation project INCOFISH. This was followed by 5 years in the Standards Department at MSC in London developing standards, and policies and assessment methods informed by best practices in global fisheries management. She was Resources Analyst of the Alaska pollock industry in the North Pacific Fisheries Management Council focusing on bycatch and ecosystem-based management issues and managing the operations of the offshore pollock cooperative. She has co-authored publications on fisheries sustainability in the developing world and the functioning of sustainability standards as an instrument for transforming fisheries to a sustainable basis.

MRAG Americas confirms that Ms. Stern-Pirlot meets the competency criteria in Annex PC for team leader as follows:

- She has an appropriate university degree and more than five years' experience in management and research in fisheries;
- She has passed the MSC team leader training;
- She has the required competencies described in Table PC1, section 2;
- She has passed the MSC Traceability training module;
- She is qualified to carry out assessments using the MSC's Risk Based Framework for data-deficient fisheries;
- She meets ISO 19011 training requirements;

- She has undertaken two fishery assessments as a team member in the last five years, and
- She has experience in applying different types of interviewing and facilitation techniques and is able to effectively communicate with clients and other stakeholders.

In addition, she has the appropriate skills and experience required to serve as a Principle 2 & 3 assessor as described in FCP Annex PC table PC3.

7	Surveillance team members

Dr. Andre Punt is a Professor at the University of Washington and Director of the School of Aquatic and Fisheries Sciences. He is a quantitative scientist with a specialty of providing quantitative scientific advice for fisheries management, focusing on new methods for assessing fish and marine mammal populations; Bayesian assessment and risk analysis methods; and valuating the performance of existing methods for assessing and managing renewable resource populations. He uses methods for assessing fish and marine mammal populations that are tailored specifically to the situation in question. Current areas of interest are spatial models, individual-based models, and stage-structured models. He has worked as a resource population models for the Benguela Current in South Africa, a resource modeler at CSIRO in Australia, and at the University of Washington. He has a Ph.D. from the University of Cape Town in South Africa.

MRAG Americas confirms that Dr. Punt meets the competency criteria in Annex PC for team members as follows:

- He has an appropriate university degree and more than five years' experience in management and research in fisheries;
- He has undertaken at least two MSC fishery assessments or surveillance site visits in the last five years; and
- He is able to score a fishery using the default assessment tree and describe how conditions are set and monitored.

In addition, he has the appropriate skills and experience required to serve as a Principle 1 assessor as described in FCP Annex PC table PC3, and MRAG Americas confirms he has no conflicts of interest in relation to the fishery under assessment.

The whole assessment team collectively meets the requirements as described in FCP Annex PC table PC3.

A discussion between team members regarding conflict of interest and biases was held and none were identified.

8	Audit time and location

16-18 December 2024, remote.

9	Assessment and review activities

The surveillance reviewed any changes in science and management and will monitor progress in closing out conditions.

- The following was reviewed during the audit:
  - Changes to the information provided in the Scope Declaration form.
  - Changes to the UoA and its management.
  - Performance in relation to any relevant conditions of the certification.
  - Any developments or changes within the UoA that affect traceability and the ability to segregate MSC from non-MSC products.
  - Any other significant changes in the UoA.
- No modifications were made to the assessment tree.

4.2. Version details

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 Reporting Template	Version 2.2

4.3. Update on the fishery

Principle 1

Fishery performance and new survey data
The fishery in ORH 7A took 843 t (41.0% of the TACC of 2,058 t) during the 2023-24 fishing year. The trend towards fishing on the "flats" (see Figure 2 of Dunn [2024] for a map of region) continued since the last assessment, with catch rates moderate compared to historical levels since the fishery re-opened (Dunn, 2024).

An acoustic survey of the southwest Challenger Plateau was conducted during June and July 2023 using the *Tangaroa* (Escobar-Flores and Maurice, 2024). The survey methodology was similar to that applied for past acoustic surveys of orange roughy, and the survey aimed to conduct at least four snapshots (ideally five) on the Challenger Flats, Westpac Bank and the Pinnacles. Searches for orange roughy occurred at all known areas or features where aggregations have been known to occur on the Challenger Plateau, with aggregations detected at Megabrick, the Pinnacle Seamount complex and Volcano on the Westpac Bank. A total of 17 acoustic snapshots occurred during the survey (Table 2 of Escobar-Flores and Maurice [2024]). No aggregations of orange roughy were detected on the Challenger flats area. Possible reasons for this include survey timing, fishing pressure, or a shift in the distribution of the stock to new spawning grounds (Escobar-Flores and Maurice, 2024) Snapshot estimates for Megbrick led to estimates of 1,380 t (CV 0.08) and 290 t (CV 0.47) while estimates of biomass of 6,461 t (CV 0.26) and 10,255t (CV 0.4) were obtained for the Volcano feature. Escobar-Flores and Maurice (2024) note that too few fish were sampled to determine whether spawning was occurring during the survey.

Stock assessment

Model structure
A stock assessment for orange roughy in ORH 7A was conducted during 2024 (FNZ, 2024a; Dunn, 2024). This stock assessment updated the last assessment conducted in 2019 (Cordue, 2019). The 2024 stock assessment maintained the same basic structure as the 2019 stock assessment (single-sex age-structured population dynamics model with a plus-group at 100 years, and mature and immature partitions). The model again had two time-steps (a full year of natural mortality followed by an instantaneous spawning season and fishery on spawning fish). Only a single fishery was modelled unlike the 2019 assessment, which modelled one fishery within the EEZ and another on Westpac Bank (FNZ, 2023). Compared to the 2019 assessment, the new data available for the 2024 assessment were the results of the 2023 acoustic survey and the catches since the last assessment. Unlike the 2019 assessment, the 2024 assessment estimated the rate of natural mortality (*M*) but not annual deviations in recruitment.

The data on which the 2024 assessment was based differed from that on which the 2019 assessment was based because the "comparable area" time series of trawl survey estimates of abundance, covering the period 1987–89 was rejected for the 2024 assessment because the decline in the biomass estimates over 1987–89 was deem to be too large to be attributed to catches alone, and the Working Group had previously concluded that the series did not reflect true stock abundance (FNZ, 2024a). The acoustic survey estimates of abundance (Table 1) were used in three ways:

1) "3series". The acoustic estimates of spawning aggregations on Volcano and in the West and East of the flats within the EEZ were used as three time series each providing an index of spawning biomass (Table 1). This assumption followed the 2019 assessment, and assumed that the three spawning aggregations were independent, the proportion of the total spawning biomass in each area was constant over time, and each area shared the same recruitment and exploitation pattern. The acoustic estimates included in this series followed the estimates used by Cordue (2019) with the addition of the 2023 estimate for Volcano. Estimates were excluded where biomass was substantially lower than adjacent years and the Working Group concluded the survey had missed the aggregation (Volcano 2009, 2011, East 2011) and where the timing of the survey in relation to peak spawning was uncertain (Volcano 2010, 2018).
2) Acoustic estimates of spawning aggregations on Volcano and in the West and East of the flats were summed, providing an estimate of total spawning biomass for each year when all three areas were surveyed (Table 1). This assumption is the same as used for assessments of the Chatham Rise and Mid-East Coast orange roughy stocks, and (implicitly) allows for movement of spawning biomass between aggregations. Two variants of this approach were considered:
    a. "All2". Only use the acoustic biomass estimates that were accepted and biological samples showed the survey timing was likely to be around peak spawning (2009 and 2023).
    b. "All6". As for "All2", plus the surveys where acoustic biomass was measured but it was uncertain that timing was around peak spawning (surveys of Volcano 2010, East & Volcano 2011; Volcano in 2018 and 2023), or where aggregations could not be located and surveyed despite search efforts (surveys of East in 2018; East & West in 2023).

Informed lognormal priors on the survey catchability (q) were used for the acoustic time series (FNZ, 2024a). For "3series", the means of the priors for each area were derived from the 2013 spawning biomass proportions across aggregations, and the assumption that all three aggregations combined represented "most" of the spawning biomass (80%; Cordue, 2014). Splitting this prior into three components gave priors for the West, East, and Volcano qs respectively of LN(0.41, 30%), LN(0.22, 30%), and LN(0.18, 30%), based on the biomass split between areas from the 2013 survey. For the "All2" and "All6" runs, there was a single acoustic biomass q with prior LN(0.80, 30%) based on acoustic biomass estimates from the early 2000s on the north east Chatham Rise.

Table 1. **Acoustic biomass estimates of spawning aggregations surveyed on Volcano, and the West and the East within the EEZ, and the total for all three areas. The CV is the observation error CV with an additional 20% of error in the years when the vessel motion correction was unknown (2005, 2011, and 2013). – no survey conducted. (Source: FNZ, 2024a).**

Year	West		East		Volcano		Total	
	Biomass (t)	CV (%)	Biomass (t)	CV (%)	Biomass (t)	CV (%)	Biomass (t)	Model CV (%)
2005	4 210	53	–	–	2 682	39	–	–
2006	4 383	59	–	–	6 329	39	–	–
2009	13 555	22	8 471	61	671	21	22 697	26
2010	8 114	14	1 707	34	1 132	24	10 953	12
2011	13 340	33	136	56	171	44	13 647	32
2013	10 183	22	5 365	26	4 559	34	20 107	15
2014	–	–	–	–	3 954	29	–	–
2018	9 966	9	0	NA	3 834	16	13 800	8
2023	0	NA	0	NA	8 132	17	8 132	17

Process error was added to the sampling CVs, and the spawning biomass estimates from the *Thomas Harrison* trawl surveys were used as relative indices of abundance with an uninformed prior for survey catchability. The 2019 assessment assumed a lognormal prior for catchability for the *Thomas Harrison* trawl surveys with a mean of 0.95 and a CV of 0.3. Dunn (2024) states that this 2019 prior was inconsistent with a prior mean for the acoustic survey of 0.8.

The age-composition data for the 2024 assessment were the same as those for the 2019 assessment because the age data from the 2023 acoustic survey were considered unrepresentative.

Model specifications

The estimable parameters of the model were virgin biomass, the maturity (selectivity) parameters (100% of mature fish were assumed to spawn), survey catchabilty and natural mortality (*M*). A LN(0.078yr^{-1},CV 120%) prior was placed on *M* based on applying the method of Cope and Hamel (2022). Recruitment was assumed to be related deterministically to the stock-recruitment relationship. Year-class strengths (YCS) were not estimated because (a) sensitivity runs showed almost identical model fits, and estimates of stock size and stock status (Table 3 of Dunn, 2024), (b) estimating a single parameter (*M*) provided a more parsimonious solution that reduced the potential for model over-parameterisation (c) estimating YCS (and pre-specifying *M*) led to a strong historical trend in YCS, and (d) estimating *M* and YCS together led to a lower estimate of *M* and flat YCS (FNZ, 2024a). Dunn (2024) also noted that the mode of the posterior distribution (MPD) estimates of the YCS can be in the tails of their distributions, which can lead to MCMC estimates of stock status being more optimistic than the MPD estimates. The decision not to estimate YCS is consistent with the results of simulation studies for stock assessment of stocks of orange roughy in the South Pacific Regional Fisheries Management Organisation (SPRFMO) area (Stephenson et al., 2022). The *q* prior and the age data imply different estimates of *M*. Fixing the YCS to 1 did not lead to appreciably broader posteriors for stock status relative to reference points.

Dunn (2024) explored sensitivity to assuming different *M* priors, dropping the 2023 acoustic estimate, including the *Amaltal Explorer* trawl series, excluding the age data for Volcano, or all age data (and fixing selectivity), changing the effective sample sizes assumed for the age data, and removing the acoustic *q* priors (Table 7 of Dunn, 2024). The All6 runs were found to be most sensitive, and some incurred a catch penalty, indicating that the biomass estimates were close to the minimum level able to satisfy the catch history (B_{min}) when the estimated acoustic *q* was closest to the mean of the *q* prior.

Assessment results

The model fits to the acoustic indices were acceptable, with the greater changes in the 3Series acoustic time series proving more difficult to fit with constant *q*s and selectivity, leading to a higher process error required to fit this data (Figure 1). The fits to the trawl series were good, although the high CV for 2013 and 2018 means that the trend was not very informative (Figure 2). The posteriors for survey *q* were shifted to the left compared to the priors. The fits to the age data were quite poor, particularly to that for Volcano in 2018 where the data were shifted to the right compared to the model predictions.

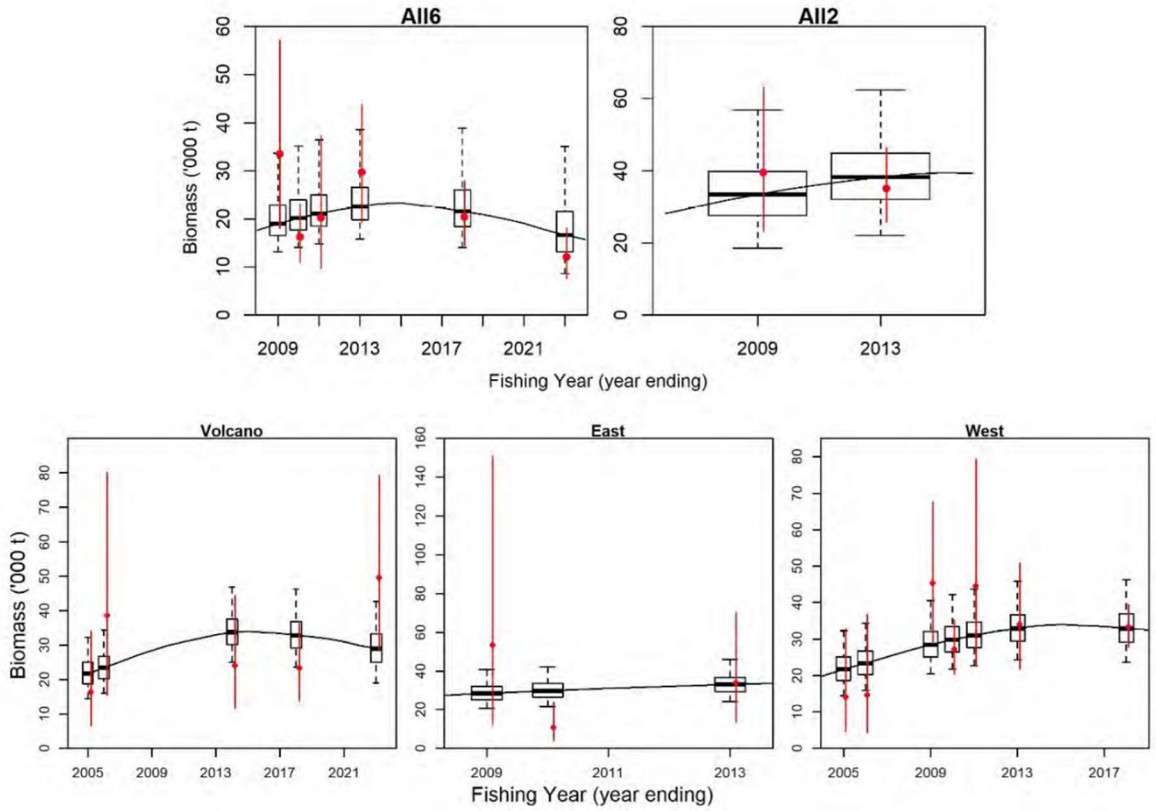

Figure 1. MCMC implied fits to the acoustic indices for the All6 and All2 runs (top panels) and Volcano, East, and West areas for the 3series run (bottom panel). Each box covers the middle 50% of the distribution and the whiskers extend to 95% CIs. The solid black indicates the median fitted spawning biomass. The observations are plotted as red points with red lines indicating 95% CIs (with a small offset by year to make them more visible). (Source: FNZ, 2024a).

