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**MSC 2<sup>nd</sup> Annual Surveillance Report**  
*for*  
**New Zealand Orange Roughy Fishery**

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January 28, 2019

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**Certificate No.: MRAG-F-059**

**MSC reference standards:**  
MSC Standards Version 1.1  
MSC Certification Requirements Version 1.3  
MSC Guidance for Certification Requirements Version 1.3  
MSC Process Certification Requirements Version 2.0

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## 1. General Information

Fishery name	New Zealand Orange Roughy		
Unit(s) of assessment	ORH 3B NWCR, ORH 3B ESCR, ORH 7A		
Date certified	8 December 2016	Date of expiry	7 December 2021
Surveillance level and type	On-site surveillance		
Date of surveillance audit	November 28-29, 2018		
Surveillance stage (tick one)	1st Surveillance		
	2nd Surveillance		X
	3rd Surveillance		
	4th Surveillance		
	Other (expedited etc.)		
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## 2. Background

This report contains the findings of the 2<sup>nd</sup> surveillance cycle in relation to the New Zealand Orange Roughy Fishery and contains an update on the fishery since the 1<sup>st</sup> surveillance audit.

**Table 1a Catch Limits and Catch Data ORH 3B NWCR**

Catch Limit (including agreed shelving and ACE carry-over*)	Year	2017-18	Amount	1,116
UoA share of Catch Limit	Year	2017-18	Amount	1,116
UoC share of Catch Limit	Year	2017-18	Amount	1,116
Total green weight catch by UoC	Year (most recent)	2017-18	Amount	724
	Year (second most recent)	2016-17	Amount	646 mt

\* Catch limit of 1,250 t reduced to 1,043 t due to quota owners' agreement to shelve 207 t. Final catch limit of 1,116 t due to 2016-17 under-fishing allocations, where up to 10% of uncaught ACE may be carried forward to the next year.

**Table 1b. Catch Limit and Catch Data ORH 3B ESCR**

Catch Limit (including ACE carry-over*)	Year	2017-18	Amount	3,193
UoA share of Catch Limit	Year	2017-18	Amount	3,193
UoC share of Catch Limit	Year	2017-18	Amount	3,193
Total green weight catch by UoC	Year (most recent)	2017-18	Amount	3,328
	Year (second most recent)	2016-17	Amount	3,300 mt*

\* If not caught, up to 10% of ACE may be carried forward to the next year.

**Table 1c. TACC and Catch Data ORH 7A**

TACC (including ACE carry-over*)	Year	2017-18	Amount	1,618
UoA share of TACC	Year	2017-18	Amount	1,618
UoC share of TACC	Year	2017-18	Amount	1,618
Total green weight catch by UoC	Year (most recent)	2017-18	Amount	1,601**
	Year (second most recent)	2016-17	Amount	1,623 mt*

\* If not caught, up to 10% of uncaught ACE may be carried forward to the next year.

\*\* This amount of 1,601 t is the commercial catch caught against ACE. In 2017-18 an MPI Special Permit was also provided for 205 t of orange roughy to be taken for research survey purposes.

## 2.1. Changes to Management systems

No substantial changes in the management system have occurred that would adversely affect the certification of the orange roughy resources. A newly elected government has separated the fisheries portfolio (now Fisheries New Zealand, FNZ) from other primary industries within the Ministry for Primary Industries (MPI) (see Section 2.3); this change is intended to raise the profile for fisheries.

### 2.1.1 Management planning

The Public Certification Report identified an area that fell behind schedule: updating the National Deepwater Fisheries Plan (National Deepwater Plan). The National Deepwater Plan provides an integrated, transparent way of defining management objectives, actions, and services required to meet relevant legislative obligations and strategic directions for managing New Zealand's deepwater fisheries. The plan also provides a reporting mechanism to measure progress towards meeting objectives. The purpose of national fisheries plans is to provide clear management objectives to support the purpose and principles of the Fisheries Act 1996 and to identify key deliverables for MPI over the medium term (5 years). Work on the revision began in 2016, with consultation on a draft Plan in July and August 2017 <https://www.mpi.govt.nz/news-and-resources/consultations/national-fisheries-plans-for-highly-migratory-species-and-deepwater-fisheries/>. The draft plan remains in review at Fisheries New Zealand (FNZ). Comments during consultation substantially supported the plan and recommended moving it to implementation. The last public update on status of the National Deepwater Plan was September 2017, plus at the most recent Fish Plan Advisory Group meeting in November 2018 attended by industry, iwi, NGO, science and government representatives. Once the National Deepwater Plan is published, the fishery-specific chapters will then be updated including the chapter for the orange roughy and oreo fisheries complex.

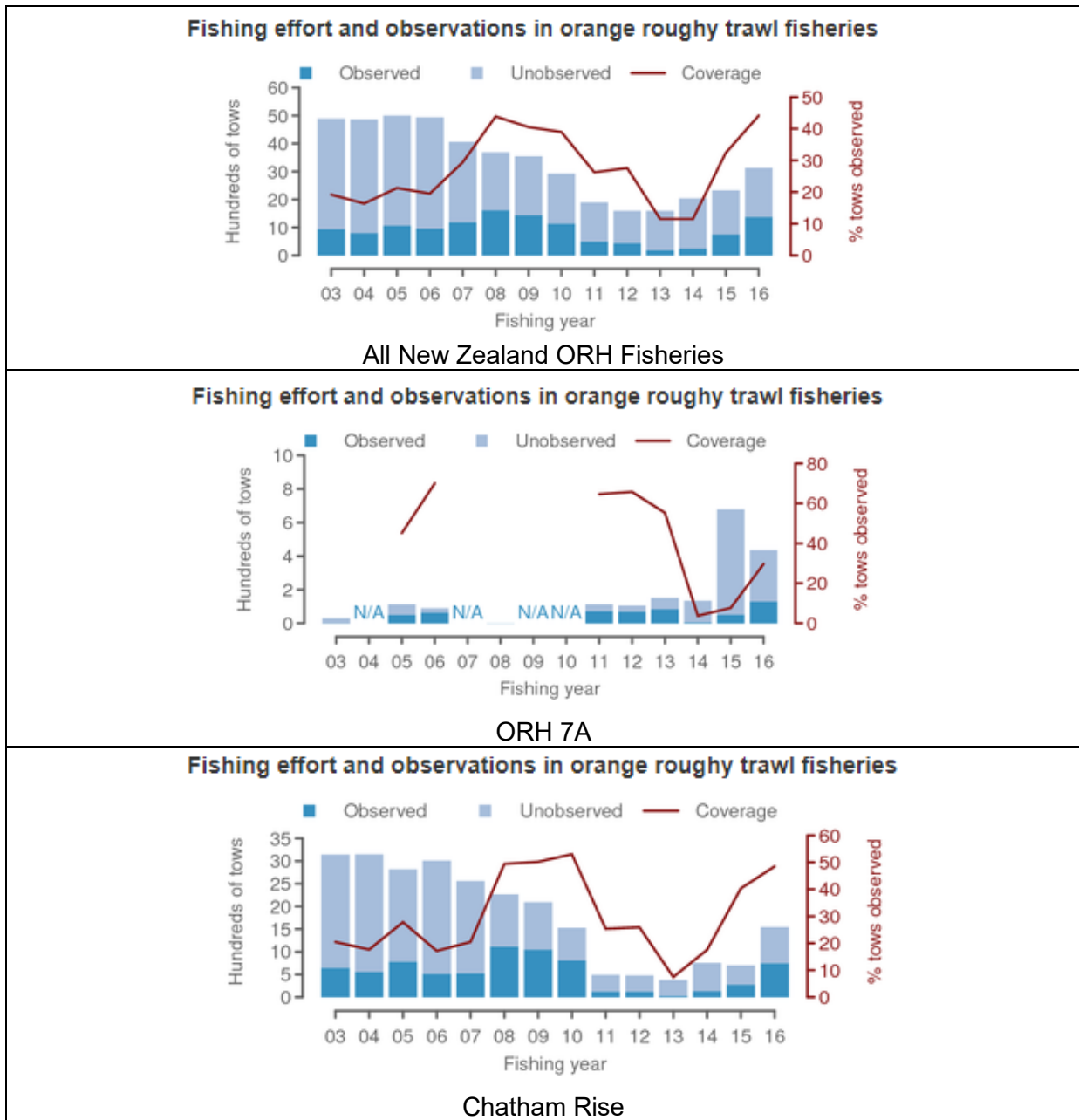
### **2.1.2 Research planning**

MPI published the medium-term research plan (MTRP) for 2018/19 - 2022/23 <https://www.mpi.govt.nz/dmsdocument/21746>. The MTRP is intended to reflect research needs to inform management of New Zealand's deepwater fisheries.

Research needs in this MTRP are based on the longer-term planning that has previously been consulted on with stakeholders, but not provided publically with descriptions, context and rationale for the planned work. The MTRP remains a living document and will be updated regularly to reflect changes in management priorities where these occur, and identification of new areas of research. Annual research plans, as guided by the MTRP, are consulted on publicly and through the Fish Plan Advisory Group attended by industry, iwi, scientists and NGOs. These plans and their progress are reported in the Annual Operational Plans (AOP) and Annual Review Reports for deepwater fisheries. The 2018-19 AOP describes proposed research in section 9.3.1.

### **2.1.2 Observer coverage**

At the time of the Public Certification Report, observer coverage in the 2014 orange roughy fishery had dropped to the lowest levels in the historical coverage pattern consequent to a priority reallocation of observers onto Foreign Charter Vessels (as orange roughy fisheries are fished by domestic vessels only). Stakeholders expressed concern that the observer coverage at the time of certification no longer provided sufficient information to support management objectives. While observer reported maturity data for orange roughy are used to assist in the research planning of some surveys, little or no observer-derived information is used in the stock assessments for these fisheries and low seabird and marine mammal incidental capture rates also do not support extensive observer coverage. MPI consultations with the assessment team demonstrated intent to increase coverage in following years. MPI and the Department of Conservation (DOC) consult to distribute the available observer days: MPI prioritizes fisheries coverage and DOC prioritizes protected species coverage (MPI, T. Bock, pers. comm.). As a result of the low level of protected species interactions in the orange roughy fisheries, the DOC share of coverage is  $\leq 10\%$  of the coverage. Coverage levels in 2015 and 2016 underwent substantial increases, from 2013-14 to 30 to 50% coverage in 2015-16 (Figure 1). Orange roughy fisheries as a whole in New Zealand had 50% observer coverage in 2016-17 (Fisheries New Zealand 2018). Note that years with no observer coverage in ORH 7A coincide with closure of the fishery to provide rebuilding during the period 2000 to 2011, the observer coverage in 2005 and 2006 was of research tows. All demersal fishing, including for orange roughy, on the Westpac Bank has to have 100% observer coverage.



