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Orange roughy implications for SPRFMO

DSCC – ECO NZ

South Pacific Regional Fisheries Management Organisation

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**New Zealand orange roughy:
Implications for SPRFMO deepwater stocks**

Observer Paper

Deep Sea Conservation Coalition and ECO

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New Zealand orange roughy: Implications for SPRFMO deepwater stocks

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1. Abstract

Next year, the SPRFMO Commission is scheduled to review CMM 03a-2025, including setting new catch limits for orange roughy and other deepwater species. Other than for orange roughy on Westpac Bank, which was assessed in 2024 and reviewed by SC12 to inform the reduction agreed at Comm13, there are no recent stock assessments available. If no papers are submitted to SC13 on which to develop recommendations for the Commission, the SC should look to the best available sources of information to develop advice consistent with the precautionary approach and the ecosystem approach (Article 3 of the Convention).

For orange roughy, the most recent information on population status comes from NZ's Chatham Rise, where the world's largest orange roughy fishery, East and South Chatham Rise (ESCR) has been assessed this year, along with several smaller fisheries within the New Zealand management unit ORH 3B. The ESCR stock is estimated to be between 8 - 18% of unfished biomass (B_0) meaning it is at, or near, the point of collapse. By the SC13 meeting the New Zealand government will likely have made a decision on whether or not to close this fishery or set a reduced catch limit (Fisheries New Zealand (FNZ) 2025).

For other deepwater species such as alfonsino, oreos and cardinalfish, precautionary catch limits have not been set by the Commission (para 11, CMM 03a-2025). None of these species have had stock assessments in the SPRFMO area and current catch limits are still set for combined multiple species and stocks, as "*all other target and non-target fish species in the Evaluated Area*" based on the combined average annual total catch between 1 January 2002 to 31 December 2006. Recent catches are low, and not constrained by that catch limit.

In light of these factors, the 2026 review of CMM 03a the SC should recommend precautionary catch limits with a clear workplan to address information deficiencies for orange roughy and other deepwater species caught in the convention area.

2. Introduction

Orange roughy is an extremely long-lived deep sea species, with maximum ages of well over two centuries recorded in SPRFMO and adjacent waters (Horn and Ó Maolagáin, 2019). It has low productivity, with maturity starting around 25-30 years. However orange roughy is known not to spawn every year and it is probable that younger mature fish, in particular, do not spawn every year.

As Clark noted more than two decades ago, deepwater exploited species have *“slow growth rates and high longevity compared to traditional commercial species from the continental shelf. They have low levels of sustainable yields, are vulnerable to overfishing, and have slow recovery rates.”* Further, there was uncertainty about *“how resilient and sustainable these fisheries may be in the long term”* (Clark 2001). These are reminders of the questions that still face orange roughy fisheries managers today.

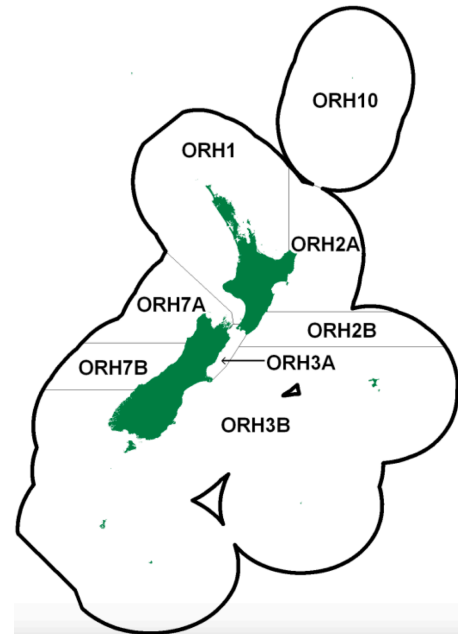


Figure 1: New Zealand orange roughy management areas (from Fisheries New Zealand)

New Zealand is likely home to the world’s largest population of orange roughy, on the Chatham Rise (ORH 3B - see figure 1). This fishery started in the late 1970s and peaked in the mid to late 1980s at over 32,000 tonnes. The fishery saw a sharp decline through the 1990s down to 9,000 tonnes reported caught. This led to fishing in other areas of ORH3B including sub-Antarctic areas. The past 25 years have seen two periods of catch increases for the ORH 3B fishery, (with catch limits around $\frac{1}{3}$ of their peak level, reducing to around 20%). Each of these has resulted in a further decline within a decade. The catch in 2023/24 was the second lowest in the history of the fishery, and only 43% of the catch limit.