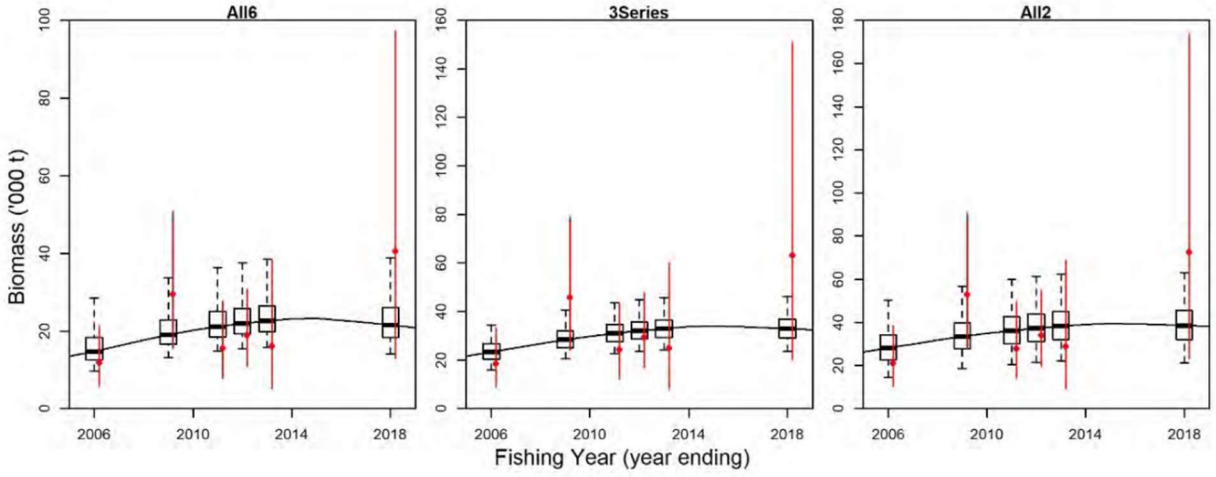

Figure 2. MCMC implied fits to the Thomas Harrison trawl survey series for the All6, 3series, and All2 runs. Each box covers the middle 50% of the distribution and the whiskers extend to 95% CIs. The solid black indicates the median fitted spawning biomass. The observations are plotted as red points with red lines indicating 95% CIs (with a small offset by year to make them more visible). (Source: FNZ, 2024a).

M was estimated to be lower than the orange roughy default (0.045 yr^{-1}) in all model runs (FNZ, 2024a). Estimated *M* was lowest for the All6 run (0.024 yr^{-1}), where the estimated spawning biomass was lowest and the acoustic *q* was closest to the prior; *M* was similar for the All2 and 3Series runs (0.033 and 0.031 yr^{-1}). FNZ (2024a) notes that estimated *M* is not directly comparable to natural mortality but includes other undefined factors and is a general descriptor of productivity.

Model All2 was selected as a base model. FNZ (2024a) justifies this decision because the All6 run estimates are close to B_{min}, and relatively sensitive to model assumptions. The 3Series run was noted to be analogous to the 2019 assessment, but the independence of the three acoustic series indexing spawning biomass was considered less plausible than the total acoustic estimates used in the All2 and All6 runs. However, the All2 run has the fewest acoustic estimates of biomass and the most recent estimate of acoustic biomass is from 2013.

Stock status shows a steep decline for all runs (to 0.11 B_0 in 1991 for model All2), reflecting the large removals during the initial fish-down phase of this stock (Figure 3). From 1990, the All2 stock status remains low and slowly rebuilds until an upturn from about 2000. Biomass is estimated to have peaked in 2015 in all model runs, within the target range (All2 and 3Series runs) or just above the soft limit (All6 run), before the increased catches, combined with a reduction in recruitment, led to a levelling out and then decline of the biomass trajectory after 2015 (Figure 3). The reduction in recruitment is a consequence of reduced spawning biomass from the late 1980s, lagged by the estimated age of selectivity and maturity (A_{50}) of about 34 years.

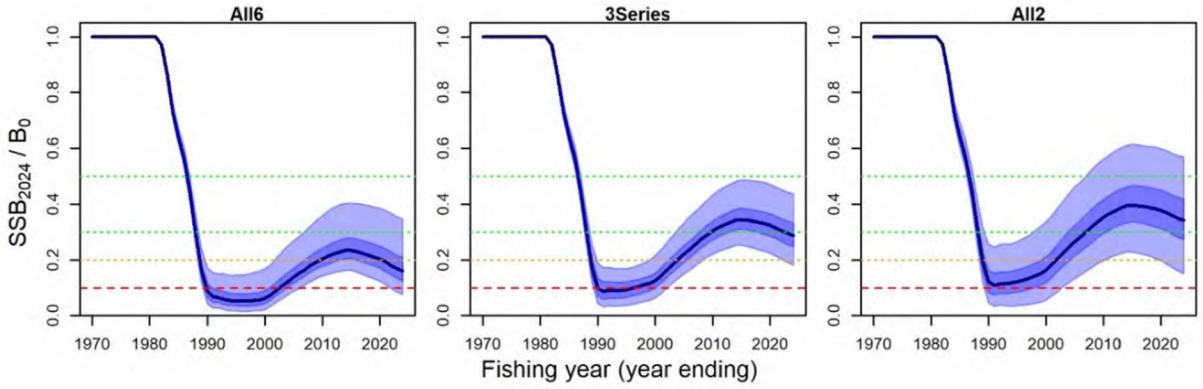

Figure 3. MCMC estimated spawning-stock status (SSB2024/B0) trajectory. The solid line shows the median, the darker shaded areas covers 50% of the distribution, and the lighter shaded areas 95% of the distribution. The hard limit 0.1 B0 (dashed red), soft limit 0.2 B0 (dotted orange), and biomass target range 0.30–0.5 B0 (green) are marked by horizontal lines.

Estimated exploitation rate (catch/spawning biomass) was generally well above the target range ($U30\%B_0$–$U50\%B_0$) during the fishing down period (1982–1989), above the target range (1990–1993), returning to the target range (1994–1999). Subsequently, it was well below the target range up until 2014, and from 2015 until 2024 it has remained in the lower half of the target range (Figure 4).

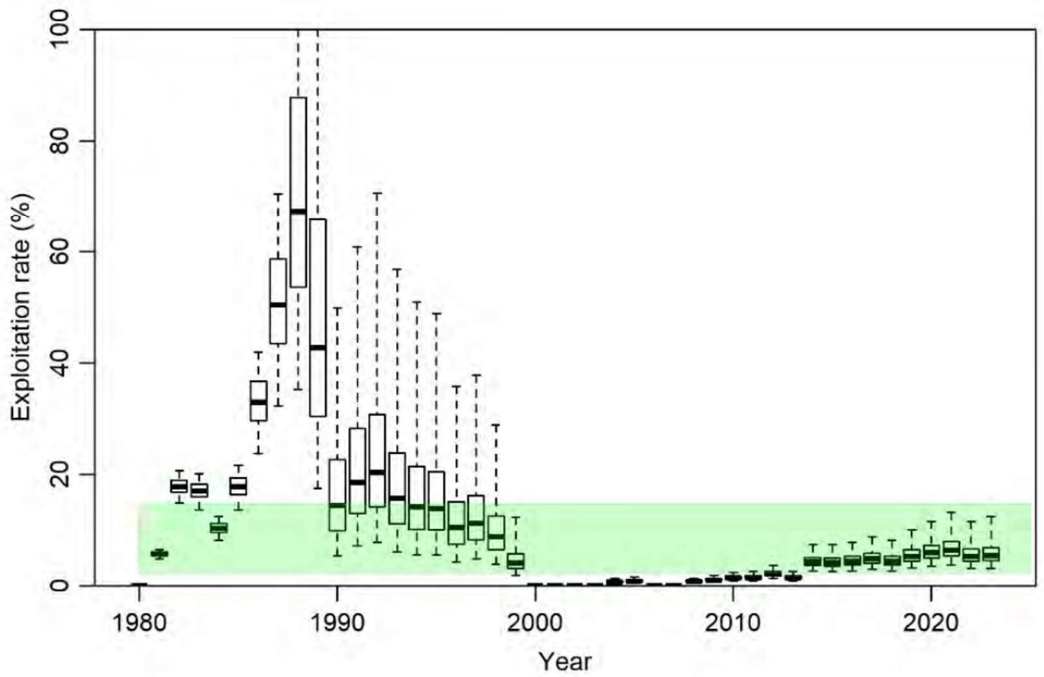

Figure 4. Base (All2) run, MCMC estimated exploitation rate trajectory. The box in each year covers 50% of the distribution and the whiskers extend to 95% of the distribution. The fishing-intensity range associated with the biomass target of 0.3-0.5 B0 is marked by the green shaded area. (Source: FNZ, 2024a).

Table 2 lists the estimates of M, B_0, stock status in 2024 and the probability being above the lower and upper limits of the target range as well as the probabilities of being below the New Zealand soft and hard limits. The point estimate of stock status for the base model is within the target range of 0.3-0.5 B_0 while the point estimate of stock status is below the lower limit of the target range for model "3series" and is below to the soft limit for model "All6".

Table 2. **MCMC estimates of natural mortality rate (M), virgin biomass (B_0), stock status (B_{2024} as $\%B_0$), and the probability of being above the upper (0.5 B_0) and lower (0.3 B_0) limit of the target range and below the soft (0.2 B_0) and hard limit (0.1B_0), for the base (All2) model, and the All6, and 3series sensitivity runs. (Source: FNZ, 2024a).**

	M	B_0 ('000 t)	B_{2024}/B_0 (%)	P(>0.5 B_0)	P(>0.3 B_0)	P(<0.2 B_0)	P(<0.1 B_0)
Base (All2)	0.033 (0.020–0.054)	99.4 (87.6–117.2)	35 (16–57)	0.09	0.66	0.07	0
All6	0.024 (0.016–0.037)	98.5 (91.3–110.3)	16 (8–35)	0.00	0.06	0.71	0.12
3series	0.031 (0.020–0.045)	97.5 (89.3–110.5)	29 (18–44)	0.09	0.44	0.05	0

The next stock assessment for ORH 7A is scheduled for 2029 (FNZ, 2024b)

Projections

Five-year projections were conducted for a constant catch equal to the current TACC (2058 t), 0.8×TACC, and 0.7×TACC (Table 3). A 5% catch over-run was assumed. At all future constant catch levels, the spawning biomass is predicted to decrease slowly over the next five years, with the base (All2) remaining within the target biomass range and with at most a 19% probability of being below the soft limit during the next five years. The TACC reduction required for the predicted spawning biomass in 2028–29 to be the same as 2023–24 was 43% for the base (All2) run, 30% for the All6 run, and 46% for the 3series run (Table 3).

Table 3. MCMC estimates of stock status (B2024 as %B0) for the base model (All2) and two sensitivity runs (All6 and 3series) with constant future catches (TACC, 0.8xTACC and 0.7xTACC), and the probability of the stock being above the lower bound of the target range, and below the soft limit (0.3 B0). (Source: FNZ, 2024a).