**Figure 1 Historical trends in observer coverage from 2002-03 to 2015-16 in the New Zealand orange roughy fisheries of all New Zealand ORH (top) ORH 7A (middle) and ORH 3B Chatham Rise (bottom). Source: <https://psc.dragonfly.co.nz/2017v1/released/>.**

For the 2016-17 financial year, Table 2 gives the targeted vs actual number of observed tows in the deepwater fisheries by area, including ORH 3B (Chatham Rise UoAs) and ORH 7A (Fisheries New Zealand 2018).

**Table 2. Observer days planned vs delivered for the Chatham Rise Deepwater and West Coast Deepwater fishing complexes in the 2016-17 financial year.**

Fishery complex	Target stocks covered	Total days planned	Total days delivered	% delivery of planned days
Chatham Rise Deepwater	ORH3B OEO3A, OEO4 BYX3	270	146	54%
West Coast Deepwater	ORH7A	70	62	89%

MPI (T. Bock pers. comm.) reported that higher priorities in other fisheries (e.g., monitoring of yelloweye penguin interactions in other fisheries) caused the diversion of observers from the planned deployment from the deepwater fisheries in 2016-2017. The 2018-2019 AOP described the 2018-2019 observer monitoring plan and noted that foreign-owned vessels require 100% observer monitoring and that domestic monitoring is discretionary. The 2018-2019 AOP notes that the observer schedule for 2018-2019 calls for 220 days planned for the Chatham Rise Deepwater fishery complex and 60 days for the West Coast Deepwater fishery complex.

### 2.1.3 Enforcement

The MRAG assessment team discussed general enforcement issues, including performance against the MSC performance indicator for enforcement (PI 3.2.3) and specific areas of compliance risk to monitor in 2019 with Simon McDonald, MPI Fisheries Compliance. MPI subsequently summarized key elements of the enforcement programme and plans for improvement that the assessment team reported on in the first surveillance report. We note that items 7 to 11 of that report are identified risks of non-compliance and not confirmed breaches in compliance.

Mr. McDonald noted that the risks identified last year still exist, but have not been fully evaluated. He stated that the risk for the deepwater fisheries is not perceived as high, which allowed enforcement time to shift in 2018 to preparation for a new enforcement emphasis based on digital monitoring regulations passed in 2017 and to be fully implemented in 2019. Mr. McDonald noted that increased demands from digital monitoring led to approximately doubling of the MPI enforcement programme.

New regulations and monitoring requirements for New Zealand fisheries call for a digital system for tracking, monitoring and reporting of commercial fishing (<https://www.mpi.govt.nz/protection-and-response/sustainable-fisheries/strengthening-fisheries-management/fisheries-change-programme/digital-monitoring-of-commercial-fishing/>).

The digital monitoring system is made up of:

- electronic catch reporting via an e-log book – to give better and more timely information on commercial catch and effort;
- electronic position reporting – to verify (when used with electronic catch reporting) where and when fishing happened; and
- on-board cameras – to verify what is being reported.

The aim is to:

- maximise the recreational, customary, commercial, and environmental value of New Zealand's fisheries;

- give New Zealanders, and consumers from around the world, confidence that fish from New Zealand waters are being managed and caught sustainably; and
- allow Fisheries New Zealand to verify information being reported and encourage compliance.

It should be noted that the deepwater fleet (including those vessels catching orange roughy) have already implemented position reporting since 1994 and electronic reporting since 2010. These data are transmitted to MPI to monitor fishing activity. The new system, however, provides MPI faster (daily) access to data, which will provide greater opportunity to target compliance risk, and as a consequence further reduce the potential for unreported catch and area misreporting.

The Minister of Fisheries is considering options for the implementation of on-board cameras and no decisions have been made yet. Therefore, an exemption from complying with Part 1 of the Fisheries (Electronic Monitoring on Vessels) Regulations is in place such that permit holders and vessel masters are not required to install or operate cameras on fishing vessels until 31 January 2019. Further work is required before cameras can be introduced, including clarifying camera specifications and how they can be introduced.

The MRAG assessment team concludes that enforcement continues at a high level for the orange roughy fishery.

## **2.2. Changes to Relevant regulations**

See Section 2.1.3 Enforcement for relevant regulation changes.

## **2.3. Changes to personnel involved in science, management or industry**

The re-organization of the Ministry for Primary Industries (MPI) to raise the profile of fisheries, as reported in the first surveillance report, was finalized in 2018. Fisheries New Zealand (FNZ) was established as a branded business unit within MPI, with FNZ now consisting of four Directorates:

- Fisheries Management
- Fisheries Science and Information
- Digital Monitoring
- Aquaculture and Branch Support.

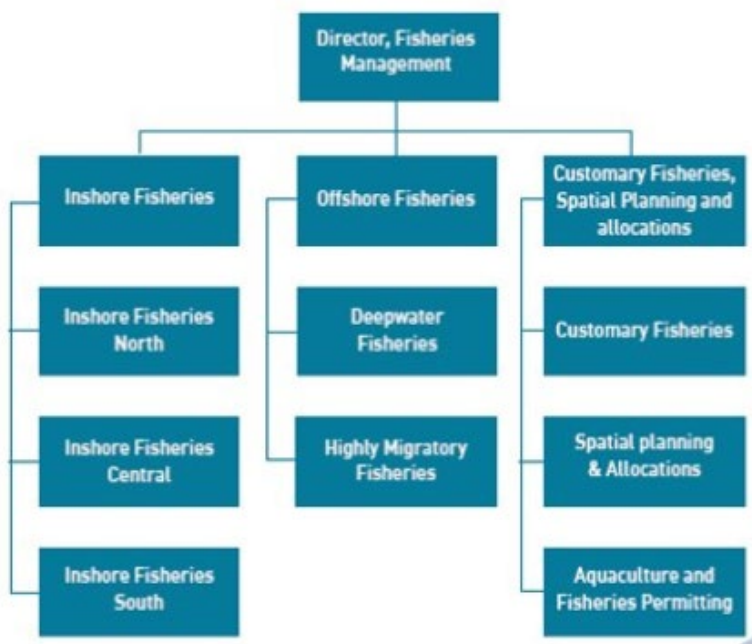
Dan Bolger is Deputy Director General of MPI and head of FNZ. Stuart Anderson is Director of Fisheries Management.

The Fisheries Management Directorate has the responsibility to carry out the full range of statutory regulatory functions, duties, and powers to manage New Zealand's fisheries resources, including:

- analysis and advice related to allocation decisions (catch limits and allowances) that allow for the sustainable utilisation of our fisheries resources;
- analysis and advice on applications for use of marine space;
- development and implementation of national standards, National Plans of Actions (NPOAs), National Fisheries Plans, and all other aspects of the operational policy framework for fisheries management; and
- negotiation of agreements with Tangata Whenua seeking fisheries redress, and development, implementation and operation of customary fishing regulations.

The Fisheries Management Directorate has three subdivisions consisting of eight teams (Figure 2), including the Deepwater Fisheries Team headed by Tiffany Bock.





**Figure 2 Organogram for Fisheries Management Directorate (Source: MPI).**

The 2017 stock assessment for ORH 3B NWCR and ESCR was conducted by M.R. Dunn and I.J. Doonan from NIWA. MPI selected NIWA to provide a fresh look at the previous assessment conducted previously by P.L. Cordue. The stock assessment was reviewed in the same way by the same MPI-led Science Working Group (DWFAG).

The CEO of the Deepwater Group, George Clement, and the Sustainable Fisheries Manager, Sharleen Gargiulo, have remained in place.

None of these changes in personnel or organization pose any threat to the integrity of the certification.

## **2.4. Changes to scientific base of information – including stock assessments**

### **2.4.1 Principle 1**

A Management Strategy Evaluation (MSE) conducted in 2014, which defined a harvest strategy including limit reference points, target biomass range, and a harvest control rule, was described in the Public Certification Report (PCR). The MSE was reviewed by the MPI-chaired Deepwater Fisheries Assessment Working Group (DWFAG), which accepted the underlying science as meeting MPI's science standards, and thus suitability for application to orange roughy stocks, and was accepted by managers as a basis for setting the TAC and TACC on a case-by-case basis (MPI 2016). The 2014 MSE defined a harvest control rule (HCR) optimized for the characteristics of orange roughy. The objective of the HCR is to maintain the stock within the management target range (30-50%  $B_0$ ) whilst ensuring there is very low (zero) probability of the stock falling below the soft limit (20%  $B_0$ ). Under the HCR, catch limits are recommended dependent on the estimated stock status in relation to the management target range. Where a stock is estimated to be below the midpoint of the target range, recommended catch limits are lower than for a stock near the top of the target range.

#### 2.4.1.1 Updated stock assessments - general

A new stock assessment for ORH 3B was conducted during 2017 (Dunn and Doonan, 2018). The updated assessment had final peer-review in May 2018 (MPI, 2018a) and formed the basis for management advice and application of the HCR. No new assessment has been conducted for ORH 7A; the next stock assessment is scheduled for 2019.

#### 2.4.1.2 Updated stock assessments – ORH 3B

The ORH 3B assessment covered the fisheries in the NWCR and the ESCR. The NWCR biomass remains well within the management target range of 30-50%  $B_0$  (base model estimates 2017 stock status to be 38%  $B_0$ ). The ESCR biomass has increased in size and moved into the target range (base model estimates 2017 stock status to be 33%  $B_0$ ).

The assessment used the same biological parameters assumed for the ORH 3B Chatham Rise orange roughy stocks by Cordue (2014) and described by MPI (2018b). Maturity-at-age, trawl survey selectivity, and fishery selectivity (ESCR only) were estimated in the models. New length-at-age data were available but were not used in the assessment to update the growth parameters but were included to infer changes in year-class strength. The new data in the assessment were (a) catches since the last assessment, (b) a 2014 acoustic estimates of biomass for the ESCR, (c) 2016 acoustic estimates of biomass for the NWCR and the ESCR, and (d) 2016 age-composition data. In addition, the acoustic estimates of biomass from 2013 onwards were revised based on new snapshot selection criteria. To be included in the acoustic estimate, surveys had to be conducted during active spawning activity. In addition, some snapshots were excluded because the resulting biomass estimate was unlikely (i.e., because a biomass estimate was considered “too high” or “too low”).

The assessment models for the NWCR and the ESCR followed Cordue (2014), and used an age-structured population model implemented in CASAL (Bull *et al.*, 2012), fitted to acoustic-survey estimates of spawning biomass, proportion-at-age data from a trawl survey and targeted trawling on a spawning aggregation, proportion-spawning-at-age from the same trawl survey, and length frequencies from the commercial fishery.