The consistent pattern observed in orange roughy fisheries in New Zealand and globally has been discovery of fish, followed by a large increase in trawl effort and then rapid decline and often collapse of fisheries focused on spawning aggregations. The serial depletion of fisheries on seamounts and other features has been well described for the ESCR and for sub-Antarctic features (e.g. Clark 1999, Tingley and Dunn 2018, Dunn 2024). Smaller orange roughy populations located on a single feature (for example Pukaki Rise and near the Auckland Islands and Bounty Islands) all showed a rapid decline in catch rates and catches and fisheries ceased

within a matter of years (FNZ 2025b). All indications are that these small feature-based orange roughy populations simply cannot sustain catches.

Both New Zealand's ORH 7A (which includes the Westpac Bank in SPRFMO area) and ORH 7B (West Coast South Island) fisheries have shown similar declines. ORH 7B was closed in 2007 and has not been re-opened.

The large declines and loss of spawning aggregations in orange roughy fisheries has been reported in several New Zealand fisheries. Fisheries New Zealand (2025c) reports the loss of large spawning aggregations in the Mid-East Coast stock (ORH 2B), Central flats in ORH 7A and from Graveyard Hill in Northwest Chatham Rise (ORH 3B). The implications of the loss of spawning aggregations are not known but is clearly a matter to be considered when applying the precautionary and ecosystem approach to orange roughy fisheries.

New Zealand's 2024 stock assessment of the Challenger and Westpac Bank fishery (Dunn, 2024b) was presented to SC12. The paper noted that no aggregations of spawning fish were found in historical spawning sites on the central flats or other areas within the New Zealand EEZ and that the only spawning aggregation was found on the feature "Volcano" in the SPRFMO area.

The disappearance of orange roughy spawning aggregations from Graveyard Hill, a historical spawning site, was noted again in the 2025 ORH 3B stock assessment (Dunn 2024b). The only spawning aggregations observed in the NWCR fishery in recent surveys have been on a seamount that is closed to trawling. Fisheries New Zealand (2025b) notes: "the main spawning aggregation now occurs on the Morgue hill which was closed to bottom fishing in 2001, rather than the Graveyard hill which remains open to fishing.

3. International experience

Globally, many orange roughy fisheries have been closed by fisheries management authorities not long after they started. In addition to New Zealand, orange roughy fisheries have been closed including in Chile, the northeast Atlantic, Australia, and Namibia. The fisheries in the NE Atlantic and Chile have been closed for many years (Tingley and Dunn 2018). The South East Atlantic Fisheries Organisation (SEAFO) limits orange roughy catches in the high seas to a 50 tonne exploratory catch limit. The Southern Indian Ocean Fishery Agreement (SIOFA) still has an orange roughy fishery but it is much reduced from past years. The Tasman Rise fishery was closed prior to the establishment of SPRFMO and remains closed.

There are many lessons from the current state of fisheries and knowledge of orange roughy from New Zealand and beyond. Even after forty years of fishing, many unknowns remain about orange roughy, including their real natural mortality, age at maturity, whether they spawn annually or not, and the impact of the loss of key spawning aggregations on ecosystems and recruitment. It is well-reported by skippers that trawling on spawning aggregations disturbs the

formation and location of aggregations. The impact of this on spawning success or future recruitment is not known but recruitment is a key uncertainty in orange roughy fisheries. What is less understood is the relationship between habitat degradation of spawning sites (most commonly on seamounts and other features) and the continuation or loss of spawning aggregations at those sites. However, it is known that bottom trawling causes fundamental and long-lasting damage or loss of benthic species and vulnerable marine ecosystems found at those locations.