	2023–24	2024–25	2025–26	2026–27	2027–28	2028–29
SSB/B_0						
All2						
TACC	35 (16–57)	34 (15–56)	33 (14–56)	32 (13–55)	31 (11–54)	30 (10–53)
0.8×TACC	35 (16–57)	34 (15–57)	33 (14–56)	33 (14–56)	32 (13–55)	32 (12–55)
0.7×TACC	35 (16–57)	34 (15–57)	34 (15–56)	33 (14–56)	33 (14–56)	33 (13–56)
All6						
TACC	16 (8–35)	15 (6–34)	14 (5–33)	12 (3–32)	11 (2–31)	10 (1–30)
0.8×TACC	16 (8–35)	15 (6–34)	14 (6–34)	14 (5–33)	13 (4–33)	12 (3–32)
0.7×TACC	16 (8–35)	15 (7–35)	15 (6–34)	14 (5–34)	14 (4–33)	13 (3–33)
3series						
TACC	29 (18–44)	28 (17–43)	27 (16–42)	26 (15–41)	25 (14–40)	24 (13–39)
0.8×TACC	29 (18–44)	28 (18–43)	28 (17–43)	27 (16–42)	27 (15–42)	26 (14–41)
0.7×TACC	29 (18–44)	29 (18–43)	28 (17–43)	28 (17–43)	27 (16–42)	27 (15–42)
p(> 0.3B_0)						
All2						
TACC	0.66	0.63	0.60	0.56	0.53	0.49
0.8×TACC	0.66	0.64	0.62	0.60	0.58	0.56
0.7×TACC	0.66	0.64	0.63	0.62	0.60	0.59
All6						
TACC	0.06	0.05	0.05	0.04	0.03	0.03
0.8×TACC	0.06	0.06	0.05	0.05	0.04	0.04
0.7×TACC	0.06	0.06	0.05	0.05	0.05	0.04
3series						
TACC	0.44	0.39	0.33	0.28	0.24	0.20
0.8×TACC	0.44	0.41	0.37	0.34	0.31	0.28
0.7×TACC	0.44	0.41	0.39	0.36	0.34	0.32
p(< 0.2B_0)						
All2						
TACC	0.07	0.09	0.11	0.14	0.16	0.19
0.8×TACC	0.07	0.08	0.1	0.11	0.13	0.14
0.7×TACC	0.07	0.08	0.09	0.10	0.11	0.12
All6						
TACC	0.71	0.75	0.79	0.82	0.85	0.87
0.8×TACC	0.71	0.75	0.77	0.79	0.81	0.83
0.7×TACC	0.71	0.74	0.76	0.78	0.79	0.81
3series						
TACC	0.05	0.08	0.12	0.16	0.21	0.27
0.8×TACC	0.05	0.07	0.10	0.12	0.15	0.17
0.7×TACC	0.05	0.07	0.09	0.10	0.12	0.14

Management and changes in TACC

Based on the results of the assessment, Fisheries New Zealand stated that the *status quo* TACC would not be consistent with the Minister's obligations under Section 13 of the Fisheries Act 1996. Fisheries New Zealand proposed three management options in addition to option 1 (*status-quo*) (FNZ, 2024c):

- Option 1: *Status-quo*: a TAC of 2,163 t (TACC of 2,508t)
- Option 2: A TAC of 1,730 t (TACC of 1,646 t)
- Option 3: A TAC of 1,301 t (TACC of 1,235 t)
- Option 4: A TAC of 942 t (TACC of 885 t).

The four options were consulted on, and 15 submissions were received (FNZ, 2024d). None of the submissions supported the *status-quo*. One fishing company supported option 2, and two companies and

one individual supported option 3. The remaining submissions supported option 4 (or "other"). Two of the "other" submissions indicated that "option 4 does not go far enough". The submission by Seafood New Zealand (FNZ, 2024e, pg 274-5) included an application of the orange roughy harvest control rule for the three models in Table 2. These led to TACCs of 3,836 t (All2), 2,081 t (3series), and 985 t (All6). This submission also noted that the current HCR is based on a value for M of $0.045yr^{-1}$ when the median estimates of M in Table 2 are substantially lower than this.

Based on its analysis of the options, including the feedback received, Fisheries New Zealand recommended option 4. Specifically, FNZ (2024c) noted that "*only under a 57% TACC reduction (Option 4) is the stock predicted to be maintained at the current level relative to B_0 after five years. This option is therefore the most likely to constrain fishing pressure enough for the stock to remain at 35% B_0 (within the management target range of 30-50% B_0) and the least likely to risk the stock falling below the target range until the 2029 stock assessment is available*." FNZ (2024c) also noted that this option also recognizes that model All2 used survey data that were over a decade old, and that two other models in Table 2 were more pessimistic regarding current stock status in relation to the target range.

The Minister of Fisheries decided to reduce to the TAC to 962 t (a TACC of 885 t) (Minister of Fisheries, 2024). This option is predicted to lead to the stock remaining within the target range in expectation if model All2 is correct (Table 4). However, there is considerable uncertainty such there is a non-negligible probability of the stock declining below the New Zealand soft limit of $0.2B_0$. The stock is likely to continue to decline if the other models (3series and particularly All6) are a better reflection of reality.

The results of the stock assessment were presented to the 12th meeting of the SPRFMO Scientific Committee (Biggerstaff and Arkhipkin, 2024). Biggerstaff and Arkhipkin (2024) also outlined the options being consulted upon.

Table 4. Projections using the base model (All2) with catches at the TACC, and at 0.8, 0.6, and 0.43 of the current TACC. 95% confidence intervals are shown in parentheses. (Source: FNZ, 2024d).

	2023–24	2024–25	2025–26	2026–27	2027–28	2028–29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38	2038-39
SSB/B_0																
TACC	35 (16-57)	34 (15-56)	33 (14-56)	32 (13-55)	31 (11-54)	30 (10-53)	29 (9-53)	28 (8-52)	27 (6-51)	26 (5-51)	25 (4-50)	25 (3-50)	24 (2-49)	23 (1-49)	23 (1-49)	22 (1-48)
0.8×TACC	35 (16-57)	34 (15-57)	33 (14-56)	33 (14-56)	32 (13-55)	32 (12-55)	31 (11-55)	31 (10-54)	30 (10-54)	29 (9-54)	29 (8-54)	29 (7-53)	28 (6-53)	28 (6-53)	28 (5-53)	27 (4-53)
0.6×TACC	35 (16-57)	34 (15-57)	34 (15-57)	34 (15-57)	34 (14-57)	33 (14-57)	33 (13-57)	33 (13-57)	33 (13-57)	33 (12-57)	33 (11-57)	33 (11-57)	33 (11-57)	33 (11-57)	33 (10-57)	33 (10-58)
0.43×TACC	35 (16-57)	34 (16-57)	35 (16-57)	35 (16-58)	35 (16-58)	35 (16-58)	35 (16-59)	35 (15-59)	36 (15-59)	36 (15-60)	36 (15-60)	36 (15-60)	37 (15-60)	37 (15-61)	37 (15-61)	37 (15-62)
P(<0.2B_0)																
TACC	7	9	11	14	16	19	22	24	27	30	33	36	38	40	42	44
0.8×TACC	7	8	10	11	13	14	16	18	19	21	23	24	25	26	27	29
0.6×TACC	7	8	8	9	10	10	11	12	12	13	13	14	14	15	15	15
0.43×TACC	7	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7
P(>0.2B_0)																
TACC	66	63	60	56	53	49	46	43	41	39	36	34	32	31	30	28
0.8×TACC	66	64	62	60	58	56	54	52	50	49	47	46	45	44	43	42
0.6×TACC	66	65	64	64	63	62	61	61	60	60	59	59	59	59	59	59
0.43×TACC	66	65	66	66	67	67	68	68	69	69	70	70	71	71	72	72

UoA 2: ORH 3B ESCR—Self-suspended; not assessed as part of surveillance 1.

UoA 3: ORH 3B NWCR

ORH 3B: NWCR

Fishery performance and new survey data
The NWCR fishery took 21.1% of the agreed catch limit during the 2023–24 fishing year (FNZ, 2024a). The level of catch for 2023-24 continues the trend from 2014-15, whereby catches are lower than catch limits, with the catch limit utilization averaging 20.1% over the most-recent five fishing years. Reasons given for low catch limit utilization include that the Morgue is closed to fishing so that much of the catch is taken on the "flats" in the western part of NWCR.

The last acoustic survey of the ORH 3B tool place during June/July 2022 (Ryan and Tilney, 2023), and the next acoustic survey of ORH 3B, including the NWCR, is scheduled for July 2026 (FNZ, 2024b). The survey of ORH 3B that occurred during 2024 did not cover any of the features in the NWCR.

Stock assessment
No stock assessment for the NWCR was undertaken during 2024, The last full stock assessment was undertaken during 2018, and additional analyses were undertaken during 2023 based on new acoustic biomass estimates for 2021 and 2022 and new age data from 2021 and 2022 (FNZ, 2024a). The analyses led to a revision of the assessment of stock status for the NWCR (FNZ, 2024a). The next stock assessment for ORH 3B, including the NWCR, is scheduled for 2025.

Principle 2

Monitoring

The Ministry for Primary Industries' (MPI) Scientific Observer Program (SOP) collects data from fisheries, including Endangered, Threatened and Protected (ETP) incidental capture information. The ETP component of observer coverage, under New Zealand law, is administered and funded by the Department of Conservation (DOC) through levies recovered from relevant fisheries' quota owners. All observer deployment is managed by the SOP.

The objective of the SOP is to collect data from fisheries for the following purposes:

- As an input to monitor key fisheries against harvest strategies
- As an input to monitor biomass trends for target and bycatch species
- To enable reliable estimations and nature of ETP species interactions and captures
- To enable timely responses to sustainability and environmental impact issues
- To provide a high level of confidence in fishers' at sea compliance with regulatory and non-regulatory measures.

Over the most recent 5-year period, observer coverage in the NWCR (Table 5 and Figure 5) and ORH 7A (Table 6 and Figure 6) UoA fishery areas has averaged 28% and 27%, respectively. This level of coverage is considered by MPI to be sufficient given the low level of ETP species captures and high level of overall compliance by orange roughy fisheries.

Table 5. Numbers of commercial trawl tows and associated observer coverage for tows that targeted ORH in the NWCR UoA trawl fishery from 2019-20 to 2023-24. Source: DWG Situation Report, FNZ pers. comm.

NWCR UoA	2019-20	2020-21	2021-22	2022-23	2023-24	5-year Average
Commercial tows	178	204	154	124	101	152
Observed tows	61	56	22	61	16	43
Observed tows (%)	34%	27%	14%	49%	16%	28%

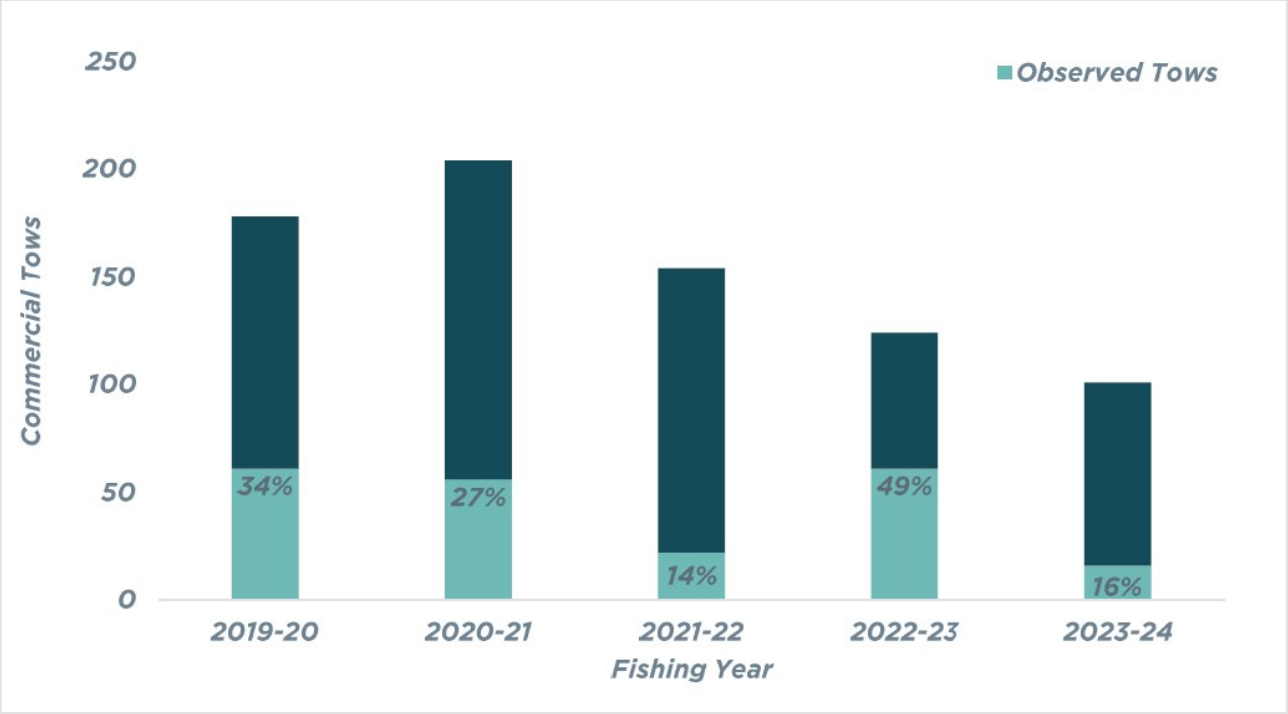

Figure 5. Observer coverage and fishing effort in orange rouhgy fisheries in the NWCR. The most recent fishing year for which data are presented is 2023-24.

Table 6. Numbers of commercial trawl tows and associated observer coverage for tows that targeted ORH in the 7A UoA trawl fishery from 2019-20 to 2023-24. Source: DWG Situation Report, FNZ pers. comm.

7A-WB UoA	2019-20	2020-21	2021-22	2022-23	2023-24	5-year Average
Commercial tows	556	639	669	520	340	545
Observed tows	169	133	100	160	177	148
Observed tows (%)	30%	21%	15%	`31%	52%	27%

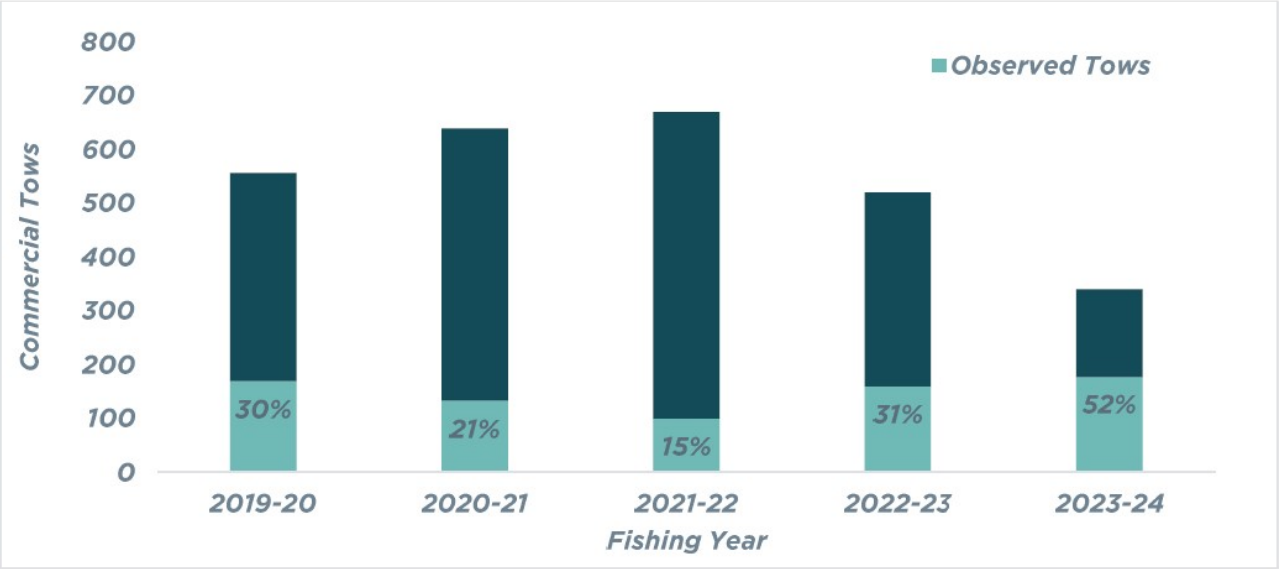

Figure 6. Observer coverage and fishing effort in orange rouhgy fisheries in the ORH 7A. The most recent fishing year for which data are presented is 2023-24.