##### 2.4.1.2.1 Northwest Chatham Rise

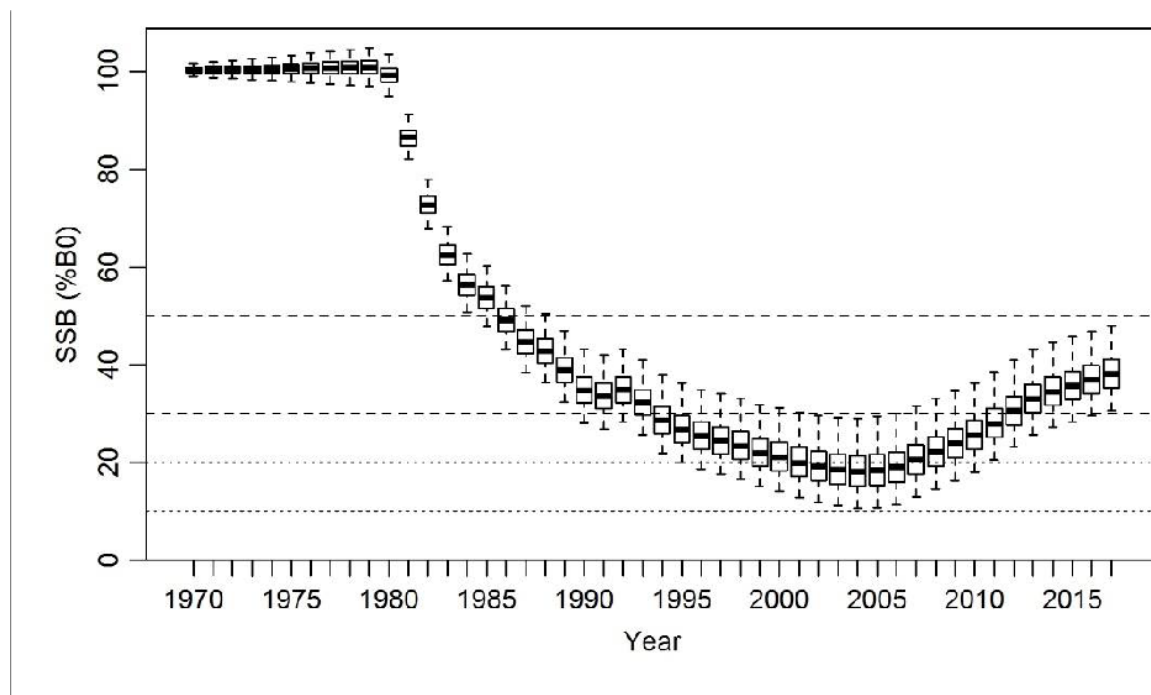
In the base model, the acoustic estimates from 1999, 2012, 2013, and 2016 were used, and the age-composition from 2016 was excluded because the fit was poor when the 2016 age-frequency was fitted assuming that the selectivity was equal to maturity, with the fit to the left-hand side of the distribution indicating that the age of selectivity was older than at maturity. There were four main sensitivity runs: add the extra acoustic data; the LowM-High $q$  and HighM-Low $q$  “standard” runs; and including the 2016 age composition with its own (logistic) selectivity. The model fitted the data well, but it over-predicted the 2016 acoustic estimate of spawning biomass.

Virgin biomass,  $B_0$ , was estimated (posterior median) to be between 64,000–67,300 t for all runs (Table 3). Current stock status was similar across the base and the first two sensitivity runs (Table 3). For the two “bounding” runs, where  $M$  and the mean of the acoustic  $q$  priors were shifted by 20%, median current stock status was estimated to be close to the lower bound, or upper bound, of the target range of 30–50%  $B_0$  (Table 3).

**Table 3 Northwest Chatham Rise, MCMC estimates of virgin biomass ( $B_0$ ) and stock status ( $B_{2017}$  as % $B_0$ ) for the base model and four sensitivity runs.**

	$M$	$B_0$ (000)	95% CI	$B_{2017}$	95% CI
Base	0.045	65.2	59.9–	38	31–48
Extra acoustics	0.045	64.0	60.0–	36	31–43
Include Morgue	0.045	65.1	58.6–	38	30–48
Low $M$ -High $q$	0.036	67.3	63.0–	29	23–36
High $M$ -Low $q$	0.054	65.5	58.2–	48	40–58

For the base model, there was a 98% probability that the stock was above 30%  $B_0$  in 2017. Therefore, for the base model, the stock was considered to be within the management target range of 30–50%  $B_0$ ; MPI 2011). For the sensitivity runs, the probability of being above 30%  $B_0$  in 2017 was 98% (Extra acoustics), 97% (Include Morgue C@A), 36% (Low  $M$ -High  $q$ ), and 100% (High  $M$ -low  $q$ ). The stock has continued to increase since the low point in the mid-2000s (Figure 3).

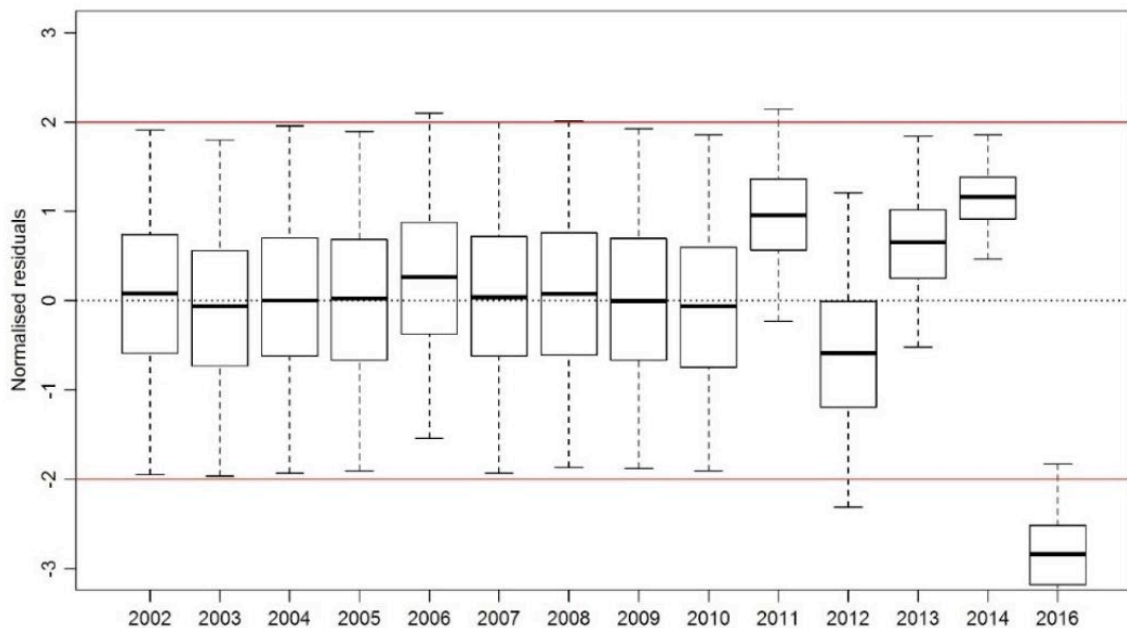


**Figure 3 Northwest Chatham Rise base, MCMC-estimated spawning-stock biomass trajectory. The box in each year covers 50% of the distribution and the whiskers extend to 95% of the distribution. Dotted lines indicate the hard limit (10%  $B_0$ ) and soft limit=LRP (20%  $B_0$ ), dashed lines the biomass target range (30–50%  $B_0$ ).**

#### 2.4.1.2.2 East and South Chatham Rise

The base model followed the previous assessment (Cordue, 2014), but with the inclusion of the new data. The key sensitivities also followed the previous assessment, and were the Low $M$ -High $q$  and High $M$ -Low $q$  “standard” runs, a run assuming Rekohu was formed more recently (in 2007), and a run estimating  $M$ . Other sensitivities investigated in the assessment related to assumptions about penalties on the ratio between acoustic biomass  $q$ s, changing the prior on the variance in the year class strengths, applying a capped selectivity curve; and a two-stock assumption. Further sensitivities included the influence of changing the relative weights assigned to the composition data. A feature of the assessment is the inability of the

model to mimic the 2016 acoustic estimate of biomass – the 2014 estimate is under-predicted by the model (although this estimate is quite imprecise) (Figure 4).



**Figure 4: East & South Chatham Rise, MCMC base: normalized residual for the acoustic indices. The box covers 50% of the distribution for each index and the whiskers extend to 95% of the distribution (Dunn & Doonan, 2018).**

Virgin biomass,  $B_0$ , was estimated (posterior median) to be about 313,000 t for the base model, with posterior median estimates ranging from 300,600–363,100 t for the four sensitivity runs presented (Table 4). Current stock status was similar across the base and the first two sensitivity runs (Table 2). The lower stock status when  $M$  was estimated reflected the lower estimate of  $M$  (0.034 rather than 0.045 yr<sup>-1</sup>). For the two “bounding” runs, where  $M$  and the mean of the acoustic  $q$  priors were shifted by 20%, current stock status was estimated below the biomass target range of 30–50%  $B_0$  for the pessimistic *LowM-Highq* run and within the target range for the optimistic *HighM-Lowq* run (Table 4).

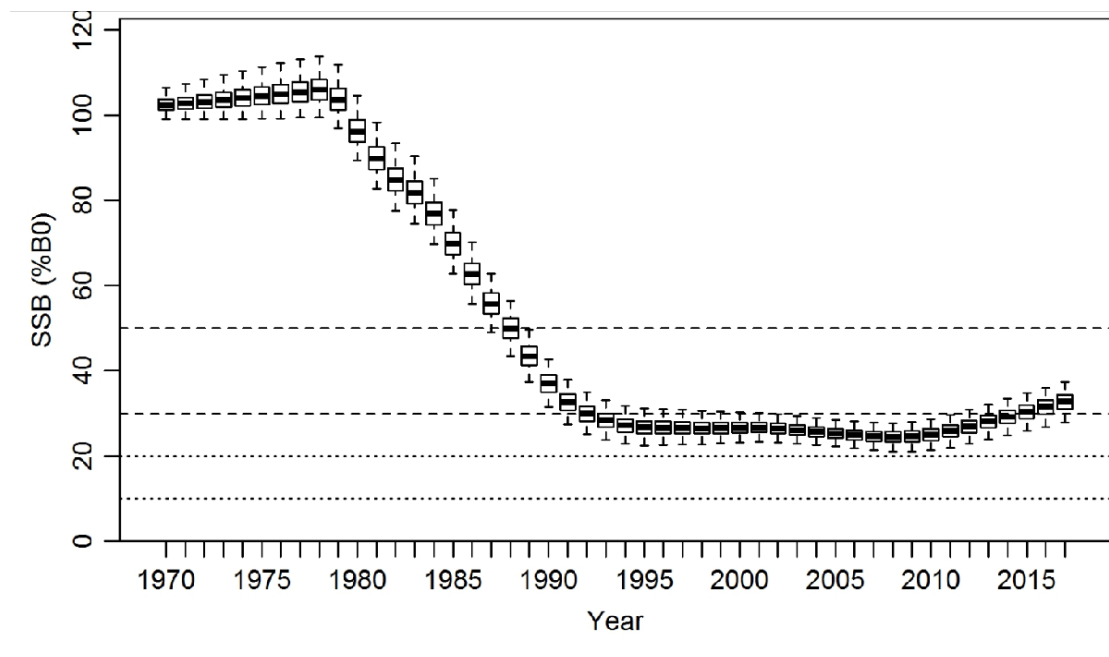
The two-stock sensitivity test leads to a notably less optimistic appraisal of stock status for the “Old Plume stock” (10.3% of  $B_0$ ) and a more optimistic appraisal for the “Rekohu stock” (92.8% of  $B_0$ ). If the results for the two stocks are combined, the combined stock is 20.3% of  $B_0$ . This sensitivity test did not form the basis for management advice. Concerns with this sensitivity test are whether it is reasonable to assume that more than half of the spawning biomass was not observed in the acoustic surveys and the lack of old fish in the Rekohu samples.