4. The 2025 stock assessment for orange roughy ORH 3B

The New Zealand ORH 3B fisheries were assessed in 2025, after concerns were raised in a previous, inconclusive stock assessment in 2023 (Dunn 2024a).

- The main fishery, ESCR (which makes up around half of ORH 3B catches) was estimated to be at 8-18% of unfished biomass (B_0).
- The 2023 investigation into this stock was inconclusive and resulted in the previous stock assessment being invalidated and the fishery self-suspended from Marine Stewardship Council (MSC) certification from 20 December 2023 (MSC 2023).
- Prior to that, an over-optimistic stock assessment had suggested the stock was recovering, leading to the catch limit being increased three times between 2018 and 2020 - from 5,197 tonnes to 7,967 tonnes.
- The smaller NWCR fishery is at the lower end of the FNZ target range, at 34-36% B_0 . However, its spawning aggregations have recently only been found on one seamount (Morgue) which has been closed to trawling since 2001 (FNZ 2025b, Clark 2010).
- The Puysegur fishery or stock has not been assessed since 2017 and its assessment is likely to be “overly optimistic” as it uses “the same model structure and range of assumptions as the 2020 ESCR stock assessment which was subsequently rejected by the [FNZ fisheries] plenary in 2023” (FNZ 2025b).
- The sub-Antarctic fisheries have never had full stock assessments, but all have seen a rapid decline in catch of any feature fished, e.g. southeast Pukaki, where the fishery started at 3,010 t and rapidly declined and ceased in four years (FNZ 2025b).

Fisheries New Zealand consulted on 2025/26 total allowable catch for the ORH 3B fishery in June-July 2025 (FNZ 2025a). The FNZ discussion document included three options ranging from a 23% to a 60% cut in the catch limit. The largest reduction (option 3) would close the ESCR fishery, which assumes the remaining ORH3B catch could be taken from the NWCR, Puysegur, and Sub-Antarctic fisheries. The FNZ discussion paper noted the largest reduction (ESCR closure) “provides the greatest certainty of rebuilding given the risk that recruitment may remain very low.”

The timeframe for recovery to 40% B_0 (the midpoint of the FNZ target range) is long, even if the ESCR fishery is closed from 2025/26. In models using “all-recruitment” (since 1911), the stock will slowly rebuild in the absence of fishing over 33 – 74 years. However, if the model uses recent recruitment (since 1980), recruitment is estimated to remain low, and the stock will not rebuild over the 100 year period assessed in the four models used for projections.

A decision on this matter must be made before 1 October 2025 and is expected prior to the SPRFMO SC13 meeting.

5. New Zealand fisheries management has implications for SPRFMO

The stark lesson from orange roughy fisheries globally is that additional caution is needed in managing long-lived low productivity species, particularly where life-history traits of the species are uncertain.

The orange roughy straddling stock in the Tasman Sea (Westpac Bank and New Zealand's ORH 7A fishery) was assessed in 2024 (Dunn 2024b). No spawning aggregations were found in-zone where they have historically occurred, the only aggregation observed was on the Volcano feature on Westpac Bank in the SPRFMO area, an area that hadn't been fished for two years when surveyed in 2023. All three models used in the 2024 ORH 7A assessment indicated that the stock had been declining since 2015. The selected base case (All2) contained no new biomass data since 2013, and indicated the stock was just above 30% B_0 while the assessment that used all the acoustic data (All6), including from the most recent 2023 survey, indicated that the stock had a 71% probability of being under 20% B_0 and was moving towards 10% B_0 (Dunn 2024b).

The 2024 ORH 7A assessment also showed that the fisheries footprint increased as the stock declined in two periods, firstly before the fishery was closed in 2000 and secondly after 2015 as the stock declined again. *“The overall fishing footprint increased again from 2015 and by 2023 reached a level similar to that in the late 1990s, although the footprint after 2015 included areas new to the fishery”* (Dunn 2024b). The unstandardised catch rates (t/tow) have shown similar trends. The expansion in fisheries footprint and likely associated benthic impact of the fishery, as stocks decline again, is one that SPRFMO should be aware of and address in the SPRFMO area.