In the 2021/22 financial year, within the Chatham Rise deepwater fisheries, which include the ORH3B NWCR UoA, 275 observer seadays were planned, and 336 were achieved (123% of planned). In ORH 7A, while 80 were planned, only 63 were achieved (79%). Note this is the same data presented at the 1st surveillance audit and is still the most recent information (FNZ 2022b).

Primary and Secondary Species

Each year, the assessment team looks at a rolling average of the most recent 5 fishing years of observer catch data to review the classification of primary and secondary species in the fishery. Therefore, this year, observer catch data for UoAs 1 (ORH 7A+Westpac) and 3 (ORH 3B NWCR) between 2019 and 2024 were used to confirm the catch composition in the orange roughy UoCs—particularly proportions of different species/groups in the catch. In both UoCs, Orange Roughy comprises the large majority of fish in the catch.

In ORH7A+Westpac there are a total of 36 species or species groups comprising at least 0.01% of the catch, but all species or groups except orange roughy comprise less than 2%, therefore there are no main species (primary or secondary).

Table 7. ORH 7A UoA average estimated catch composition of targeted orange roughy tows, in weight (kg) and percentage, from 2019-20 through 2023-24 based on observer data. Species with less than 0.01% of the catch composition have been omitted. Source: Fisheries New Zealand.

Species	QMS/Non-QMS	Observer Estimated Catch	
		(kg)	(%)
Orange roughy	**QMS**	1,755,600.0	86.93
Rattails (RAT)	Non-QMS	113,506.0	5.62
Ribaldo (RIB)	QMS	39,520.3	1.96
Hake (HAK)	QMS	22,648.4	1.12
Sharks and dogfish, unspecified (OSD)	Non-QMS	14,569.0	0.72
Seal shark (BSH)	Non-QMS	10,561.9	0.52
Ghost shark, pale (GSP)	QMS	7,786.3	0.39
Shovelnose dogfish (SND)	Non-QMS	7,297.0	0.36
Slickhead (SLK)	Non-QMS	6,250.2	0.31
Australasian narrow-nosed spookfish (LCH)	Non-QMS	5,703.8	0.28
Spiky oreo (SOR)	QMS	5,652.2	0.28
Hoki (HOK)	QMS	4,622.0	0.23
Black slickhead (BSL)	Non-QMS	4,124.2	0.20
Slender cods (HJO)	Non-QMS	3,252.0	0.16
Unicorn rattail (WHX)	Non-QMS	2,693.0	0.13
Baxter's lantern dogfish (ETB)	Non-QMS	2,341.2	0.12
Morrids (MOD)	Non-QMS	2,237.2	0.11
Cardinal fish (CDL)	QMS	1,914.8	0.09
Requiem shark (RSH)	Non-QMS	1,761.4	0.09
Leafscale gulper shark (CSQ)	Non-QMS	1,692.4	0.08
Sea perch (SPE)	QMS	1,419.1	0.07
Longnose velvet dogfish (CYP)	Non-QMS	768.7	0.04
Portuguese dogfish (CYL)	Non-QMS	439.6	0.02
Javelinfish (JAV)	Non-QMS	309.2	0.02
Deepwater dogfish, unspecified (DWD)	Non-QMS	283.8	0.01
Starfish (SFI)	Non-QMS	265.8	0.01
Plunket's shark (PLS)	Non-QMS	253.6	0.01
White warehou (WWA)	QMS	212.0	0.01
Smooth skin dogfish (CYO)	Non-QMS	200.4	0.01
Spinyfin (SFN)	Non-QMS	172.8	0.01
Cape scorpionfish (TRS)	Non-QMS	154.4	0.01
Black oreo (BOE)	QMS	154.0	0.01
Warty oreo (WOE)	QMS	150.8	0.01
Sea urchin; other (URO)	Non-QMS	135.2	0.01
Lanternfish (LAN)	Non-QMS	123.6	0.01
Smooth skate (SSK)	QMS	118.5	0.01
	TOTAL	2,018,894.9	99.96

In ORH3B NWCR, 40 species or species groups each comprise at least 0.01% of the catch. There's a smaller proportion of orange roughy (73.0%) and smooth oreo (primary) and rattails (secondary), are main species (Table 8). Slender cod/Johnson's cod was previously a main secondary species but has reduced in catch proportion in the most recent five years to be a minor secondary species.

Table 8. ORH 7A average estimated catch composition of targeted orange roughy tows, in weight (kg) and percentage, from 2019-20 through 2023-24 based on observer data. Species with less than 0.01% of the catch composition have been omitted. Source: Fisheries New Zealand.

Species	QMS/Non-QMS	Observer Estimated Catch	
		(kg)	(%)
Orange roughy	**QMS**	**236,800**	**73.00**
Smooth oreo (SSO)	QMS	20,382.6	6.28
Rattails (RAT)	Non-QMS	19,043.0	5.87
Slickhead (SLK)	Non-QMS	9,808.4	3.02
Hoki (HOK)	QMS	9,743.8	3.00
Slender cods (HJO)	Non-QMS	6,895.2	2.13
Morids (MOD)	Non-QMS	5,366.2	1.65
Sharks and dogfish, unspecified (OSD)	Non-QMS	2,541.6	0.78
Javelinfish (JAV)	Non-QMS	2,097.4	0.65
Shovelnose dogfish (SND)	Non-QMS	1,629.2	0.50
Clubhook squid (WSQ)	Non-QMS	1,236.0	0.38
Ghost shark, dark (GSH)	QMS	1,213.6	0.37
Hake (HAK)	QMS	1,041.2	0.32
Seal shark (BSH)	Non-QMS	948.8	0.29
Baxter's lantern dogfish (ETB)	Non-QMS	734.4	0.23
Ribaldo (RIB)	QMS	587.8	0.18
Ghost shark, pale (GSP)	QMS	492.6	0.15
Australasian narrow-nosed spookfish (LCH)	Non-QMS	475.2	0.15
Small-scaled brown slickhead (SSM)	Non-QMS	398.0	0.12
Chimaera, purple (CHP; CHG)	Non-QMS	379.6	0.12
Chimaera, wide-nosed (RCH)	Non-QMS	321.6	0.10
Basketwork eel (BEE)	Non-QMS	301.4	0.09
Spiky oreo (SOR)	QMS	241.2	0.07
Alfonsino (BYX)	QMS	240.0	0.07
Deepwater dogfish, unspecified (DWD)	Non-QMS	218.4	0.07
Tam O'Shanter urchin (TAM)	Non-QMS	160.2	0.05
Longnose velvet dogfish (CYP)	Non-QMS	150.8	0.05
Starfish (SFI)	Non-QMS	129.0	0.04
Chimaera spp. (CHI)	Non-QMS	111.0	0.03
Deepwater eel, unspecified (DWE)	Non-QMS	104.0	0.03
Black cardinal fish (CDL)	QMS	79.0	0.02
Smooth skate (SSK)	QMS	75.0	0.02

Black oreo (BOE)	QMS	69.0	0.02
Longnose deep-sea skate (PSK)	Non-QMS	58.6	0.02
Warty oreo (WOE)	QMS	53.2	0.02
Ling (LIN)	QMS	44.9	0.01
Sea perch (SPE)	QMS	31.0	0.01
Deepwater king crab (KIC)	QMS	29.0	0.01
Small-headed cod (SMC)	Non-QMS	24.6	0.01
Hydrolagus spp. (HYD)	QMS	19.2	0.01
	TOTAL	**324,275.7**	**99.96%**

Smooth Oreo (*Pseudocyttus maculatus*). The OEO4 management area for smooth oreo (reporting code SSO) overlaps the NWCR and ESCR UoAs. A 2019 stock assessment of SSO in OEO4 estimated B_{2018} at 40%B_0 for the base model (FNZ 2021). B_{2018} is 'About as Likely as Not (40-60%)' to be at or above the target of 40%B_0. Stock projections indicate there would be little change in biomass over the next five years at annual catches of 2,300 – 3,000 t (Cordue, 2019). The catch limit for SSO in OEO4 is currently 2,600 t (DWG, 2021). Smooth oreo was assessed in 2018 using a CASAL age-structured population model with Bayesian estimation, incorporating stochastic recruitment, life history parameters, and catch history up to 2017–18 (FNZ 2021). There has been no new stock assessment for this species since the last surveillance audit.

Rattails. The IUCN has graded rattails in general as least concern (https://www.iucnredlist.org/search?query=Rattails&searchType=species). This grading includes the four-rayed rattail, *Corphaenoides subserrulatus* (https://www.iucnredlist.org/species/154890/115249673), which is commonly found in trawl surveys in New Zealand. These species have depth and areal distributions that extend beyond the range of the fishing fleets (and substantially beyond that of the UoAs), so the IUCN concluded that fishing activities are not likely to cause a significant population decline at present. Although analytic stock assessments are not conducted for rattails, trawl surveys have monitored relative abundance on the Chatham Rise since 1992, including Bollon's rattail. In 2010, the surveys added a number of species, including four-rayed rattail. Bollon's rattail has shown no trends in abundance for the period since 1992, and four-rayed rattail no trends since 2010 according to the annual Chatham Rise trawl survey (**https://tsip-uat.niwa.co.nz/search**). Rattail bycatch in the NWCR fishery has fluctuated over the last 5 years but has a notable peak in the 2019-20 fishing year followed by a steady decline over the next four years. The declining trend in the reported bycatch of rattails under the generic code 'RAT' could be attributed to the increasing use of species-specific reporting codes in recent years, noting that observers now record at least seven rattail species against individual codes.

Anderson and Finucci (2022) published a summary of non-target fish and invertebrate catch and discards in the NZ orange roughy and oreo trawl fisheries from 2002-3 through 2019-20. Their analysis of discards in the orange roughy fishery shows the folloiwng:

1. Very low annual discards of non-target QMS species (between 1 and 46t annually with no obvious trend).
2. Discards of non-QMS species ranged from 108t in 2013-14 to 1,504t in 2017-18 with no obvious trend over time.
3. Annual discards of invertebrate species ranged from 5t to 140 t with levels in the first five years of the time searies higher than in any subsequent year, after which they remained relatively steady.

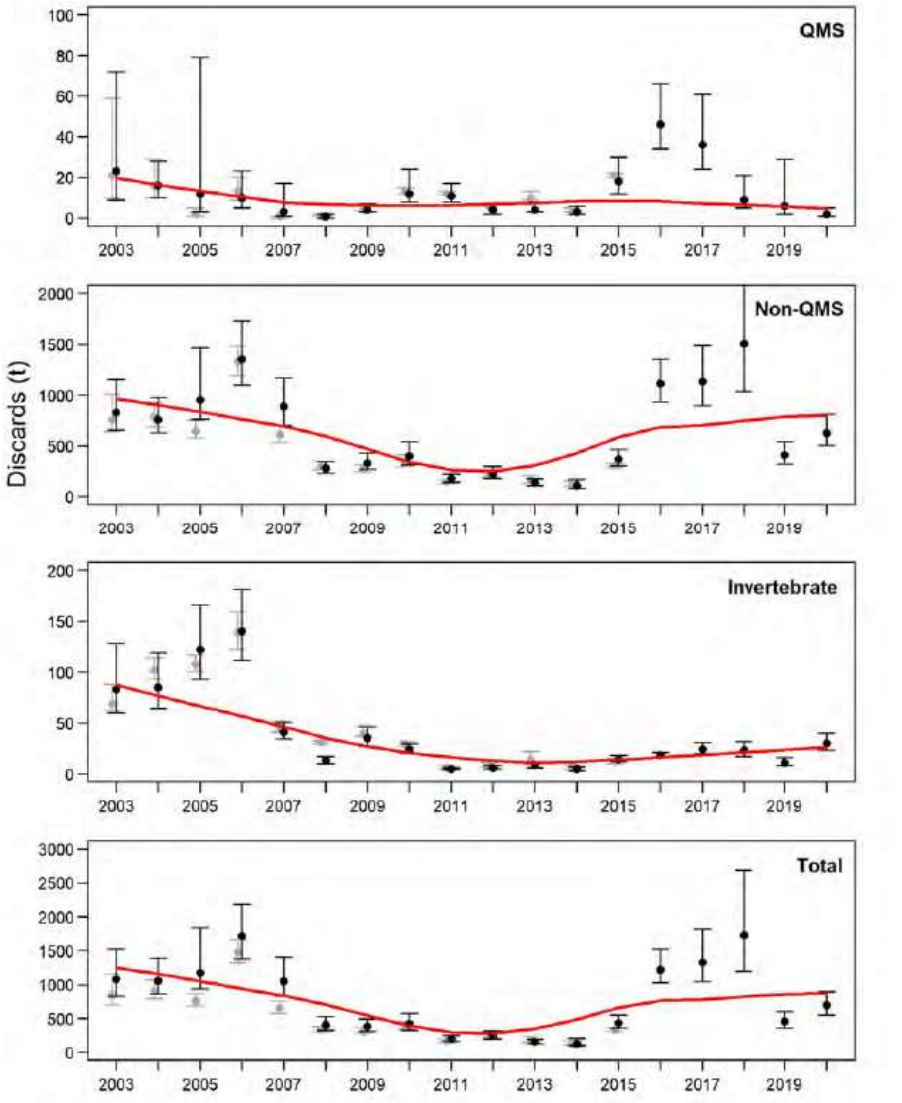

Figure 7. Annual estimates of discards in the target orange roughy trawl fishery, by species category, for 2002-2003 to 2019-2020 and equivalent estimates up to 2014-15 from Anderson et. al. (2017; grey dots). Error bars indicate 95% confidence intervals. The red lines show the fit of ta locally-weighted polynomial regression to annual discards. Source: Anderson and Finucci (2022), Figure 25

Endangered, Threatened and Protected (ETP) species

Seabirds

Over the past five years, seabird captures in the NWCR UoA fishery have remained low and stable, with a total of four observed captures. In the most recent fishing year, no seabirds were captured. Of the four captures, one was a storm petrel and one a white-chinned petrel, both of which were found dead. The remaining two captures involved a Salvin's albatross and an unidentified petrel, prion, or shearwater, both of which were alive (FNZ pers com).