**Table 4 East & South Chatham Rise, MCMC estimates of virgin biomass ( $B_0$ ) and stock status ( $B_{2017}$  as % $B_0$ ) for the base model and four sensitivity runs.**

	$M$	$B_0$ (000)	95% CI	$B_{2017}$	95% CI
Base	0.045	313.3	281.2–346.9	33	28–37
Estimate $M$	0.034	363.1	304.3–416.1	27	21–34
Rekohu 2007	0.045	300.6	270.8–332.4	31	26–35
Low $M$ -High $q$	0.036	335.5	308.3–362.8	25	20–29
High $M$ -Low $q$	0.054	306.3	272.8–342.7	42	36–47

For the base model, there was an 86% probability that the stock was above 30%  $B_0$  in 2017. Therefore, for the base model, the stock is considered to be fully rebuilt according to the

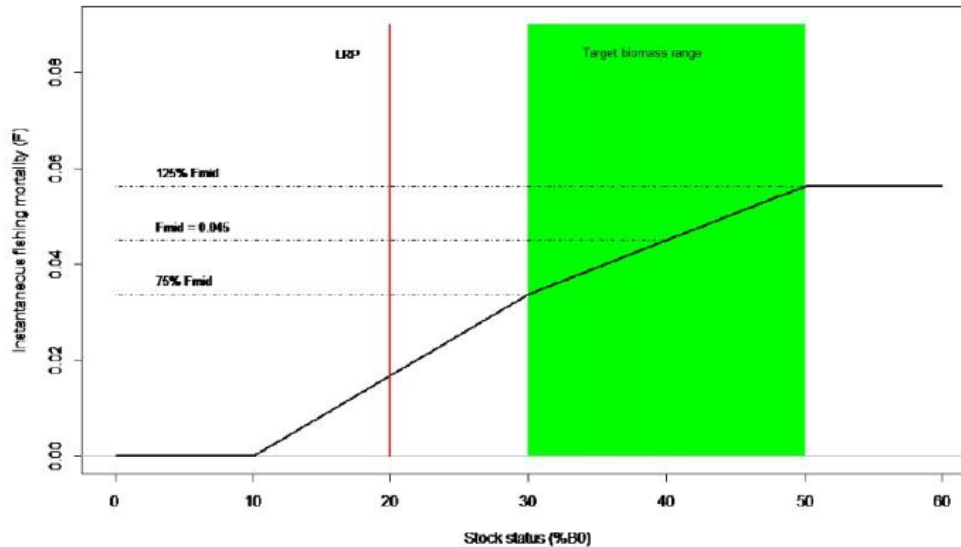
New Zealand Harvest Strategy Standard (at least a 70% probability that the lower end of the management target range of 30–50%  $B_0$  has been achieved; MPI 2011). For the sensitivity runs, the probability of being above 30%  $B_0$  in 2017 was 1% (Low  $M$ -High  $q$ ), 20% (Estimate  $M$ ), 65% (Rekohu 2007), and 100% (High  $M$ -Low  $q$ ). The stock has continued to increase in size since the low point in the mid-2000s (Figure 5). The estimate of the absolute spawning biomass of the stock in 2017 is lower than that in 2014 from the previous stock assessment, indicating a rescaling of abundance, but with similar abundance trends. The increase of the stock to above 30%  $B_0$  is sufficient to demonstrate that the stock is at or above the target reference point and **Condition 1 is thus closed**.



**Figure 5 East and South Chatham Rise base, MCMC-estimated spawning-stock biomass trajectory. The box in each year covers 50% of the distribution and the whiskers extend to 95% of the distribution. Dotted lines indicate the hard limit (10%  $B_0$ ) and soft limit=LRP (20%  $B_0$ ), dashed lines the biomass target range (30–50%  $B_0$ ).**

#### 2.4.1.3 Application of the HCR and TACC setting

The HCR (Figure 6) was applied to three orange roughy stocks in 2014 (ORH 3B Northwest Chatham Rise, ORH 3B East & South Chatham Rise, and ORH 7A). The result of the application of the HCR to ORH 3B was an increase in the cumulative TACs of 2,585 t to 8,055 t (a TACC of 7,667 t compared with a TACC of 5,197 t for 2017-18). At the assessment unit level, this corresponds to an increase of 2,570 t for the ESCR sub-area catch limit, and a 100 t decrease to the sub-area catch limit for NWCR. The catch limit from the HCR for the NWCR is slightly higher than the industry-implemented sub-area catch limit (1,043 t), though lower than the 'official' sub-area catch limit of 1,250 t.



**Figure 6 The Harvest Control Rule for ORH 3B**

The harvest control rule for orange roughy was applied to the results of the assessments for the ESCR and the NWCR. An exploitation rate ( $U=0.03814$  for the ESCR and  $0.04388$  for the NWCR) was applied to the vulnerable biomass in the middle of 2018 (161,500 t and 27,650 t for the ESCR and the NWCR, respectively) to compute the TACs (Cordue, 2018), and these TACs reduced by 5% to account for sources other than commercial fishing to compute the TACCs for the 2018-19 fishing year (MPI, 2018c). The vulnerable biomass for the ESCR was the weighted average of estimates of the vulnerable biomass computed for the fisheries on the Box & Flats, Hills, and Andes & South (Cordue, 2018). The exploitation rate is higher for the NWCR than for the ESCR because the NWCR area is estimated to be at a higher proportion of its unfished level.

The assessment team strongly recommends that MPI include in future Plenary or Stock Assessment Reports the calculations presented in Cordue (2018) documenting how the vulnerable biomass is computed, including any weighting scheme, the exploitation rate ( $U$ ) used, and hence the product of the two. The HCR has a sliding scale of  $U$  depending on estimated biomass and the values of each are not clear in the standard documents MPI produces.

Three TAC and TACC options were proposed for consideration by the Minister of Fisheries (MPI, 2018c):

- Option 1: The status quo (i.e., a TACC for ORH 3B of 5,197 t for the 2018-19 fishing year, with sub-area catch limits of 1,250 t for the NWCR and 3,100 t for the ESCR).
- Option 2: An increase to the values from the HCR (i.e., a TACC for ORH 3B of 7,667 t for the 2018-19 fishing year, with sub-area catch limits of 1,150 t for the NWCR and 5,670 t for ESCR).
- Option 3. An increase to the values from the HCR for the ESCR over three fishing years and an immediate change to the HCR output for the NWCR (i.e., a TACC for ORH 3B of 6,091 t for the 2018-19 fishing year, with sub-area catch limits of 1,150 t for the NWCR and 4,095 t for the ESCR).

Option 3 was recommended by MPI based on the rationale that (a) it is a prudent approach in light of the large proposed increase in the TACC, and allows Fisheries New Zealand to make subsequent adjustments should biomass estimates be too optimistic, or if signs that the orange roughy stock is being adversely impacted are detected, and (b) doing so will

allow monitoring of any fishing impacts associated with increasing fishing effort to determine if any impacts on ETP species are adverse and additional management action is required (MPI, 2018d).

The options were consulted on and submissions were received from industry, iwi and conservation groups. The Minister of Fisheries selected Option 3, and noted his intent to consult with stakeholders and make separate TAC and TACC decisions for the 2019-20 and 2020-21 fishing years (MPI, 2018e).

## 2.4.2 Principle 2

### Retained species and bycatch

MPI provided updated, interim catch compositions for Area 3B ESCR and NWCR (Table 5, Table 6). No species or species group other than rattails in NWCR newly reached the 5% of total catch. MPI provided catch composition of the rattail species in the Chatham Rise surveys (Table 7), and the most abundant rattail species, four-rayed rattail, made up approximately 60% of the total rattail catch. Assuming that the species composition of the commercial catch is generally similar to the species composition in the trawl surveys, four-rayed rattails would make up about 3.4% of the total catch. Therefore, no additional main species were added to the retained or bycatch categories.

**Table 5 Catch composition of the ESCR orange roughy fishery (Source: MPI)**

<b>ESCR ORH &amp; OEO Fishery: QMS species 2013-14 to 2017-18</b>	<b>scaled up 5 year catch</b>	<b>% total catch</b>	<b>Average annual catch</b>
	tonnes	%	tonnes
Orange roughy	35,229.4	67.3	7,045.9
Smooth oreo	13,794.3	26.4	2,758.9
Black oreo	1,196.8	2.3	239.4
Ribaldo	266.2	0.5	53.2
Hoki	342.2	0.7	68.4
Spiky oreo	185.0	0.4	37.0
Cardinalfish	40.4	0.1	8.1
Alfonsino	76.4	0.1	15.3
Hake	14.7	0.0	2.9
Pale ghost shark	6.7	0.0	1.3
Ling	17.5	0.0	3.5

<b>ESCR ORH &amp; OEO Fishery: non-QMS (bycatch) species 2013-14 to 2017-18</b>	<b>scaled up 5 year catch</b>	<b>% total catch</b>	<b>Average annual catch</b>
	tonnes	%	tonnes
Baxter's lantern dogfish	191.4	0.4	38.3

Other sharks and dogs	115.1	0.2	23.0
Slickhead	160.5	0.3	32.1
Slender cods	162.2	0.3	32.4
Shovelnose spiny dogfish	124.5	0.2	24.9
Rattails	84.0	0.2	16.8
Morid cods	42.3	0.1	8.5
Longnose velvet dogfish	33.4	0.1	6.7
Basketwork eel	37.2	0.1	7.4
Warty squid	39.3	0.1	7.9
Deepwater dogfish	56.2	0.1	11.2