The ORH 7A catch limit was reduced from 2,058 tonnes to 885 tonnes in the most recent fishing year (2024/25). The new catch limit is close to the previous year (2023/24) catch (846 tonnes) and would not allow the stock to rebuild if the All6 assessment is correct.

In the NWCR, one seamount closed to trawling is most likely now supporting the reproduction of the stock after spawning aggregations have disappeared from historical areas that have been, and still are, open to bottom trawling. This is further evidence of the need to protect orange roughy spawning sites, such as Volcano on the Westpac Bank, from being impacted by trawling.

In late 2024 on the NWCR one orange roughy bottom trawl event brought up six tonnes of bycatch, including stony corals (FNZ 2025a) demonstrating the significant adverse impacts that bottom trawling has on vulnerable marine ecosystems (VMEs). For SPRFMO, this underscores the need to fully implement relevant UNGA resolutions and other commitments to protect biodiversity from significant adverse impacts from fishing, including closing known VMEs to bottom fishing in line with CMM 03-2025.

Another issue for SPRFMO SC to consider is whether reductions in New Zealand's in-zone catch limits could displace effort into fisheries that have not been assessed by SPRFMO, such as alfonsino or oreos - both now considered long-lived species. Recent research on alfonsino from the Indian Ocean using otolith bomb carbon to estimate fish ages indicates alfonsino is much older than previously thought (even from a small sample, the maximum age was found to be at least 50 years old rather than a maximum of 20 years as previously thought) (Andrews 2023).

In the SPRFMO area these non-orange roughy deepwater stocks are not constrained by current catch limits, and catch limits are not even set for individual species or stocks (Para 11 and table 3 of Para 11 and table 3 of CMM 03a-2025).

6. Immediate priorities for SPRFMO

The SPRFMO Scientific Committee has an obligation to provide advice and recommendations to the Commission on catch limits, management strategies or plans for fisheries resources. The Commission must determine catch limits for most orange roughy fisheries at its next meeting. Paragraph 35 of CMM 03a-2025 states: *“Notwithstanding that the Commission may alter the catch limits prescribed in paragraphs 6, 8 and 10, this CMM shall be reviewed no later than the annual meeting of the Commission in 2026.”*

The current catch limits for the SPRFMO orange roughy fisheries (with the exception of Westpac Bank) expire at the end of 2025, so stock assessments should have been carried out in 2025, and presented to SC13 to inform new catch limits. We are not aware of any such assessments. If orange roughy catches in the SPRFMO area are to continue, new catch limits need to be agreed at Comm14 in 2026.

The SPRFMO convention (Article 3.2) is clear that the Scientific Committee *“shall:*

- (i) be more cautious when information is uncertain, unreliable or inadequate;*
- (ii) not use the absence of adequate scientific information as a reason for postponing or failing to take conservation and management measures; and*
- (iii) take account of best international practices regarding the application of the precautionary approach, including Annex II of the 1995 Agreement and the code of conduct”.*

In 2026 SPRFMO will be reviewing CMM 03a-2025, likely in the absence of new stock assessments. SC13 must ensure that the Commission is nevertheless aware of the best available information, including the status of New Zealand's main orange roughy fishery (at or near collapse), the disappearance of spawning aggregations from numerous historical spawning sites and recent instances of significant adverse impacts when bottom fishing occurs on VMEs.

In light of these factors, extreme caution is required in the setting of catch limits for orange roughy and other deepwater species in the SPRFMO area, and SPRFMO must prevent significant adverse impacts on VMEs from those fisheries.

7. Recommendations to SPRFMO SC

Noting the status of New Zealand's main orange roughy fishery, and the implications and lessons this has for SPRFMO's deepwater fisheries, DSCC recommends that SC:

1. Recommends to the Commission **new precautionary catch limits for orange roughy fisheries.**
2. Recommends to the Commission that **the feature "Volcano" on the Westpac Bank be closed to bottom fishing** as the only observed spawning aggregation for this straddling orange roughy stock.
3. Develops advice for the Commission on **precautionary catch limits for other deepwater species** caught in the SPRFMO area.

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