Over the past five years, seabird captures in the 7A fishery have varied, with a noticeable increase in captures during 2022/23, followed by a return to zero captures in the most recent fishing year. Of the 11 captures, four birds were found dead, including a white-chinned petrel, northern giant petrel, great albatross, and an unspecified pair of antipodean and Gibson's albatross. The remaining captures involved live birds, consisting of a white-capped albatross, two unidentified Procellaria petrels, three unidentified petrels, prions, or shearwaters, and one unidentified albatross (FNZ pers com).

The estimated seabird capture rates in deepwater fisheries (including orange roughy) remain below the benchmark level of 0.4 captures per 100 tows. The 2020/21 estimated capture rate was approximately 0.2/100 tows (FNZ 2023c).

Mammals

In the 2023-24 fishing year, there were no observed captures of New Zealand sea lion, New Zealand fur seals or any whales or dolphins in either the NWCR or 7A orange roughy trawl UoAs. No estimates of total interactions were made.

Corals/Habitat

The single open condition on this fishery pertains to performance indicator 2.4.2 and potential encounters with sensitive benthic organisms such as corals. An update on the progress against this condition is given in section 5.3 of this report. In New Zealand, because some coral groups are technically ETP species under domestic legislation, the evaluation of the fishery's impact to corals has been done under both the ETP and habitats components of the assessment tree.

Deepwater Council reports that the Chatham Rise fishery has be come more of a "flats" fishery then one focused on UTFs. This is because more fish are being found on the flats, and the fishermen are going to places they know they will find them, rather than exploring new areas (Aaron Irving, pers. com.). There are currently around six active fishing vessels participating in this fishery.

Since the initial assessment, the NZ department of conservation (DOC) has made considerable advancements in research and data analysis on interactions between protected corals and fisheries, as well as improved modelling of coral occurrence and potential "hot spots." These were reported on in detail in the previous surveillance report (MRAG Americas 2024).

In the most recent 2023-24 fishing year, there were relatively large catches of stony corals observed in the NWCR UoAs. (268.8 kg), leading to observer catch estimates of close to 1,700 kg. Likewise, 2023/24 is the first year in the past 5 where observer reported catch is far greater than commercially reported coral catch in the NWCR UoA. The reason for this is still being explored and will be revisited at the next annual audit. The coral captures in the 7A UoA remain low and without trend.

Table 9. NWCR observed and estimated coral catch (kg) from fishing years 2019-20 to 2023-24. Source: Fisheries New Zealand

Species	Observer Reported Catch (kg)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Stony coral - Goniocorella dumosa (GDU)	0	0	0	0	265.2
Stony coral - cup (unspecified; CUP)	2	0	0	0	0
Gorgonian coral - Lepidisis spp. (LLE)	1	0	0	0	0.8
Stony coral - cup Desmophyllum dianthus (DDI)	0	0	0	0	1.6
True coral (unidentified; COU)	0	1	0.2	0	0
Golden corals - Chrysogorgia spp. (CHR)	1	0	0	0	0
Black coral - Dendrobathypathes spp. (DEN)	0	0	1	0	0
Gorgonian coral - Lepidisis spp. (LLE)	0	0	0	0	1
Gorgonian coral - Keratoisis spp. (BOO)	0.3	0	0	0	0
Black coral - Bathypathes spp. (BTP)	0	0	0.2	0	0
Black coral (COB)	0	0	0	0	0.2
Gorgonian coral - Bushy bamboo (ACN)	0	0.1	0	0	0
TOTAL	**4.3**	**1.1**	**1.4**	**0**	**268.8**
Total Tows	178	204	154	124	101
Observed Tows	61	56	22	61	16
Observer Tows (%)	34%	27%	14%	49%	16%
Estimated Coral Catch (kg)	12.55	4.01	9.80	0.00	1696.80
Estimated Coral Catch/100 Tows (kg)	7.05	1.96	6.36	0.00	1680.00

Table 10. ORH 7A observed and estimated coral catch (kg) from fishing years 2019-20 to 2023-24. Source: Fisheries New Zealand

Species	Observer Reported Catch (kg)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Black coral (COB)	1.8	0	0	0	0
Gorgonian coral - Lepidisis spp. (LLE)	0.3	0	1	0.1	0
True coral (unidentified; COU)	0	0	0.8	0	0
Bamboo coral (ISI)	0	0	0	0	0.51
Gorgonian coral - Bushy bamboo (ACN)	0	0	0.1	0	0.1
Gorgonian coral - Keratoisis spp. (BOO)	0.1	0	0	0	0
Black coral - Bathypathes spp. (BTP)	0	0	0	0	0.1
TOTAL	**2.2**	**0**	**1.9**	**0.1**	**0.71**
Total Tows	178	204	154	124	101
Observed Tows	61	56	22	61	16
Observer Tows (%)	34%	27%	14%	49%	16%
Estimated Coral Catch (kg)	6.42	0	13.3	0.2	4.48
Estimated Coral Catch/100 Tows (kg)	3.61	0	8.64	0.16	4.44

Table 11. Vessel-reported and observer-reported coral catch (kg) in NWCR and 7A from fishing years 2019-20 through 2023-34. Source: Fisheries New Zealand.

Year	NWCR Catch (kg)		7A-WB Catch (kg)	
	Commercially Reported	Observer Reported	Commercially Reported	Observer Reported
2019/20	2.02	4.3	9.15	2.2
2020/21	405.3	1.1	1.57	0
2021/22	1190.47	1.4	0.86	1.9
2022/23	0	0	1.45	0.1
2023/24	20.98	268.8	0.1	0.71

Principle 3

Fisheries New Zealand published a review of sustainability measures for orange roughy (ORH 3B) for the 2023/2024 fishing season in June of 2023 (FNZ 2023d). This review was in response to the issues with the Chatham Rise stock assessment for orange roughy and the need to understand issues such as flat or declining patterns and recent historical lows in unstandardized CPUE that are inconsistent with the stock assessment, and divergences between catch and sub-area limit in the NWCR, etc. The review looks at the implications of different levels of TAC reduction relative to e.g. Treaty of Waitangi obligations, and environmental principles in the Fisheries Act (section 9). This is listed as a Principle 3 update because it is an example of the fishery-specific management system responding to serious or other concerns arising within the fishery, as well as an example of well-defined roles and responsibilities within the fisheries management system.

Aquatic environment and biodiversity research initiatives related to the benthic effects of fishing are detailed in the Annual Operational Plan for Deepwater Fisheries. Projects to monitor seabed contact by bottom trawling are ongoing and include the following projects (note none of these are new for 2023-24):

- BEN2019-04 A spatially explicit benthic impact assessment for inshore and deepwater fisheries New Zealand to describe and quantify the likely nature and extent of impacts to benthic taxa or communities by mobile bottom fishing methods.
- 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.
- BEN2020-01 Extent and intensity of seabed contact by mobile bottom fishing in the New Zealand Territorial Sea and Exclusive Economic Zone.
- BEN2020-07 Extent and intensity of trawl effort on or near underwater topographic features in New Zealand's Exclusive Economic Zone
- BEN2021-03 Taxonomic identification of benthic invertebrate samples.
- BEN2022-01 Extent and intensity of seabed contact by mobile bottom fishing in the New Zealand Territorial Sea and Exclusive Economic Zone and development of an interactive bottom fishing footprint website.
- ENV2020-20 Temporal and spatial distribution on non-target catch, and non-target species, in deepwater fisheries
- ZBD2019-01 Quantifying Benthic Biodiversity Across Environmental Gradients - To expand and develop initiatives to improve confidence in predictive models of seabed fauna and habitat distributions.
- ZBD2020-06 Recovery of biogenic habitats: assessing the recovery potential offered by spatial planning scenarios proposed in the Sea Change Plan.
- ZBD2020-07 Recovery of Seamount Communities.

Research needs for deep water fisheries are driven by the objectives of the National Fisheries Plan for Deepwater and Middle-depth Fisheries and delivered through the Medium-Term Research Plan for deepwater fisheries (**MTRP**).[82] The

MTRP provides a five-year schedule of science and monitoring projects (e.g., biomass surveys and stock assessments), required to support the sustainable management of deepwater fisheries.

The schedule of stock assessments for the orange roughy UoA fisheries is being adhered to. All research projects are reviewed by FNZ's Science Working Groups and assessed against FNZ's Research and Science Information Standard for New Zealand Fisheries. The AOP provides detail of the research projects relating to deepwater fisheries to be undertaken during 2022/23 and 2023/24.

Changes in Personnel/Management Structure:

Deepwater Group Limited has amalgamated with Fisheries Inshore New Zealand Limited and has been rebranded as Seafood New Zealand Deepwater Council (DWC). In July 2024, Lisa Futschek was appointed as the Chief Executive Officer of Seafood New Zealand. DWC appointed Tanayaz Patil as a Senior Policy Advisor in September 2024.

DWC has contracted Dragonfly Ltd to assist in the development of a revised stock assessment approach for orange roughy in ORH 3B ESCR, and potentially for application in NWCR and ORH 7A.

Fisheries New Zealand's Deepwater Management team leader, Tiffany Bock has been appointed to head up Seafood New Zealand's Inshore Council and her role at FNZ has been filled by James Andrew.

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4.3.1. Inseparable or practicably inseparable (IPI) stock status

Not Applicable

4.3.2. Total Allowable Catch (TAC) and catch data

Table 12: Allowable Catch (TAC) and catch data-ORH 7A (UoC 1)

TAC / Catch Data	Year	Amount
TAC	Year (22-23)	2,058 mt
UoA share of TAC	Year (22-23)	100%
Total catch by UoC (most recent year)	Year (22-23)	1,763 mt
Total catch by UoC (second most recent year)	Year (21-22)	2,193 mt

Table 13: Allowable Catch (TAC) and catch data-ORH3B NWCR (UoC 3)

TAC / Catch Data	Year	Amount
TAC	Year (22-23)	1,150 mt
UoA share of TAC	Year (22-23)	100%
Total catch by UoC (most recent year)	Year (22-23)	176 mt
Total catch by UoC (second most recent year)	Year (21-22)	203 mt

4.4. Changes which impact traceability systems

Table 14: 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

4.4.1. Traceability within the fishery description

Table 15: Traceability within the fishery

Statement on fishery's ability to track and trace to each Unit of Certification
Systems are in place to allow the tracking and tracing of product to each UoC.
Movement of fish and fish product between **harvest** and **landing** *An illustration of movement of product between harvest and landing. Include when any of the following happen: Harvesting, At-Sea processing, Translocation, Transhipment, Offloading, Landing.*
All catches are landed to a Licensed Fish Receiver (LFR) in New Zealand and these landings are recorded and balanced (to the nearest kg) against total allowable landings for each stock. The LFRs are responsible for ensuring catch records are aligned with landing records, and they are audited to ensure compliance. The following information is recorded from the vessel: catch weight by species, date, area where the fish was caught, and processed state (if there was processing at sea). Every container into which fish is packaged on an LFR's premises shall be marked with species name, date, LFR's name, processed state and area. Product moves from the fishing vessel (freezer vessels) to land (there is no transshipment) in cartons labelled with species, weight, and catch area. On board, factory vessels have fully integrated weighing/labelling systems that barcode every carton on production before storage in the ship's hold. The data is downloaded on arrival, reconciled on landing figures, providing a final inventory. This system allows the tagging of product lines. An example of using a fully integrated weighing/labelling system, is with orange roughy, where on a trip, a vessel may target orange roughy within units of certification, and then in areas that are not subject to MSC certification. In these different areas, in addition to accurate catch, time and location information, a MSC code is also encoded on the box, and as such traceable and separable simply upon scanning. These systems are all auditable and are audited. Another example where MSC certified and non-certified fish is kept separated is in the southern blue whiting fisheries where again not all fish is MSC certified. Here keeping certified MSC fish and non-certified fish is accomplished by not only to adhering to reporting and landing regulations, but also by operational procedures completed on board the vessel as described above. All LFRs hold CoC certification, so there is no further product flow prior to the start of CoC
Movement of fish and fish products between **landing** and **start of the CoC** if relevant. *An illustration of movement of product between landing and start of CoC. Include when any of the following is happening: Transport, Storage, Sorting/ Grading, Packing, Auction.*
Landing to LFR (who has CoC)
Description of any processing and sorting/ grading prior to change of ownership
Most orange roughy vessels are freezer trawlers, that do all primary processing prior to change of ownership. Product comes off the boat already processed, frozen and in labelled cartons. It's offloaded to an LFR when ownership effectively changes.