<b>ESCR ORH &amp; OEO Fishery: elasmobranch species 2013-14 to 2017-18</b>	<b>scaled up 5 year catch</b>	<b>% total catch</b>	<b>Average annual catch</b>
	tonnes	%	tonnes
Baxter's lantern dogfish	191.4	0.4	38.3
Other sharks and dogs	115.1	0.2	23.0
Shovelnose spiny dogfish	124.5	0.2	24.9
Longnose velvet dogfish	33.4	0.1	6.7
Deepwater dogfish	56.2	0.1	11.2

**Table 6 Catch composition of the NWCR orange roughy fishery (Source: MPI)**

<b>NWCR ORH &amp; OEO Fishery: QMS species 2013-14 to 2017-18</b>	<b>scaled up 5 year catch</b>	<b>% total catch</b>	<b>Average annual catch</b>
	tonnes	%	tonnes
Orange roughy	3,301.3	72.3	660.3
Smooth oreo	243.5	5.3	48.7
Hoki	86.6	1.9	17.3
Cardinalfish	43.6	1.0	8.7
Hake	19.1	0.4	3.8
Pale ghost shark	12.5	0.3	2.5
Alfonsino	7.4	0.2	1.5
Ribaldo	3.7	0.1	0.7
Black oreo	3.6	0.1	0.7
Spiny dogfish	3.5	0.1	0.7
Spiky oreo	2.9	0.1	0.6



<b>NWCR ORH &amp; OEO Fishery: non-QMS (bycatch) species 2013-14 to 2017-18</b>	<b>scaled up 5 year catch</b>	<b>% total catch</b>	<b>Average annual catch</b>
	tonnes	%	tonnes
Rattails	265.7	5.8	53.1
Slickhead	141.3	3.1	28.3
Slender cods	113.7	2.5	22.7
Baxter's lantern dogfish	47.8	1.0	9.6
Warty squid	29.3	0.6	5.9
Deepwater dogfish	27.2	0.6	5.4
Long-nosed chimaera	23.8	0.5	4.8
Shovelnose spiny dogfish	19.9	0.4	4.0
Morid cods	17.8	0.4	3.6
Widenosed chimaera	16.8	0.4	3.4
Smallscaled brown slick head	15.8	0.3	3.2

<b>NWCR ORH &amp; OEO Fishery: elasmobranch species 2013-14 to 2017-18</b>	<b>scaled up 5 year catch</b>	<b>% total catch</b>	<b>Average annual catch</b>
	tonnes	%	tonnes
Baxters lantern dogfish	47.8	1.0	9.6
Deepwater dogfish	27.2	0.6	5.4
Long-nosed chimaera	23.8	0.5	4.8
Shovelnose spiny dogfish	19.9	0.4	4.0
Widenosed chimaera	16.8	0.4	3.4
Longnose velvet dogfish	13.3	0.3	2.7
Seal shark	12.9	0.3	2.6
Pale ghost shark	12.5	0.3	2.5
Smooth skin dogfish	12.1	0.3	2.4
Plunket's shark	10.6	0.2	2.1
Other sharks and dogs	10.2	0.2	2.0

**Table 7 Rattail species summary, NWCR 2013, 2014, 2016, 2018 Trawl Surveys (Source MPI)**

Common Name	Species Code	Deep strata (>800 m) catch (kg)				Sum	%
		2013	2014	2016	2018		
Abyssal rattail	CMU	3.40		2.80		6.20	0.001
Banded rattail	CFA	8.90	2.10	7.20	1.90	20.10	0.004
Blackspot rattail	VNI			0.10		0.10	0.000
Bollons rattail	CBO	7.00	11.30	17.20	14.20	49.70	0.010
Filamentous rattail	GAO	0.20	0.70	0.50	0.60	2.00	0.000
Four-rayed rattail	CSU	1267.10	469.20	777.30	405.30	2918.90	0.588
Humpback rattail (slender rattail)	CBA	26.80	18.60	3.60	3.80	52.80	0.011
Mahia rattail	CMA	28.00	14.50	10.60	12.20	65.30	0.013
Notable rattail	CIN	33.90	29.60	27.90	6.80	98.20	0.020
Oblique banded rattail	CAS				0.50	0.50	0.000
Olivers rattail	COL	13.70	27.50	18.70	6.20	66.10	0.013
Ridge scaled rattail	MCA	84.30	11.00	20.90	48.80	165.00	0.033
Roughhead rattail	CHY	17.70	1.60	3.20	1.70	24.20	0.005
Serrulate rattail	CSE	64.20	50.10	38.90	15.70	168.90	0.034
Squashedface rattail	NNA	0.50		0.20	0.10	0.80	0.000
Trachonurus villosus	TVI	0.20				0.20	0.000
Unicorn rattail	WHX	18.70		2.40	0.20	21.30	0.004
Velvet rattail	TRX	0.30	0.30	0.50	0.80	1.90	0.000
White rattail	WHR	374.00	369.50	350.30	212.20	1306.00	0.263
						4968.20	1.000

## ETP Species

### *Seabirds and Marine mammals*

Updated data on seabird and marine mammal captures in the orange roughy fisheries was provided by MPI (Abraham and Thompson 2015a; Abraham and Thompson 2015b), indicating low levels of mortality, as is consistent with previous years.

Table 8 shows observed and estimated seabird captures in the orange roughy fisheries UoAs. For the 2017-18 fishing year, there was one dead white-capped albatross observed in the ORH 7A UoA, and none in the other UoAs (MPI, pers. comm., R Tinkler, 2019). Though the IUCN classifies white-capped albatross as 'near threatened,' the population is considered stable (Birdlife International 2018) and neither of these is an ETP listed bird species according to the MSC definition.

**Table 8. Observed and estimated seabird captures in the New Zealand orange roughy UoAs since 2014.**

	Observed	Estimated
2014-15	0	5
2015-16	3	7
2016-17	2	7
2017-18	1(white-capped albatross—dead; ORH7A)	

Concerning marine mammal captures, although this fishery is known to potentially interact with New Zealand fur seals, there have been no observed captures of any marine mammal since 2014-15, despite increased observer coverage in the past year (Table 9). It is noteworthy that observations and estimates of bird and mammal captures have not appreciably increased even as observer coverage rates have increased in the past year (Figure 1), providing confidence that low observed interactions are (and have been) representative.

**Table 9. Observed and estimated marine mammal captures in the New Zealand orange roughy UoAs since 2014.**

	Observed	Estimated
2014-15	1 (fur seal)	1
2015-16	0	0
2016-17	0	0
2017-18	0	0

The assessment team is confident that the impact of the UoAs on seabirds and marine mammals remains very low.

#### *Protected Corals*

Table 10 provides a breakdown of observed coral captures in the orange roughy UoAs for the 2017-18 fishing year (MPI, pers. comm., R Tinkler, 2019). The total amount observed is substantially less than that reported for the equivalent area in the 2016-17 observer year although the totals are not directly comparable due to the data being aggregated differently. See MRAG (2018) for details from 2016-17.

**Table 10. Observed coral captures from tows targeting orange roughy and oreo during the 2017-18 fishing year.**

<b>Observed coral captures from tows targeting orange roughy and oreo during the 2017-18 fishing year</b>		
Data as provided by Fisheries New Zealand		
<b>ORH 3B Northwest Chatham Rise UoA</b>		
Number of observed tows catching coral: 11		
<b>Common name</b>	<b>Scientific name</b>	<b>GWT (kg)</b>
Black coral	<i>Antipatharia</i>	0.3
Coral (unspecified)	<i>Alcyonacea, Gorgonacea, Scleractinia, Antipatharia (Orders) &amp; Stylasteridae (Family)</i>	0.1
Coral rubble	-	1.7
Desmophyllum di	<i>Desmophyllum dianthus</i>	3.4
Flabellum coral	<i>Flabellum spp.</i>	1.0
Gorgonian coral	<i>Gorgonacea</i>	0.4
Leiopathes spp.	<i>Leiopathes spp.</i>	0.3
Parantipathes spp.	<i>Parantipathes spp.</i>	0.3
<b>Total</b>		<b>7.5</b>
<b>ORH 7A &amp; Westpac Bank UoA</b>		
Number of observed tows catching coral: 30		
<b>Common name</b>	<b>Scientific name</b>	<b>GWT (kg)</b>
Dendropathes spp.	<i>Dendropathes spp.</i>	1.4
Golden coral	<i>Chrysogorgia spp.</i>	0.1
Gorgonian coral	<i>Gorgonacea</i>	3.0
Bamboo coral	<i>Lepidisis spp.</i>	0.9
Bathypathes spp.	<i>Bathypathes spp.</i>	4.8
Dendrobathypath	<i>Dendrobathypathes spp.</i>	1.0
Gorgonocephalus	<i>Gorgonocephalus spp.</i>	0.6
Metallic coral	<i>Metallorgorgia spp.</i>	1.4
Solitary bowl cora	<i>Stephanocyathus platypus</i>	0.1
<b>Total</b>		<b>13.3</b>
<b>ORH 3B East &amp; South Chatham Rise UoA</b>		
Number of observed tows catching coral: 0		

The Client presented a progress report outlining work completed and underway as part of the Client Action Plan to address the coral conditions. This is discussed in Section 4.

## Habitat and Ecosystem

The orange roughy fishery operates over two main habitat types (UTF and slope) within the orange roughy distribution area within the three UoA areas and across the New Zealand EEZ as a whole, as characterized and described in the Public Certification Report.

Regarding trawl footprint changes, Table 11 shows a provisional analysis provided by MPI for orange roughy and oreo tows in the UoAs since 2008. The footprint remains small, and the assessment team is monitoring small increases that have occurred in recent years for possible correlation with increases in the orange roughy TACs as stocks continue to increase. Note also that the analysis includes research tows and therefore in years with research surveys, the footprint can increase beyond that of the commercial fishery. The slight change in footprint does not change the conclusion from the full assessment PCR regarding potential impact of these UoAs on habitats.