For the critical tracking events (i.e. where in the product flow this data needs to be transferred) of all fish and fish product handling and sale not covered by CoC describe: • Process of segregating to each Unit of Certification • Key data elements (i.e. the data or documents to identify the UoC such as species, catch area, gear)
CoC starts upon landing to an LFR. On board the vessels, information on the location and gear type of the landing is registered in the factory upon haulback of a fishing event, and coded into the factory labelling system, so as the product is processed in the factory, it is labelled with the correct information relevant to certification.
Where there are IPI stock(s) within the scope of certification, describe the verification of traceability systems
N/A
Other relevant information on the systems to track and trace to each UoC
If there is any doubt whether orange roughy landed into an LFR is from a certified fishery the product is treated as non-certified.

4.4.2. Traceability within the fishery description

Table 16: Traceability risks and mitigation within the fishery

Factor	**Description of the traceability risk factors and details of the risk mitigation and management** *Include in each description:* • *Whether each factor occurs* • *When it occurs and how frequently (e.g. regularly, seasonally, rarely)* • *How any potential traceability risks are mitigated and any risk management* • *If covered by information provided elsewhere in the assessment report (such as Table 5 for segregation or in Section 5 MSC Fisheries Standard – Principle 3 – Effective management for regulatory frameworks), cross reference as needed.*
Will the fishery use gears that are not part of the UoC? If Yes, include in the description: • If this may occur on the same trip, on the same vessels, or during the same season; • How any risks are mitigated.	No. The fisheries use only bottom trawl gear. No other types of fishing gear are used.
Will vessels in the UoC also fish outside the UoC geographic area? If Yes, include in the description: • If this may occur on the same trip; • How any risks are mitigated.	Yes. Vessels regularly fish outside the UoC and may do so during a single voyage. Factory vessels are equipped with fully integrated weighing and labelling systems in which every carton is barcoded on production and before storage in the hold. This system allows non-certified product to be barcoded as non-certified and to be trackable and separable by scanning at any subsequent stage. In port, vessel product data are reconciled with landing figures to arrive at a final inventory. Fresher vessels land their fish whole, and standard practice involves all fish bins being labelled as per MPI and NZFSA requirements. These outer markings are used to separate and inventory all product on landing.

Factor	Description of the traceability risk factors and details of the risk mitigation and management *Include in each description:* • *Whether each factor occurs* • *When it occurs and how frequently (e.g. regularly, seasonally, rarely)* • *How any potential traceability risks are mitigated and any risk management* • *If covered by information provided elsewhere in the assessment report (such as Table 5 for segregation or in Section 5 MSC Fisheries Standard – Principle 3 – Effective management for regulatory frameworks), cross reference as needed.*
Do vessels from outside the UoC and/or client group ever fish on the same stock?	All fish and fish product is landed to Licenced Fish Receivers (LFR) who hold Chain of Custody certification requiring strict, approved procedures to ensure certified and non-certified products are separately stored and are identifiable as certified or non-certified throughout the landing, processing, storage and transportation stages. In addition, MPI regulations require all packaged fish on a LFR's premises to be labelled such that the species name, date of landing, LFR name, processed state and area caught are clearly displayed. The process is considered to be well managed.
Do the fishery client members ever handle certified and non-certified products during any of the activities covered by the fishery certificate? This refers to both at-sea activities and on-land activities and should reflect those listed in product movement in Table 5. It includes: • Translocation • Transhipment • Transport • Storage • Processing • Sorting/ grading • Packing • Landing • Auction	There is no transhipment of catches at sea within the EEZ by New Zealand vessels.
Does transhipment occur within the fishery? If yes, include in the description: • What is the type of transhipment in-port/ high seas/ other • What are the systems used to track and trace to UoC For high seas transhipment include in the description how the systems to track and trace to the UoC: • Are verified independently of the fishery client • Cover all fishing and receiving vessels involved in transhipment • Apply to all transhipment events If any of these 3 criteria above are not met for high seas transhipment CoC certification is	If there is any doubt whether orange roughy landed into an LFR is from a certified fishery the product is treated as non-certified.

Factor	Description of the traceability risk factors and details of the risk mitigation and management *Include in each description:* • *Whether each factor occurs* • *When it occurs and how frequently (e.g. regularly, seasonally, rarely)* • *How any potential traceability risks are mitigated and any risk management* • *If covered by information provided elsewhere in the assessment report (such as Table 5 for segregation or in Section 5 MSC Fisheries Standard – Principle 3 – Effective management for regulatory frameworks), cross reference as needed.*
required for both the fishing and receiving vessels involved in this transhipment.	
Are trading agents to be covered within the fishery certificate? If yes, include in the description: • How information on UoC is passed through	No, LFRs are effectively the “agents” taking delivery of product at landing and they have their own CoC.
Are there any other risks of mixing or substitution between certified and non-certified fish? If No, refer to the section describing product movement and segregation which demonstrates this.	No. Please see Table 6.
Are there any other risks of mixing between different Units of Certification? If Yes, include in the description: • link to any relevant variations relating to this If No, refer to the section describing product movement and segregation which demonstrates this.	

4.4.3. Traceability within the fishery description

Copy from last full assessment and update as relevant.

Table 17: Traceability risks and mitigation within the fishery

Determination on whether fish and fish products from the certified UoC(s) can go onto be sold as certified. Including: • *Whether the ability for fish and fish products to be sold as certified is conditional upon CoC certification.* • *If traceability systems still need to be established prior to either CoC certification OR revised fishery determination.*
Delete as appropriate: • It is determined that fish and fish products from the certified Units of Certification can go on to be sold as certified.

The point of change of ownership of product to any party not covered by the fishery certificate and detail of any trading between client group members prior to this
The change of ownership occurs upon landing to Licensed Fish Receivers, who have their own CoC.
The point from which subsequent Chain of Custody (CoC) is required *The latest this can happen is the point of change of ownership of fish or fish product to any party not covered by the fishery certificate (reference section above) but it may happen sooner in which case describe as per the product flow (in Table 5). Note the requirement for when CoC is required to start on High Seas Transhipment*
CoC is required by LFRs who take delivery of product at landing.
The entities, or categories of entities, at the point of landing and/or sale required to have separate CoC including any auctions, selling agents, offloaders or storage facilities and so not covered in the above Tables 5 and 6.
A list of entities, or categories of entities, eligible to access the certificate and sell product as certified including: • *Confirm if all vessels within the geographic area and gear of the UoC are eligible to sell fish and fish products as certified.* • *Any other limits to vessel types, ownership, client group membership.* • *Include any trading agents used.*
All vessels fishing in one of the certified UoCs.
Points of landing, auctions or other transfer which may be used for the sale of fish from the certified fishery into further chains of custody, either: • *The geographic region where all landing points are possible, or* • *Named landing points, auctions or other transfer sites if there are limits.*
Any Licensed Fish Receiver within NZ.
Any specific eligibility criteria for product to be sold as certified, or where to find this information where relevant, including: • *Product form.* • *Trip type (e.g. includes outside EEZ).* • *Need for Chain of Custody.* • *Need for trading through client group members*.
N/A
How fish or fish products can be identified or can be confirmed as certified at the point it enters certified CoC, including: • *How information on gear, species, stock, area, vessel (where relevant) client group member (where relevant) is provided.* • *Any segregation to UoC required of first buyers (e.g. sort batches by species).* • *Where relevant how any specific eligibility criteria can be confirmed by the first buyer (as per section above).*
Information on species, catch location, gear, weight, certified status, and other information is coded into the barcode of cartons offloaded from freezer vessels.
How IPI is identified to first buyers at the point it enters certified CoC where relevant
N/A

5. Surveillance Audit Results

5.1. Summary overview

5.1.1. Summary of conditions update

Table 18: Summary of conditions

Condition number	Condition	PI	Status	PI original score	PI revised score
Add rows as needed	*Add condition summary*		*Choose from: New / Closed / Ahead of target / On target / Behind target / Inadequate progress. If closed, indicate surveillance number when closed.*	*PI score from most recent assessment.*	*PI score after this surveillance, or 'Not revised'.*
1	By the 4th annual audit in 2026 there will be some quantitative evidence that the partial strategy outlined in the DWG benthic operational procedures is being implemented successfully in the NWCR ~~and ESCR*~~ unit of assessment.	2.4.2(c)	On-target	75	Not Revised

* Note the ESCR UoA is still subject to this condition but the certificate is suspended and it's now covered in the ITM Improvement Action Plan.

5.1.2. Recommendations (new) –

Recommendations

- While model All2 represents a pragmatic and parsimonious way to interpret the existing data for ORH 7A, the last survey estimate of abundance is a decade old (Table 1; Figure 1). Obtaining a new representative survey index of abundance should be a high priority.
- There may be a need for an evaluation of alternative ways to monitor abundance for ORH 7A given the difficulties finding fish (if they are there) during a relatively short survey period.

5.2. Re-scoring Performance Indicators

PI 1.1.1. for the Northwest Chatham Rise UoA was rescored during the 1st surveillance audit due to the impact of issues with the stock assessment described in the Principle 1 update section of that report. The following table is the result of this rescoring. The overall score for this PI was reduced from 100 to 80. No new condition was raised. The overall P1 score for this UoA was reduced from 94.6 to 85.6. **Note this is a change made during the 1st surveillance audit, not the present assessment.**

1.1.1. – Stock status Northwest Chatham Rise

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue	SG 60	SG 80	SG 100
a	Stock status relative to recruitment impairment		

	Guide post	It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.
	Met?	NWCR – Y	NWCR – Y	NWCR – N
Rationale				

For the purposes of this assessment, the PRI is taken to be the limit reference point. This was set to $0.2B_0$ by Cordue (2014) who defined the limit reference point to be the maximum of $0.2B_0$ and $0.5B_{MSY}$ (based on a deterministic yield analysis), accounting for uncertainty in natural mortality *M* and stock-recruitment steepness *h*. Cordue (2019) revised the analysis on which the limit reference point was based taking into account the results of new assessments.

The probabilities of the biomass in 2017 (the last year included in the 2018 assessment) being above the lower end of the target range ($0.3B_0$) and the soft limit ($0.2B_0$) were reported to be <0.05 in the report of the 2022 Stock Assessment Plenary (FNZ, 2022), while the probability of this biomass being above $0.3B_0$ (the lower end of the target range) was reflected as "as likely as not". Given the additional uncertainty associated with the assessment, the status of the NWCR stock in relation to being below $0.2B_0$ was modified in the report of the 2023 Stock Assessment Plenary to "unlikely" or a probability between 0.1 and 0.4, with no indication of where within the range the probability lies. In relation the probabilities of being above or below the management reference points, the FNZ "Guidelines for Status of Stocks Summary Tables" (FNZ, 2023b) note that

> "*Probability categories and associated descriptions should relate to the probability of being "at or above" biomass targets (or "at or below" fishing intensity targets if these are used), below biomass limits, and above overfishing thresholds. Note, however, that the descriptions and associated probabilities adopted need not correspond exactly to model outputs; rather they should be superimposed with the Working Group's belief about the extent to which the model fully specifies the probabilities. This is particularly relevant for the "Virtually Certain" and "Exceptionally Unlikely" categories, which should be used sparingly*."

A key question is therefore the reliability of the range of 0.1 to 0.4 for assessing the probability of being below $0.2B_0$ given the semi-quantitative basis for the range. Moreover, if the range is appropriate where within the 0.1 to 0.4 range does the probability lie (in particularly whether it is above or below 0.3). **Error! Reference source not found.** is suggestive that the trend in biomass continues to be increasing[1] and if the acoustic catchability is 0.66 [Doonan et al., 2015] (rather than the 0.8 implied the priors for acoustic catchability in the 2018 assessment), of the same scale. Had **Error! Reference source not found.** been created with an acoustic catchability coefficient of 0.8 the absolute biomass would be lower but the trend would remain. Thus, while there is clearly increased uncertainty regarding the status of the stock relative to the outcomes of the 2018 assessment, it is unlikely based on the current information that the stock is below $0.2B_0$ with more than a 0.2 probability **hence meeting SG80**. However, the additional uncertainty reinforces the need to address the problems with the stock assessment identified during 2023 and produce a new quantitative assessment.

The new information arising from the 2023 assessments suggest that while SG 60 and most likely SG 80 is satisfied. However, the increased uncertainty means that the evidence cannot justify that the probability of the stock being above the PRI is as high as 95%

	Stock status in relation to achievement of Maximum Sustainable Yield (MSY)			
b	Guide post		The stock is at or fluctuating around a level consistent with MSY.	There is **a high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

[1] A key part of the views of some DWWG members in rejecting the 2020 stock assessment for the ESCR fishery was the poor fit to the observed acoustic biomass index (the model estimates of biomass are increasing in size, the observations are flat).

	Met?		NWCR – Y	NWCR – N
Rationale				

The estimates of B_{MSY} based on deterministic considerations (the usual basis for estimating B_{MSY} when conducting stock assessment) are not considered reliable for orange roughy and range from $0.31B_0$ to $0.43B_0$ depending on whether the Beverton-Holt or Ricker stock-recruitment relationships is assumed. The management target range adopted for orange roughy in New Zealand is $0.3\text{-}0.5B_0$. The stock assessments provide estimates of biomass relative to B_0. For the base model, the stocks are assessed to have been above the lower end of the management target range ($0.3B_0$) since 2012 (ORH3B NWCR). However, while the report of the stock assessment plenary reflects that the stock is as likely as not above the lower end of the management target range (FNZ, 2023a), the increased uncertainty associated with assessment means that it is not possible to conclude with 95% certainty (required for SG100) that the stock is above the level consistent with MSY. However, the available evidence is that the stock is fluctuating about B_{MSY} and hence meeting SG 80.

References:

FNZ (2023a); Cordue (2014, 2019)

Stock status relative to reference points			
	Type of reference point	Value of reference point	Current stock status relative to reference point
Reference point used in scoring stock relative to PRI (SIa)	*Spawning biomass*	*0.2 B_0*	*ORH 3B NWCR: 0.38 B_0 (2017)*
Reference point used in scoring stock relative to MSY (SIb)	*Spawning biomass*	*0.3 – 0.5 B_0*	*(Relative to $0.3B_0$)* *ORH 3B NWCR: 0.38 B_0 (2017)*

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	**3B NWCR-80**
Condition number (if relevant)	**N/A**

Where the information base has changed the CAB shall re-score relevant Performance Indicators.