**Table 11. Summary data for the ORH/OEO dataset for the four analysis areas, for fishing years 2008–17 and the sum of all years: number of bottom-contacting tows, number of 25-km<sup>2</sup> cells contacted, footprint area, percentage of fishery seafloor area (in 800–1600 m waters open to bottom trawling) with contact from the ORH/OEO trawl footprint.**

Fishing					Fishing				
ORH7A (area = 83 747.6 km <sup>2</sup> )					Northwest Chatham Rise (area = 23 439.0 km <sup>2</sup> )				
year	No. tows	No. cells	Footprint (km <sup>2</sup> )	800–1600 m (%)	year	No. tows	No. cells	Footprint (km <sup>2</sup> )	800–1600 m (%)
2008	0	–	–	–	2008	291	183	155.9	0.7
2009	65	51	13.7	< 0.1	2009	190	215	168.7	0.7
2010	78	51	15.7	< 0.1	2010	277	298	385.3	1.6
2011	114	59	60.2	< 0.1	2011	10	14	3.7	< 0.1
2012	105	59	47.7	< 0.1	2012	7	13	3.0	< 0.1
2013	154	73	66.5	< 0.1	2013	11	17	3.8	< 0.1
2014	132	136	162.3	0.2	2014	227	234	167.4	0.7
2015	707	478	819.1	1.0	2015	284	270	275.8	1.2
2016	434	365	516.5	0.6	2016	406	327	488.9	2.1
2017	525	560	1030.3	1.2	2017	466	370	680.4	2.9
2008–17	2 314	813	2551.2	3.0	2008–17	2 169	559	1 867.0	8.0

Fishing					Fishing				
Westpac Bank (area = 12 988.5 km <sup>2</sup> )					East & South Chatham Rise (area = 44 960.1 km <sup>2</sup> )				
year	No. tows	No. cells	Footprint (km <sup>2</sup> )	800–1600 m (%)	year	No. tows	No. cells	Footprint (km <sup>2</sup> )	800–1600 m (%)
2008	0	–	–	–	2008	2 288	657	1 318.8	2.9
2009	13	15	1.9	< 0.1	2009	2 257	668	1 640.7	3.6
2010	12	15	1.7	< 0.1	2010	1 671	562	1 391.7	3.1
2011	3	4	0.4	< 0.1	2011	718	256	274.7	0.6
2012	12	11	1.8	< 0.1	2012	882	311	332.9	0.7
2013	9	9	1.6	< 0.1	2013	832	232	287.7	0.6
2014	15	25	5.6	< 0.1	2014	946	353	356.8	0.8
2015	20	18	4.8	< 0.1	2015	975	296	401.1	0.9
2016	134	65	44.2	0.3	2016	1 284	466	635.0	1.4
2017	29	18	6.5	< 0.1	2017	1 190	430	661.3	1.5
2008–17	245	342	65.1	0.5	2008–17	13 043	981	4 942.3	11.0

## 2.5. Developments or changes within the fishery that impact traceability or the ability to segregate UoC and non-UoC fish

No changes have occurred that affect the traceability or segregation of product from the fishery. The fishery monitoring system remains robust and well suited to confirming traceability.

## 2.6. Conditions

The client’s responses to the conditions of certification were set out in the Client Action Plan (CAP). Progress associated with the actions set forth in the CAP was examined as a part of this surveillance audit. For each condition, the report sets out progress to date. This

progress has been evaluated by MRAG Americas Audit Team (set out below as “Progress on Condition”) against the commitments made in the CAP. For this surveillance, Conditions 1 and 4 were rescored and closed out.

The ESCR fishery had one condition on P1; the NWCR and ESCR fisheries had two conditions on P2, and all fisheries together had one condition on P3 (Table 12).

**Table 12 Summary of Assessment Conditions**

Condition number	Performance indicator (PI)	Status	PI original score	PI revised score
1	1.1.1	Closed	70	90
2	2.3.1	On schedule	75	n/a
3	2.3.3	On schedule	75	n/a
4	3.2.5	Closed	70	90

## 2.7. Recommendations

The assessment team strongly recommends that FNZ include in future Plenary or Stock Assessment Reports the calculations presented in Cordue (2018) documenting how the vulnerable biomass is computed, including any weighting scheme, the exploitation rate (U) used, and hence the product of the two. The HCR has a sliding scale of U depending on estimated biomass and the values of each are not clear in the standard documents FNZ produces.

## 3. Assessment Process

This audit followed the surveillance audit process as defined in the MSC Fishery Certification Requirements v2.0.

Information supplied by the clients and management agencies, much of which was made publicly available at the DWG website: <http://deepwatergroup.org/certification/orange-roughy-second-surveillance-audit-2018/>, was reviewed by the assessment team ahead of the on-site meeting, and discussions with the clients and management agencies centered on the content within the provided documentation. In addition, the assessor not in attendance supplied a list of follow-up questions and requests for discussion at the site visit following his review of the advance material. In cases where relevant documentation was not provided in advance of the meeting, it was requested by the assessment team and subsequently supplied during or shortly after the meeting.

Thirty days prior to the surveillance audit, all stakeholders from the full assessment were informed of the meeting and the opportunity to provide information to the auditors in advance of, or during, the meeting. At that time, the draft meeting agenda and logistical arrangements were also provided to stakeholders.

The MRAG Americas surveillance carried out the following as part of the surveillance audit:

- Audit public claims made by the client regarding its certified status (including but not restricted to those made on printed material such as brochures).
- Review any potential or actual changes in management systems.
- Review any changes or additions/deletions to regulations.

- Review any personnel changes in science, management or industry to evaluate impact on the management of the fishery.
- Review any potential changes to the scientific base of information, including stock assessments.
- Evaluate progress against any conditions placed on the certificate, as well as for continued compliance with the *MSC's Principles and Criteria for Sustainable Fishing* as specified in the Public Certification Report.

The surveillance team has the responsibility, if it identifies an issue requiring further investigation, to:

- Report and record the existence of the issue, and/or
- Immediately conduct a limited assessment to determine if a full re-assessment of the fishery is warranted to continue the certification status, and/or
- Raise further conditions.

The surveillance audit was conducted at the offices of Deepwater Group in Auckland, NZ on 28 and 29 November 2018.

The following participants were in attendance:

<b>Name</b>	<b>Affiliation</b>
Bob Trumble (BT)	MRAG Americas assessment team
Amanda Stern-Pirlot (ASP)	MRAG Americas assessment team
George Clement (GC)	Deepwater Group (client)
Sharleen Gargiulo (SG)	Deepwater Group (client)
Geoff Tingley (GT)	Gingerfish Ltd (client consultant)
Tiffany Bock (TB)	Ministry for Primary Industries
Rob Tinkler (RT)	Ministry for Primary Industries
Simon McDonald (SM)	MPI Enforcement and Compliance

Private meetings with non-client meeting participants (including with MPI/Fisheries New Zealand) were offered but declined and the assessment team did not receive written comments.

Agenda for meetings (the participants agreed to move the Update on Management discussion scheduled from Thursday to Wednesday to accommodate MPI staff):

	<b>NZ Time</b>	<b>Agenda</b>	<b>Presenter</b>	<b>Attendees</b>
<b>Wednesday 28</b> (Times are indicative)	<b>0900-0915</b>	<b>Opening Meeting</b>	MRAG	BT, ASP, GC, SG, GT, TB (remote), RT (remote)
	<b>0915-1015</b>	<b>Updates on Stock Status (P1)</b>		
	0915-0945	Updates on stock assessments, Ministers TACC decisions, and Condition 1	MPI	BT, ASP, GC, SG, GT, TB (remote), RT (remote)
	0945-1015	Questions from MRAG	MRAG	BT, ASP, GC, SG, GT, TB (remote), RT (remote)
	<b>1015-1215</b>	<b>Updates on Environmental Interactions (P2)</b>		
	1015-1045	Updates on P2 interactions and management	MPI	BT, ASP, GC, SG, GT, TB (remote), RT (remote)

	<b>NZ Time</b>	<b>Agenda</b>	<b>Presenter</b>	<b>Attendees</b>
	1045-1115	Questions from MRAG	MRAG	BT, ASP, GC, SG, GT, TB (remote), RT (remote)
	1115-1145	Update on Conditions 2 & 3	DWG	BT, ASP, GC, SG, GT, TB (remote), RT (remote)
	1145-1215	Questions from MRAG	MRAG	BT, ASP, GC, SG, GT, TB (remote), RT (remote)
		Lunch		
	1330-1430	Assessment team meeting	MRAG	BT, ASP
	1430-1700	Available time for other requested meetings	MRAG	None requested
<b>Thursday 29</b> (Times are indicative)	<b>0900-1030</b>	<b>Updates on Management (P3)</b>		
	0900-0915	Update on Compliance and Enforcement, including traceability	MPI	BT, ASP, GC, SG, GT, SM (remote), RT (remote)
	0915-0930	Questions from MRAG	MRAG	BT, ASP, GC, SG, GT, SM (remote), RT (remote)
	0930-1000	Update on Management, incl. on Condition 4	MPI	BT, ASP, GC, SG, GT, TB (remote), RT (remote)
	1000-1030	Questions from MRAG	MRAG	BT, ASP, GC, SG, GT, TB (remote), RT (remote)
	1030-1100	Assessment team pre-closing meeting	MRAG	BT, ASP
	1100-1600	Available time for other requested meetings		None requested
	<b>Following last meeting</b>	<b>Closing Meeting</b>	MRAG	BT, ASP, GC, SG, GT

**Standards and Guidelines used:**

MSC Certification Requirements version 2.0 (for process requirements)

MSC Certification Requirements version 1.3 (for performance requirements, including assessment tree)

Guidance to the MSC Certification Requirements version 2.0 (for process requirements)

Guidance to the MSC Certification Requirements version 1.3 (for performance requirements, including assessment tree)

MSC Surveillance Reporting Template version 1.0



## 4. Results

The assessment team provides updates in Table 13 for each condition reviewed in this audit. All reporting on conditions used the same narrative or metric form as the original condition. The team has documented progress against interim milestones and closed out Conditions 1 and 4; see Appendix 1 for rescoring tables.

**Table 13. Conditions and Status of Conditions for the Orange Roughy Fisheries**

### Condition 1

Performance Indicator(s) & Score(s)	Insert relevant PI number(s)	Insert relevant scoring issue/ scoring guidepost text	Score
	1.1.1	1.1.1b The stock is at or fluctuating around its target reference point.	70
<b>Condition</b>	Provide evidence that the ESCR stock is at or fluctuating around its target reference point.		
<b>Milestones</b>	Year 1 to Year 3: provide estimates of ESCR stock relative to target reference point. This may result in a score $\geq 80$ if evidence demonstrates the stock is at or fluctuating around the target reference point. Year 4: provide evidence that the ESCR stock is at or fluctuating around the target reference point. This will result in a score $\geq 80$ .		
<b>Client action plan</b>	Year 1 to Year 3: The client, in collaboration with MPI, will continue to monitor ESCR stock relative to its target reference point. The client will provide documentary evidence of the ESCR stock status. Year 4: Documentary evidence will be supplied to demonstrate that the ESCR stock is at or fluctuating around the target reference point.		
<b>Progress on Condition [Year 1]</b>	The client provided evidence in the form of the draft stock assessment (see Section 2.4.1) that a new stock status update is imminent. By the time of the next surveillance, the stock assessment will have undergone final peer review and finalization via the 2018 Stock Assessment Plenary. The draft stock assessment shows that the stock continues to increase and the estimated abundance has exceeded the bottom of the target range. Finalization of the stock assessment will allow the assessment team to determine the stock size against the target range.		
<b>Progress on Condition [Year 2]</b>	The 2017 stock assessment completed in 2018 demonstrated that the ORH3B ESCR stock is above the lower limit of the management target range (Figure 2; Table 2) and increasing under the base-case assessment. The stock is estimated to have reached the lower limit of the management target range in 2015.  The base run demonstrates that the ESCR stock has increased for the past eight years, and that the abundance has been at or above the lower end of the management target range for the past three years. The ESCR stock has an 86% probability of being above the lower limit of the target range for the base-case analysis. Therefore, the assessment team concludes that the ESCR meets the SG80 requirement of being at the target reference point.		
<b>Status of condition</b>	The condition is closed.		