5.3. Conditions

5.3.1. Progress against conditions

Table 19: Condition 1–OPEN

Performance Indicator	2.4.2
Score	*75*
Justification	From the study by Black (2021), management action would have been triggered in ORH3B NWCR and ESCR, but not in ORH7A. This suggests that pVME has a non-trivial chance of designation as VME in ORH3B NWCR and ESCR, while designation of pVME as VME in ORH7A is unlikely. For potential VME habitat, DWGs operational procedures for BMA indicator taxa encounters have been implemented too recently for there to be quantitative evidence of successful implementation. Therefore, for potential VME habitat in ORH3B NWCR and ESCR, the SG80 is not met and a condition has been assigned.
Condition	By the 4th annual audit in 2026 there will be some quantitative evidence that the partial strategy outlined in the DWG benthic operational procedures is being implemented successfully in the NWCR and ESCR units of assessment.
Condition start	Certification date, 2022.
Condition deadline	4th annual audit, 2026 (month TBD)
Milestones	At the first annual surveillance audit (2023), the client will provide a plan that assures availability of some quantitative metrics capable of demonstrating successful implementation. At the second and third surveillance audits, the client will provide a report of progress in meeting the condition. At the fourth surveillance audit, the client will provide a report with some quantitative metrics capable of demonstrating that the partial strategy has been successfully implemented. Score SG80.
Year 1 Action Plan Expected Output.	**Surveillance Audit 1:** DWG will provide a report outlining the processes and analyses undertaken that provide information on the estimated nature and scale of any coral habitat encountered. This report will demonstrate that a plan has been put into effect to ensure tows catching orange roughy in the NWCR and ESCR UoA areas do not pose a risk of serious or irreversible harm to coral habitats.
Progress on Condition (Year 1)	The first milestone for this condition is that the client would provide a plan that assures availability of some quantitative metrics capable of demonstrating successful implementation of the benthic operational procedures. At the time of recertification, DWG's Benthic Operational Procedures had just been implemented (starting 1 October 2021) and are designed to ensure that vessels are cognisant of the requirement to accurately measure, record and report all captures of benthic biota to the Ministry and to their shore managers. DWG's Environmental Liaison Officer is at hand to assist in providing response management advice for implementation in real-time (DWG, 2021b). Orange roughy quota owners had agreed to implement specific benthic interaction measures to closely monitor and minimize catches of live corals within the UoA areas, noting Westpac Bank is excluded from these specific procedures because measures relating to the impact of fishing on benthic biodiversity in this area are managed by SPRFMO. These measures include identifying Benthic Management Areas (BMAs) containing extensive aggregations or communities of epibenthic organisms such as corals and sponges, and a "Monitor, Pause, Survey and Assess (MPSA)" management framework, underpinned by a set of "trigger points" that, when reached, require management action. At the time of this first surveillance audit, these encounter protocols had been in place and working for two orange roughy fishing seasons. If coral or sponge bycatch triggers a towline pause, a sample of the coral is sent to a coral expert to determine the species and whether it is alive or dead. If it is verified as dead coral rubble only, the tow is unpaused. Otherwise it remains paused until video of the area can check whether there is a "VME-like" aggregation of benthic biota in the area. The buffer zones around paused towlines were modified in 2022 to better reflect the real position of the net during the tow.

	In addition, a coral and sponge identification guide and online quiz for crew has been developed and launched in order to improve identification of benthic biota. To date, four towlines on the Chatham Rise (one in NWCR and three in ESCR) have been paused due to triggering the encounter protocols. This evidence is sufficient to meet the first milestone for this condition.
Year 2 Action Plan expected output	DWG will provide annual progress reports demonstrating that the MPSA strategy is operational and is effective in mitigating the effects of fishing on coral habitats within the UoA areas.
Progress on Condition (Year 2)	The second (and third) milestones for this condition are that at the second and third surveillance audits, the client will provide a report of progress in meeting the condition. From March 2022 to September 2024, the MPSA strategy remained in place, and a total of 4 towlines were paused in the NWCR and ESCR fisheries. A record of trawl tows that yielded trigger-level coral catches is maintained by DWC, along with details on the locality, quantity of coral and the alive/dead status of the coral (Table 20). Table 20. Details of trigger-level towlines and paused towlines (red) in the NWCR Uoa and in ORH 3B ESCR to date. Source: DWG
Progress status	This condition is on target.
Remedial action	N/A
Additional information	N/A

Capture Date	Vessel	ORH3B UoA	Stat Area	Coral Catch (kg)	Tow start Lat	Tow start Lon	E/W	Tow end Lat	Tow end Lon	E/W	Target Species	Paused Y/N	Comments
29/11/21	*San Waitaki*	ESCR	412	3,000	44 27.382	174 52.451	W	44 27.522	174 52.250	W	ORH	N	Reported as dead coral rubble - not paused
03/01/22	*Amaltal Explorer*	ESCR	412	270	44 15.122	174 34.494	W	44 15.122	174 34.491	W	ORH	N	Reported as dead coral rubble - not paused
21/01/22	*Amaltal Mariner*	NWCR	404	4,000	42 48.936	179 11.582	W	42 47.780	179 13.113	W	BYX	N	Reported as dead coral rubble - not paused
07/03/22	*Amaltal Mariner*	NWCR	403	600	42 38.492	179 52.984	W	42 38.636	179 52.228	W	ORH	N	Reported as dead coral rubble - not paused
19/03/22	*Otakou*	NWCR	403	450	42 39.410	179 54.353	W	42 39.364	179 54.263	W	ORH	Y	Reported as live coral. Paused on 8/04/22
28/10/22	*San Waitaki*	ESCR	052	80	44 37.04	177 33.82	W	44 38.20	177 32.60	W	SSO	Y	Confirmed live coral. Paused on 3/11/22
25/11/22	*San Waitaki*	ESCR	412	118	44 30.67	174 49.30	W	44 30.70	174 48.35	W	ORH	N	Confirmed dead coral
01/12/22	*Amaltal Explorer*	ESCR	412	800	44 15.25	174 35.05	W	44 15.12	174 34.68	W	ORH	Y	Confirmed live coral. Paused on 5/12/22
19/06/23	*San Waitaki*	ESCR	404	109	42 46.82	177 13.41	W	42 46.84	177 13.09	W	ORH	N	Confirmed dead coral
23/06/23	*Rehua*	ESCR	404	50	42 47.77	177 13.84	W	42 47.738	177 14.273	W	ORH	Y	Confirmed live coral. Paused on 27/06/23
17/09/24	*Tasman Viking*	NWCR	403	200	42 40.518	180 38.22	E	42 40.512	180 38.28	E	ORH	N	Confirmed dead coral

5.3.2. Progress against recommendations

- Conducting a new assessment for the NWCR sub-area should be a priority. However, given the difficulties with making use of the age-composition data (especially if it is concluded that the differences in age-frequencies among years is due to sampling error), consideration should be given to applying simpler assessment methods (e.g. based on Bayesian surplus production models) that have the ability to fit the primarily data sources (catch and acoustic estimate of biomass) and provide the information needed to apply the harvest strategy (or management procedure).
- Consider collecting age data from the commercial fishery as well as the survey.
- The assessment process did not lead to an accepted assessment in 2023. Management of the fishery would benefit from “back up” approaches for providing advice for TAC setting as the rejection of assessments is not uncommon worldwide (Punt et al., 2020). Management jurisdictions such as the US New England and Mid-Atlantic regions must develop a ‘plan B,’ along with the proposed assessment in case the proposed assessment is rejected. The ‘plan B’ assessments are index-based, easy to compute, and theoretically require little review once agreed upon (NEFSC, 2017). This ‘plan B’ approach was developed to define roles, responsibilities and process in cases when assessment working groups or review panels deem that a stock assessment is

insufficient or inappropriate, and empirical approaches are required to provide management advice. The approaches used in the 'plan B' should be MSE-based.

Progress update 2024: Research on the self-suspended ORH 3B ECSR assessment was initiated during 2024 based on population dynamics models that are simpler than those used in previous stock assessment but that are sufficient support application of the harvest strategy.

- The probabilities included in the report of the Stock Assessment Plenary were qualitative and reflected both the results of the quantitative stock assessment and expert option. The interpretation of these probabilities would be enhanced by text that more clearly reflects the logic that led to the final probabilities. In addition, reporting probability ranges that better match those referred to in the MSC Standard would enhance the ability to evaluate stock status relative to PI 1.1.1.
- The next full assessment should explore the impact of higher ages at maturity and older plus group ages in the models considered for the assessment.
- The next assessment for ORH 7A should explore the issues that led to the rejection of the assessment of ESCR, in particular whether recent survey estimates of abundance, length-frequencies and age-compositions are consistent with the results of the 2019 assessment. The next assessment for ORH 7A should also analyze (ideally standardize) the CPUE data for the fishery.

5.4. Client Action Plan

N/A No updates to the CAP. However, the self-suspended ESCR UoA was published as an In-Transition to MSC (ITM) fishery on the MSC's track-a-fishery page on 20 December 2023.

6. Appendices

6.1. Evaluation processes and techniques

6.1.1. Site visits

A remote site visit was held from 17-18 December, 2024. The purpose of these meetings is for the assessment team to receive information from fishery representatives, government management agencies, non-governmental organizations, and other interested stakeholders. Thirty days prior to the surveillance audit, all stakeholders from the previous full assessment and parties to other related assessments, and others having expressed interest in this assessment, were informed of the meeting and the opportunity to provide information to the auditors in advance of, or during, the meeting. The following participants were in attendance:

Name	Organization
Amanda Stern-Pirlot	MRAG Americas, Assessment Team
Andre Punt	Assessment Team
Aaron Irving	Deepwater Council, Fishery client
Tanayaz Patil	Deepwater Council
Geoff Tingley	Gingerfish Ltd.
Robert Tinkler	Fisheries New Zealand (FNZ)
Matt Dunn	NIWA
James Andrew	FNZ
Ben Steele-Mortimer	FNZ
Richard O'Driscoll	NIWA

The following agenda was followed:

17 December 2024

08:30-Opening meeting with client and assessment team

09:00-Discussion on the state of the fishery the past year and any areas of concern

11:00-Labor declaration and traceability update

11:15-Changes to personnel

11:30-Principle 1 discussion including 7A plenary report and stock assessment and approaches to ORH 3B ESCR assessment and survey.

18 December 2024

8:00-Principle 2 and Principle 3 topics

10:00-Closing meeting

6.1.2. Stakeholder participation

The assessment team received written comments from the Deep Sea Conservation Coalition (DSCC; see below), however they were unavailable for participation in the site visit. This appears together with assessment team responses after the letter from DSCC.

6.2. Stakeholder input

MRAG Americas received the following email and letter (reproduced in its entirety) from Karli Thomas on behalf of the Deep Sea Conservation Coalition.

Tēnā korua Amanda and Michealene,

Please see below and attached a letter and briefing outlining the Deep Sea Conservation Coalition's serious concerns about the state of the New Zealand orange roughy fishery, most recently shown in the stock assessment for ORH 7A which shows the stock is already below the management level set by the South Pacific Regional Fisheries Management Organisation(SPRFMO), even under the most optimistic of the model runs. If the most recent data is included it could be as low as 16% already. None of the options presented to the Minister for consideration for the 2024/25 fishing year would see any increase in the population in the next five years, most would see it decline further.

As we brought to your attention last year, the orange roughy fishery is also responsible for over half of the coral bycatch that occurred in Aotearoa in a recent 13-year period, most of which are protected species under the New Zealand Wildlife Act, and indicator taxa of vulnerable marine ecosystems under SPRFMO.

The continued certification of this fishery is putting orange roughy, and its ancient and fragile ecosystem, at risk. We note the 2024 surveillance audit has been postponed and no date set yet, and that the main part of the certification (over 70% by volume) was already self-suspended in 2023. Please update us when the audit will occur.

It is time for the MSC and its Assessors to stop endorsing further damage to deep-sea ecosystems, orange roughy populations and their own credibility, and suspend the certification in its entirety.

Regards,

Karli

--

Karli Thomas

Deep Sea Conservation Coalition

Aotearoa ~ New Zealand (GMT+12)

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5 September 2024

Mr Matt Watson
Senior Fisheries Program Manager, Asia Pacific
Marine Stewardship Council

By email: matt.watson@msc.org

MSC must urgently suspend the NZ orange roughy sustainability certification

Tēnā koe Matt,

Following evidence of another orange roughy stock in decline, disappearance of spawning aggregations, disturbance to spawning habitats such as seamounts, and ongoing damage to deep sea life from bottom trawling the Deep Sea Conservation Coalition is strongly and urgently recommending that **the Marine Stewardship Council (MSC) urgently suspend the remainder of the New Zealand orange roughy certification**. The major part of the certification (over 70% of the MSC catch in 2021-22) was self-suspended in 2023.

A recent stock assessment reveals critical concerns about the orange roughy population in the Tasman Sea west of New Zealand, a 'straddling stock' that occurs partly in NZ waters and partly in the high seas (ORH 7A and the Southwest Challenger / Westpac Bank). The population is below management targets and projected to decline further over the next five years. Around 25% of the MSC certified orange roughy catch in 2021-22 was trawled from this area.

Fisheries New Zealand's June 2024 stock assessment relies on old data and selects the most optimistic estimate and projections, but these are still below the relevant management range. The exclusion of the latest survey data potentially masks the true extent of the population decline. If the 2023 survey data *is* considered in the assessment, population modelling suggests the stock could already be as low as 16% of its unfished biomass and, under current catch limits, could fall to 10% in the next five years.

New Zealand's management of this fishery fails to apply the precautionary principle or ecosystem approach, putting this very low productivity species and its ancient and fragile ecosystem at further risk. Last year's ministerial decision on another orange roughy fishery (based on a stock assessment also showing population decline and the disappearance of spawning aggregations) is now being legally challenged for inadequate management.

Orange roughy is bottom trawled from seamounts, and the fishery is responsible for over half of the coral bycatch in New Zealand waters from 2007/8 to 2019/20.