## Condition 2

	Insert relevant PI number(s)	Insert relevant scoring issue/ scoring guidepost text	Score
Performance Indicator(s) & Score(s)	2.3.1	<b>2.3.1 The fishery meets national and international requirements for the protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.</b>	75
Condition	For the ORH 3B NWCR and ORH 3B ESCR, by the end of the certification period, the direct effects of ORH fishing must be highly unlikely to create unacceptable impacts to ETP coral species.		
Milestones	Year 1: Present a plan to increase certainty regarding the impact of ORH fishing in the two UoAs on ETP coral groups. Years 2-3: Carry out the plan developed for the Year 1 milestone. Year 4: Demonstrate that the fishery is highly unlikely to create unacceptable impacts to ETP coral species in the NWCR and ESCR UoA areas. This will result in a score $\geq 80$ .		
Client action plan	Year 1: The client will review the outcome status of ETP coral and develop a plan to increase our understanding of the direct effects of fishing on ETP coral so as to reduce uncertainty in relation to the impacts of fishing on ETP coral. Years 2-3: The client will develop, conduct and begin reporting on studies to deliver the plan developed in Year 1. Year 4: Using the outputs from the studies conducted during years 2 and 3, plus any additional management actions implemented to protect corals, the client will report with improved certainty the likelihood of unacceptable impacts of the ORH 3B NWCR and ORH 3B ESCR fisheries on ETP coral such that the SG80 will be met for each fishery.		
Progress on Condition [Year 1]	By the first surveillance audit, the client was required to review the outcome status of ETP coral and develop a plan to increase understanding of the direct effects of fishing on ETP coral, so as to reduce uncertainty in relation to the impacts of fishing on ETP coral. Ahead of the first surveillance audit, the client produced such a plan (Update on the Conditions of Certification 2 and 3 (ETP Corals), published here: <a href="http://deepwatergroup.org/update-on-conditions-2-3-corals/">http://deepwatergroup.org/update-on-conditions-2-3-corals/</a> ). This plan has three objectives initially relevant to this condition: <ol style="list-style-type: none"> <li>1. To improve understanding of predicted coral distribution;</li> <li>2. To improve understanding of gear impacts on protected coral species; and</li> <li>3. To improve confidence in predicted coral distribution models.</li> </ol> <p>The resulting work from these three objectives is designed to enable the client to eventually be able to demonstrate that the fishery is meeting the 80 scoring guidepost for this performance indicator.</p> <p>According to this plan, reports will be produced to fulfil the three objectives listed above, during subsequent surveillance audits.</p>		
Progress on Condition [Year 2]	The Client presented a progress report outlining the work completed and underway to meet each of the Plan's objectives (DWG 2018). This included: <ul style="list-style-type: none"> <li>• A workshop held by DOC in 2017 to identify research needs, which is now being used to inform research priorities and plans</li> <li>• A national literature review underway on the state of knowledge of New Zealand's protected corals, expected to be completed in 2019</li> <li>• An international literature review underway on the depth distributions of New Zealand's protected corals, expected to be completed in 2019</li> <li>• Ongoing annual trawl footprint monitoring, which is expected to increase in precision with new tow position reporting required to the nearest three or four decimal degrees (previously required to the nearest minute)</li> <li>• A spatial analysis conducted on the nature and extent of coral captures to</li> </ul>		

- better understand where, what and when captures have occurred
- A benthic biodiversity survey on the Chatham Rise was undertaken in 2017 using a towed camera system with HD digital video and still image cameras and a multicorer, which concentrated particularly on areas previously under-sampled with the aim to improve distribution information and models
- An inventory of all benthic samples within the Benthic Protection Areas to improve distribution information and models was underway
- Three coral population projects in DOC's Conservation Services Programme for 2018/19.

The Conservation Services Plan 2018/19 lists three industry/government co-funded projects related to the Client Action Plan for years 2 and 3 of this condition:

1. The age and growth of New Zealand protected corals at high risk (Project Code: POP 2017-07);
2. Improved habitat suitability modelling for protected corals in New Zealand waters (Project Code: POP 2018-01); and
3. Protected coral connectivity in New Zealand (Project code: POP2018-06).

The first of these projects was completed in June of 2018 and resulted in a methodology to determine the age and growth characteristics of protected New Zealand cold-water coral species which is needed to better understand the productivity inputs for an Ecological Risk Assessment on these protected species (Tracey et al. 2018).

The second project is intended to update the distribution modelling of protected corals initially carried out by Anderson et al. in 2014. This project will include updated datasets of observer presence records for protected corals, recent research and biodiversity trawl survey data for protected corals, revised and extensive regional environmental data layers, and the updated trawl footprint for the region. Catch effort data will be considered. The project is slated for completion in late June, 2020 with the following planned outputs:

- a. Data on coral distribution in an electronic format suitable for use in risk assessment.
- b. A technical report describing the methods used along with maps of the presence and predicted distribution of protected corals in relation to commercial fishing effort.
- c. Recommendations for any future research required to further improve the estimation of risk to protected corals from commercial fishing.

The third project will review connectivity information on deep sea corals in New Zealand, based on existing genetics studies in the region. Following the information review, a genetic study investigating previously identified at risk coral species would be undertaken on a species of the protected black coral group, where genetic connectivity data in New Zealand is particularly limited. The analyses will be focused on archived specimens for which existing molecular markers are available. Analyses will assess connectivity at various temporal and spatial scales and, if possible, will address on contemporary vs. historical connectivity. The project is scheduled for completion in mid-2019 with the following outputs identified:

- a. A technical report summarizing coral genetic connectivity studies carried out to date in the New Zealand region, and methods applied and results obtained from a genetic connectivity assessment of a 'high-risk' coral species.
- b. Data obtained, suitable for use in further analyses such as fisheries risk assessment.

In addition, observer coverage (funding for which is supplemented by the CSP) for orange roughy and oreo deepwater bottom trawl fisheries will be focused on

	assessing the extent of protected coral landed on vessels (as well as monitoring and recording interactions with, and behaviours of, seabirds). Sub-samples of corals will be taken for identification when required. This directed observer sampling will support data collection for the second two projects listed above.
<b>Status of condition</b>	This condition is open and on target. There has been progress against the plan set out in year 1, which is expected to contribute to the improvement of certainty regarding the impact of the orange roughly fishery on protected coral species. Ongoing monitoring of coral captures and trawl footprint is additionally contributing to the body of evidence related to these fisheries' impacts on protected corals.

### Condition 3

	<b>Insert relevant PI number(s)</b>	<b>Insert relevant scoring issue/ scoring guidepost text</b>	<b>Score</b>
<b>Performance Indicator(s) &amp; Score(s)</b>	2.3.3	<b>Relevant information is collected to support the management of the fishery impacts on ETP species, including: -information for the development of the management strategy;- information to assess the effectiveness of the management strategy; and –information to determine the outcome status of ETP species.</b>	75
<b>Condition</b>	By the end of the certification period information must be sufficient to determine whether the fishery may be a threat to protection and recovery of ETP coral species.		
<b>Milestones</b>	Year 1: Present a plan to reduce uncertainty regarding the threat of ORH fishing to the two UoAs on ETP coral groups. Years 2- 3: Carry out the plan developed for the Year 1 milestone. Year 4: Provide information sufficient to determine whether the fishery may be a threat to the protection and recovery of ETP coral species. This will result in a score $\geq 80$ .		
<b>Client action plan</b>	Year 1: The client will supply a plan that establishes a sequence of analyses of existing data related to reducing uncertainty of the impacts of ORH fishing on ETP coral groups. Years 2 - 3: The client will develop, conduct and begin reporting on analyses to deliver the plan developed in Year 1. Year 4: Using the outputs from the studies conducted during years 2 and 3, plus any additional management actions implemented to protect corals, the client will report with improved certainty the information necessary to determine the likelihood of unacceptable impacts of the ORH3B NWCR and ORH3B ESCR fisheries on ETP coral such that the SG 80 will be met for each fishery.		
<b>Progress on Condition [Year 1]</b>	According to the Client Action Plan, in year 1, the client was to supply a plan that establishes a sequence of analyses of existing data related to reducing uncertainty of the impacts of ORH fishing on ETP coral groups. Ahead of the first surveillance audit, the client produced such a plan (Update on the Conditions of Certification 2 and 3 (ETP Corals), published here: <a href="http://deepwatergroup.org/update-on-conditions-2-3-corals/">http://deepwatergroup.org/update-on-conditions-2-3-corals/</a> ). This plan has three objectives initially relevant to this condition: <ol style="list-style-type: none"> <li>1. To improve understanding of predicted coral distribution;</li> <li>2. To improve understanding of gear impacts on protected coral species; and</li> <li>3. To improve confidence in predicted coral distribution models.</li> </ol> <p>The resulting work from these three objectives is designed to enable the client to eventually be able to demonstrate that the fishery is meeting the 80 scoring guidepost for this performance indicator.</p>		