Major issues with this, and other, orange roughy fisheries:

- The ORH 7A and Westpac Bank straddling stock is below the relevant management targets and none of the proposed responses would see any increase in the next five years.
- Unless catch limits are reduced by over half, the population will decline. Even if catch limits are reduced by 57%, there will be no recovery in the next five years.
- The orange roughy fishery is responsible for about half of all coral bycatch in New Zealand, and this fishing area includes hotspots of coral diversity identified by the government.
- Seamounts and features are being trawled, despite being home to vulnerable marine ecosystems and protected corals, and habitats of particular significance to orange roughy.
- Coral ecosystems can be reduced to rubble in just a few trawls, and while recovery may be possible, it only begins after multiple decades.
- Orange roughy spawning aggregations have disappeared from heavily trawled seamounts and the only aggregation found in 2023 was on the Westpac Bank Area.

MSC must immediately suspend this fishery's "sustainability" certification

All modelling indicates the stock is below SPRFMO management targets and will stay there or decline further under the proposed management options. Spawning aggregations have disappeared in-zone, fragile ecosystems are still being impacted by bottom trawling, and NZ has so far failed to apply the precautionary approach and the ecosystem approach. The Marine Stewardship Council (MSC) must suspend the entire New Zealand orange roughy certification to avoid putting the species and its habitat at further risk.

Yours sincerely,

Karli Thomas.

Karli Thomas
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NZ orange roughy must not be labelled "sustainable"

The Marine Stewardship Council certification of New Zealand orange roughy must be suspended in its entirety

September 2024

This briefing to the Marine Stewardship Council (MSC) is regarding the certification of New Zealand (NZ) orange roughy fisheries. It summarises the latest scientific findings showing that the straddling stock of orange roughy on the South-west Challenger Bank area of the Tasman Sea is below the management range set out by the South Pacific Regional Fisheries Management Organisation (SPRFMO) and is projected to decline further over the coming five years in all modelling.

This is history repeating itself: the stock was fished to collapse in the 1990s and closed for a decade. The current decline follows over-optimistic stock assessments resulting in orange roughy catch limits, including for this stock (referred to in New Zealand management as ORH 7A), being ratcheted back up to levels the populations cannot sustain.

These concerns about the ORH 7A orange roughy population add to fundamental issues with the method of the fishery: bottom trawling on spawning aggregations of extremely long-lived fish which can live to over 200 years on seamounts and similar features that are known to be hotspots of deep sea biodiversity, including vulnerable marine ecosystems and protected coral species. Those corals can live for even longer still, hundreds of years or even millenia.

People expect more from seafood certifications. Vague promises of future improvements are not adequate. We note that another stock (Northwest & South Chatham Rise) within this unit of certification was already self-suspended from the MSC scheme last year on the basis of evidence showing a declining population, as opposed to the recovery predicted by previous stock assessments. We urge the MSC and its assessors to immediately suspend the remainder of the New Zealand orange roughy certification. It's a fishery that should never have been certified in the first place.

- The ORH 7A and Westpac Bank straddling stock is below the relevant management targets and none of the proposed responses would see any increase in the next five years.
- The orange roughy fishery is responsible for over half of all coral bycatch in New Zealand, and ORH 7A includes areas identified as hotspots of coral diversity.
- Seamounts and features are being trawled, despite being home to vulnerable marine ecosystems and protected corals, and habitats of particular significance to orange roughy.

- Coral ecosystems can be reduced to rubble by as few as ten trawls. Orange roughy spawning aggregations have disappeared from heavily trawled seamounts.

Orange roughy population is below the relevant management targets or ranges

In June 2024 Fisheries New Zealand (FNZ) published a new stock assessment for orange roughy ORH 7A, a straddling stock under shared management by the NZ government and SPRFMO. The Deep Sea Conservation Coalition (DSCC) raised a number of concerns about that stock assessment (see attached submission). Essentially, its overall findings were of a stock predicted to decline over the next five years - not the recovery predicted by previous stock assessments - with spawning aggregations not found in areas where they have historically been present.

Fisheries New Zealand selected the most optimistic of the three model runs for the base case (which meant ignoring the most recent survey data from 2018 and 2023 and relying on survey data at least a decade old). Even under the most optimistic model run, the spawning stock was assessed at 35% of unfished biomass (B_0). This means the stock is:

- Below the 45%+ B_0 target for 'very low productivity' species set out in the New Zealand Harvest Strategy Standard operating guidelines.
- Below the management parameters of the Southwest Challenger area set out in SPRFMO CMM 03a-2023, which specify maintaining the stock *"at or above 40% B_0"*.
- Well below the 60% B_0 target for orange roughy in Australia, the other country that has an allocation in the high seas part of this fishery.

In 2023 SPRFMO agreed a conservation and management measure for deepwater species (CMM 03a-2023).[1] This sets out the estimated annual yield for the Southwest Challenger Plateau, which includes the New Zealand fishery ORH 7A and the SPRFMO fishery in the Westpac Bank Fisheries Management Area (FMA), as 2,448 tonnes, and the allocation for the high seas part of that at 258 tonnes, based on the assumption of 12.5% of the stock occurring in that area. That 258 tonnes is allocated to New Zealand and Australia, split 95% and 5% respectively.

> *"Consistent with the report of the 7th meeting of the Scientific Committee, Members and CNCPs acknowledged that* ***to maintain the Southwest Challenger Plateau orange roughy stock at or above 40% B_0 for the next five years,*** *the estimated annual yield was calculated to be 2,448 tonnes."*
>
> *"The total catch of orange roughy in Westpac Bank shall be* ***limited to 258 tonnes*** *(based on the assumption that 12.5% of the Southwest Challenger Plateau biomass resides in the Westpac Bank area) in each of the, 2023, 2024 fishing years"*[1]

[1] SPRFMO CMM 03a-2023 Paragraphs 9 and 10

The latest assessment by FNZ was published in the 2024 May Plenary Report.[2] This clearly places the stock below the SPRFMO management reference point. None of the management options outlined by FNZ in its June 2024 discussion paper in NZ would see the population increasing over the next five years, let alone returning to the SPRFMO management level.[3] Only a catch limit reduction down to 43% of the current catch limit (TACC) would prevent further decline in the stock over the next five years, under the most optimistic model run.

If the most recent acoustic survey is considered in the assessment, the picture becomes much worse. The model run "All6" includes the most recent survey data (from 2023) and indicates that the stock may already be down to 16% B_0 (see table 5 p 962) and would decline even further over the next five years if fishing is continued at any of the levels it was projected at (see table 6 p 963).[2] Under this model run, there is a 0.71 probability (71%) that the biomass is currently below the NZ soft limit of 20% B_0[4] and at the current TACC the stock will continue to decline to 10% B_0 over the next five years.

FNZ continues to refer to the "default" management targets (30-50% B_0) rather than following the operational guidelines for the NZ Harvest Strategy Standard. These guidelines outline a "very low productivity" category for certain stocks, e.g. those with mortality (M) < 0.1 and/or time to maturity (t_{mat}) > 15. Orange roughy is clearly a very low productivity stock, with natural mortality well below 0.1 (for ORH 7A the default value for M is 0.045 and estimated levels in the 2024 stock assessment range were even lower, between 0.024-0.033). The age at maturity is well above 15 years (for ORH 7A the age at 50% maturity A_{50} is about 34 years). The operational guidelines recommend a target biomass of ≥ 45% of unfished biomass B_0 for very low productivity species. This is not being followed, nor even considered, in the proposed management options for ORH 7A.

Significant habitats not protected, spawning aggregations not found

The latest acoustic survey for ORH 7A found no spawning aggregations in the in-zone areas they have previously been found. This builds on growing evidence that seamounts and features are habitats of particular significance for orange roughy, as spawning areas, and that heavy trawling and overfishing on seamounts and features may lead to the long-term loss of spawning aggregations from locations where they historically occurred.

These lost spawning aggregations include Ritchie Bank (ORH 2A South), Strawberry Mountain (mid-East Coast), Spawning Box (Chatham Rise) and Graveyard Hill (Northwest Chatham Rise). The 2022 Plenary Report (Volume 2) noted: *"the implications of the loss of spawning aggregations for orange roughy and the wider ecosystem, should be investigated".*[5]

[2] Fisheries Assessment Plenary May 2024 Volume 2: ORH 7A
[3] Fisheries New Zealand Discussion Paper 2024/16
[4] Noting that Australia uses 20% as a hard limit reference point
[5] Fisheries New Zealand (2022)

Protecting habitats of particular significance for fisheries management is a requirement under the Fisheries Act, and while Fisheries New Zealand repeatedly refers to seamounts and features as "potential habitat of particular significance" it refuses to treat them as such, and has not taken any steps to protect those habitats.

Precautionary principle not followed

As outlined above, orange roughy is not being managed according to the precautionary principle, even as far as applying the appropriate management parameters for a very low productivity stock. The New Zealand government is failing to implement the precautionary principle and ecosystem approach required under both New Zealand law, the SPRFMO Convention, the UN Fish Stocks Agreement, and other international agreements..

A recent study (Edgar et al, 2024) indicated that, globally, stock assessments tend to have a positive bias which can indicate "phantom recovery" of overfished stocks. That study found that *"85% more stocks than currently recognized have likely collapsed below 10% of maximum historical biomass"* and *"66% had positive assessment bias, indicating that the full extent of biomass depletion was not known when management actions were considered."*[6]

Precaution must be applied, especially given the uncertainties in this assessment. Issues include: the most pessimistic results in current biomass (16% B_0 in 2024) occurred in the model run using the latest acoustic results (2018 and 2023); the ongoing decline in biomass is predicted in all three model runs at current catch levels, and no spawning aggregations were found in zone. None of the options set out by Fisheries New Zealand are adequate to address these issues.

Ecosystems being harmed

A recent study of coral bycatch in New Zealand fisheries found bottom trawling was responsible for 99% of reported bycatch of protected corals for the period 2007/8 to 2019/20. The orange roughy fishery had the worst impact, accounting for more than half the reported catch of protected corals (112.7 tonnes over the reporting period).[7]

It is also very well established that the amount of coral that comes up in a net represents only a small proportion of the amount that is damaged or destroyed on the seabed (known as 'catchability' where the lower the level of catchability the more that bycatch in the net underestimates damage on the seabed). A review of catchability estimates including new video/trawl comparisons found for most vulnerable marine ecosystem indicator taxa less than 4% of what was impacted on the seabed came up in the net as bycatch.[8] This means that seabed

[6] G.J. Edgar *et al* (2024)
[7] Meyer, S. (2023)
[8] Stephenson, F. *et al.* (2022)

damage is orders of magnitude higher than the volume of coral or other taxa brought up in the net and reported as bycatch.

A recent management decision for orange roughy is subject to legal challenge

Last year the MSC's assessor, MRAG Americas, audited the recently-recertified orange roughy bottom trawl fishery. At that time, similar worrying signs were emerging from ORH 3B on the Chatham Rise. With previous stock assessments declared invalid and no new assessment possible for the main sub-stock, the fishing industry self-suspended part of its certification. At that time it was incorrectly communicated by MRAG Americas that the industry supported the Minister's decision to reduce the catch limit by 50%, despite industry submissions (available online) opposing this level of reduction.

Although the previous Minister opted for the largest reduction in catch limits, all the options put to her were flawed and insufficiently precautionary. The 2023 decision on ORH 3B is now subject to judicial review. According to a claim filed by the Environmental Law Initiative (ELI)[9] the Minister:

- *failed to take into account the best available information on the trawl footprint for orange roughy;*
- *failed to consider how the adverse effects of bottom trawling could be avoided, remedied, or mitigated;*
- *failed to protect habitats of significance, such as seamounts where many species congregate for spawning and shelter;*
- *should have considered the total allowable catch controls for other species in the area, in line with considering the ecosystem as a whole.*[8]

Meanwhile, a raft of lawsuits in the US seeks to call the seafood industry to account for misleading claims about the sustainability of the fish that they sell.[10] New Zealand is now the only country still bottom trawling seamounts in the South Pacific, and the ORH 7A fishery is a part of that shameful legacy. While the MSC continues to award its blue tick of so-called sustainability to one of the most destructive fisheries in the South Pacific, it condones ongoing environmental destruction, rewards inadequate fishery management and undermines its own credibility.

The MSC must respond to this new information by immediately suspending the sustainability certification of the remainder of the New Zealand orange roughy bottom trawl fishery, or it will be complicit in misleading consumers about the state of a fishery that is clearly far from sustainable.

[9] Environmental Law Initiative (2024)
[10] White, C. (2024)

Assessment Team Response

The assessment team reviewed the recent work conducted at SPRFMO, including stock status relative to management reference points and research related to the performance of stock assessment methods for orange roughy in the SPRFMO area. The ORH 7A stock is assessed to be within the management target range for New Zealand orange roughy of 0.3-0.5B_0. This management target range differs from management targets in other areas but was based on analytical work specific to orange roughy (a Management Strategy Evaluation developed specifically for New Zealand orange roughy) and is hence considered to be more robust compared to the proxies for stocks in other countries and the defaults in the New Zealand Harvest strategy Standard. The projections for the selected base model (All6) indicate that the stock will remain in the management target range and be stable for the other model runs (currently considered less likely). The next assessment should provide additional information on trends in stock status and form the basis for revising the TACC, if this is needed.

6.3. Revised surveillance program

No change to the surveillance program. The next (3rd annual audit is scheduled to be off-site, and the surveillance level is still 4. See MRAG Americas (2022) for details.

6.4. Harmonised fishery assessments

Overlapping fisheries

Fishery name	Certification status and date	Performance Indicators to harmonise
New Zealand Hoki, Hake and Ling Trawl Fishery	Certified since September 2018 under FCR v 1.3	Principle 3 for 3.1.1-3.1.3

Overlapping fisheries

Supporting information	
- Describe any background or supporting information relevant to the harmonisation activities, processes and outcomes.	
Harmony exists between the P3 assessments for these fisheries.	
Was either FCP v2.2 Annex PB1.3.3.4 or PB1.3.4.5 applied when harmonising?	**No**
Date of harmonisation meeting	**NA**
If applicable, describe the meeting outcome	
- e.g. Agreement found among teams or lowest score adopted.	

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