	<p>According to this plan, reports will be produced to fulfil the three objectives listed above, during subsequent surveillance audits.</p>
<p><b>Progress on Condition [Year 2]</b></p>	<p>The Client presented a progress report outlining the work completed and underway to meet each of the Plan's objectives (DWG 2018). This included:</p> <ul style="list-style-type: none"> <li>• A workshop held by DOC in 2017 to identify research needs, which is now being used to inform research priorities and plans</li> <li>• A national literature review underway on the state of knowledge of New Zealand's protected corals, expected to be completed in 2019</li> <li>• An international literature review underway on the depth distributions of New Zealand's protected corals, expected to be completed in 2019</li> <li>• Ongoing annual trawl footprint monitoring, which is expected to increase in precision with new tow position reporting required to the nearest three or four decimal degrees (previously required to the nearest minute)</li> <li>• A spatial analysis conducted on the nature and extent of coral captures to better understand where, what and when captures have occurred</li> <li>• A benthic biodiversity survey on the Chatham Rise was undertaken in 2017 using a towed camera system with HD digital video and still image cameras and a multicorer, which concentrated particularly on areas previously under-sampled with the aim to improve distribution information and models</li> <li>• An inventory of all benthic samples within the Benthic Protection Areas to improve distribution information and models was underway</li> <li>• Three coral population projects in DOC's Conservation Services Programme for 2018/19.</li> </ul> <p>The Conservation Services Plan 2018/19 lists three industry/government co-funded projects related to the Client Action Plan for years 2 and 3 of this condition:</p> <ol style="list-style-type: none"> <li>1. The age and growth of New Zealand protected corals at high risk (Project Code: POP 2017-07);</li> <li>2. Improved habitat suitability modelling for protected corals in New Zealand waters (Project Code: POP 2018-01); and</li> <li>3. Protected coral connectivity in New Zealand (Project code: POP2018-06).</li> </ol> <p>The first of these projects was completed in June of 2018 and resulted in a methodology to determine the age and growth characteristics of protected New Zealand cold-water coral species which is needed to better understand the productivity inputs for an Ecological Risk Assessment on these protected species (Tracey et al. 2018).</p> <p>The second project is intended to update the distribution modelling of protected corals initially carried out by Anderson et al. in 2014. This project will include updated datasets of observer presence records for protected corals, recent research and biodiversity trawl survey data for protected corals, revised and extensive regional environmental data layers, and the updated trawl footprint for the region. Catch effort data will be considered. The project is slated for completion in late June, 2020 with the following planned outputs:</p> <ol style="list-style-type: none"> <li>a. Data on coral distribution in an electronic format suitable for use in risk assessment.</li> <li>b. A technical report describing the methods used along with maps of the presence and predicted distribution of protected corals in relation to commercial fishing effort.</li> <li>c. Recommendations for any future research required to further improve the estimation of risk to protected corals from commercial fishing.</li> </ol> <p>The third project will review connectivity information on deep sea corals in New Zealand, based on existing genetics studies in the region. Following the information review, a genetic study investigating previously identified at risk coral species would be undertaken on a species of the protected black coral</p>

	<p>group, where genetic connectivity data in New Zealand is particularly limited. The analyses will be focused on archived specimens for which existing molecular markers are available. Analyses will assess connectivity at various temporal and spatial scales and, if possible, will address on contemporary vs. historical connectivity. The project is scheduled for completion in mid-2019 with the following outputs identified:</p> <ol style="list-style-type: none"> <li>A technical report summarizing coral genetic connectivity studies carried out to date in the New Zealand region, and methods applied and results obtained from a genetic connectivity assessment of a 'high-risk' coral species.</li> <li>Data obtained, suitable for use in further analyses such as fisheries risk assessment.</li> </ol> <p>In addition, observer coverage (funding for which is supplemented by the CSP) for orange roughy and oreo deepwater bottom trawl fisheries will be focused on assessing the extent of protected coral landed on vessels (as well as monitoring and recording interactions with, and behaviours of, seabirds). Sub-samples of corals will be taken for identification when required. This directed observer sampling will support data collection for the second two projects listed above.</p>
<b>Status of condition</b>	<p>This condition is open and on target. There has been progress against the plan set out in year 1, which is expected to contribute to the improvement of certainty regarding the impact of the orange roughy fishery on protected coral species. Ongoing monitoring of coral captures and trawl footprint is additionally contributing to the body of evidence related to these fisheries' impacts on protected corals.</p>

#### Condition 4

	<b>Insert relevant PI number(s)</b>	<b>Insert relevant scoring issue/ scoring guidepost text</b>	<b>Score</b>
<b>Performance Indicator(s) &amp; Score(s)</b>	<b>3.2.5</b>	<b>The fishery-specific management system is subject to regular internal and occasional external review.</b>	<b>70</b>
<b>Condition</b>	By the third annual surveillance the fishery-specific management system must undergo occasional external review.		
<b>Milestones</b>	Year 1: Present a plan to establish occasional external review. Year 2: Carry out the plan developed for the Year 1 milestone. Year 3: Provide information that demonstrates occasional external review. This will result in a score $\geq 80$ .		
<b>Client action plan</b>	Year 1: The client will supply a plan that establishes occasional external review. Year 2: The client will provide documentary evidence of the status of the plan and progress towards its implementation. Year 3: The client will provide documentary evidence that demonstrates occasional external review.		
<b>Progress on Condition [Year 1]</b>	MPI has contracted an independent review, expected in January 2018 (MPI personal communication via Tiffany Bock at the 2017 site visit). DWG and MPI have discussed the need for a more regular review, with expectations for an annual process similar to the previously completed MFish Annual Report.		
<b>Progress on Condition [Year 2]</b>	Both CABs (Acoura and MRAG Americas) assessing New Zealand deepwater fisheries discussed the findings of the Independent Quality Assurance Review Report Deep Water Fisheries Management conducted by Independent Quality Assurance New Zealand for MPI as part of harmonizing their assessments and audits of the New Zealand MSC-certified deep water fisheries (hoki, hake, ling, and southern blue whiting – Acoura, and orange roughy – MRAG Americas). The teams agreed that the Review met the SG80 requirements of PI 3.2.5 scoring issue b (CR v1.3) and PI 3.2.4 scoring issue b (CR v2.0). Rationale for the change in scoring is presented in Appendix 1.		
<b>Status of condition</b>	The condition is closed.		

## **5. Conclusion**

MRAG Americas confirms that the New Zealand Orange Roughy Fishery remains certified following the completion of this surveillance. No changes in the fishery occurred that would adversely affect the certification of orange roughy. A minor change to the surveillance schedule occurred, with the on-site surveillance originally set for first surveillance switched to the second surveillance, and the off-site surveillance originally set for second surveillance switched to the first surveillance (see Appendix 4 for details).

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**Appendix 1. Re-scoring evaluation tables**

**Evaluation table for PI 1.1.1b ESCR**

<b>PI 1.1.1</b>		<b>The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>b</b>	<b>Guidepost</b>		The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.
	<b>Met?</b>		<u>N</u> <u>Y</u> - ESCR	(Y/N) N
	<b>Justification</b>	<p>The ORH3B ESCR stock is, however, estimated to be just below the lower bound of the target management range for the base case analysis in 2014 (<math>0.296B_0</math>; Cordue 2014d). The stock is projected to increase above the lower limit of management target range in 2015 for the base case analysis (<b>Error! Reference source not found.</b>) and in 2025 for the “worst case” “lowM-highq analysis (<b>Error! Reference source not found.</b>). However, given the uncertainty in the estimate, more than one year at or above the lower limit or a lower uncertainty is needed to assure that the stock has reached the harvest range. Hence this stock is not considered to meet the SG80, resulting in a condition.</p> <p>The ORH 3B ESCR stock is estimated to be above the lower limit of the management target range by <math>0.03B_0</math> in the base case model (Figure 2; Table 2) and to be increasing under the base-case assessment. The stock is estimated to have reached the lower limit of the management target range in 2015.</p> <p>The probability of being above the lower limit of the management target range depends on the assumptions of the assessment, ranging from 100% for the “optimistic” highM-lowq analysis to 1% for the “worst case” lowM-highq analysis.</p> <p>The base run demonstrates that the ESCR stock has increased for the past eight years, and that the abundance has been at or above the lower end of the management target range for the past three years. The ESCR stock has an 86% probability of being above the lower limit of the target range for the base-case analysis. Therefore, the assessment team concludes that the ESCR meets the SG80 requirement of being at the target reference point.</p> <p>The stock does not meet the SG100 because there is not a high degree of certainty (95% probability) of being at the target reference point. The assessment team does not consider that three years at or above the bottom of the management target range meets the requirement of being above the target range over recent years, because of 1) the short time above the lower end of the range compared to the lifespan of the animal, and 2) the range of results in the sensitivity runs demonstrate that a high degree of certainty for the status of the stock does not exist.</p>		
<b>References</b>		MPI 2018b, Dunn and Doonan (2018)		
<b>Stock Status relative to Reference Points</b>				
	<b>Type of reference point</b>	<b>Value of reference point (1000 mt)</b>	<b>Current stock status relative to reference point</b>	
<b>Target reference</b>	30-50% $B_0$	ORH3B ESCR 94.0-156.7	33% (86% probability > 30%)	

<b>PI 1.1.1</b>	<b>The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing</b>		
<b>point</b>			
<b>Limit reference point</b>	20% B <sub>0</sub>	ESCR 62.7	<1% likelihood below LRP
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>			ORH 3B ESCR 70 <u>90</u>
<b>CONDITION NUMBER (if relevant):</b>			<b>ORH 3B ESCR</b> <b>1 - Closed</b>

## Evaluation table for PI 3.2.5b ESCR

<b>PI 3.2.5</b>		<b>There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives</b> <b>There is effective and timely review of the fishery-specific management system</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>b</b>	<b>Guidepost</b>	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	<b>Met?</b>	(Y/N) Y	(Y/N) N	(Y/N)
	<b>Justification</b>	<p>Progress against the objectives in the National Fisheries Plan for Deepwater and the Annual Operational Plan is reviewed annually and reported in the Annual Review Report. MPI conducts an extensive review of performance of the deep water fisheries (e.g., MPI 2015) that incorporates consultations with industry and other stakeholders. Parts of the management system, specifically science and enforcement, undergo external review. <del>Although</del> The internal review is very comprehensive and parties external to MPI participate, <del>there is no explicit separate external review reported for the management system.</del></p> <p><u>In 2018, MPI completed an external review of the Deepwater Fisheries Management conducted by Independent Quality Assurance New Zealand (IQANZ 2018). The review covered the relevant parts of fishery management described in CR v1.3 GCB4.11 and CR v2.0 GSA4.10. Therefore, this scoring issue meets the SG80. Evidence of regular external review has not been provided, thereby precluding the SG100.</u></p>		
<b>References</b>		IQANZ 2018		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>70 <u>90</u></b>
<b>CONDITION NUMBER (if relevant):</b>				<b>4 - Closed</b>

## **Appendix 2. Stakeholder submissions (if any)**

No stakeholder submissions received.

**Appendix 3. Additional detail on conditions/ actions/ results (if necessary)**

No additional detail necessary.

## Appendix 4. Revised Surveillance Program

The original surveillance schedule called for on-site surveillance for years 1 and 4. The team reconsidered that the on-site visits should occur in years 2 and 4, as little new information would be available in year 1.

**Table 5.1: Surveillance level rationale**

Year	Surveillance activity	Number of auditors	Rationale
3	Off-site audit	3 auditors off-site	The client provides a wide range of information ( <a href="https://deepwatergroup.org/certification/orange-roughy-second-surveillance-audit-2018/">https://deepwatergroup.org/certification/orange-roughy-second-surveillance-audit-2018/</a> ) that can be used to verify progress towards all conditions and means for effective remote meetings is available (well-functioning video conferencing technology).

**Table 5.2: Timing of surveillance audit**

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
3	December 2019	December 2019	The actual anniversary date works well for gathering relevant information and providing access to the assessment team and stakeholders.

**Table 5.3: Fishery Surveillance Program**

Surveillance Level	Year 1	Year 2	Year 3	Year 4
Level 4	Off-site surveillance audit	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit & re-certification site visit.

**Appendix 5. Surveillance audit information (if necessary)**

No additional information necessary.