South Pacific Regional Fisheries Management Organisation

14th MEETING OF THE SCIENTIFIC COMMITTEE

7 to 12 September 2026, Tórshavn, Faroe Islands

SC14 - DW 16
Update of New Zealand 2024 VME Encounter Review

New Zealand

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Contents

1. Purpose

This paper is an update of SC13-DW09 which contained New Zealand's review of a Vulnerable Marine Ecosystem (VME) Encounter that occurred in 2024 on a New Zealand-flagged vessel that was bottom trawling in the SPRFMO Convention Area (Central Lord Howe Rise Fishery Management Area).

It presents the key findings of SC13-DW09 on the likelihood of VME occurrence, and the potential for significant adverse impacts from re-opening the area, and takes into account direct observation data which was previously unavailable. It then proposes management recommendations for the Scientific Committee's consideration.

2. Background

SC13-DW09 was prepared according to the SPRFMO Encounter Review Standard (ERS, SC12-DW10), and provides a detailed description of the 2024 encounter and suggested management actions to prevent significant adverse impacts (SAIs) on VMEs. It also proposed delaying management recommendations to the Scientific Committee (SC) in 2026 to enable consideration of an independent analysis of direct observational data collected by Greenpeace from within the encounter area. The ERS supports the use of indirect analysis but indicates that "*direct assessment methods are likely to provide the most robust information for identifying VMEs and should be the preferred assessment approach*". Hence the approach taken by New Zealand ensures the review and management actions are informed by the best available scientific information.

A description of the methodologies based on indirect data undertaken for the 2024 Review can be found in SC13DW-09. The analysis undertaken by Greenpeace is described in detail in the Restricted Information Paper as submitted to SC14, although preliminary findings were also presented to the 14th Meeting of the SPRFMO Commission (COMM14-Obs05). A draft of the paper was shared with New Zealand in early August to aid in the preparation of this updated review.

3. Assessment of whether a VME is known or likely to occur within the encounter area

3.1 Analysis and Conclusions in SC13-DW09

In SC13-DW09, New Zealand considered (i) geomorphological and biogeographical information, (ii) historical effort and VME indicator taxa bycatch, and (iii) predictive models for VME indicator taxa to determine the likelihood of VME occurrence within the encounter area.

3.1.1 Geomorphological and biogeographical information

SC13-DW09 includes analysis of geomorphology and topography, noting the presence of an underwater topographical feature (UTF), whose basal polygon partly overlaps with the encounter area. The 'SEAMOUNT' database (Clark et al., 2022) classified this as a 'knoll' – a feature with an elevation of between 250 and 999 m. However, low-resolution bathymetry data and a lack of surveys conducted at this location cause uncertainties regarding the UTF's characteristics.

3.1.2 Historical effort and VME indicator taxa bycatch

SC13-DW09 included analysis of benthic bycatch data for the 2008-2024 period from the New Zealand fleet bottom trawling in the following areas: the Bottom Trawl Management Area (BTMA), the 5nm buffer area around the encounter area, the encounter area and the UTF polygon. The paper noted[1]:

- Bycatch data recorded capture of VME indicator taxa for 131 of 209 historical tows within the BTMA.
- Some historical bycatch events (21 tows, 10% of tows in the BTMA) would have exceeded the thresholds (single VME indicator taxa) defined under Annex 6A of CMM03-2025 if this measure was in place at the time the fishing events took place.
- Within the 5nm Buffer Area, some historical tows would have exceeded the Annex 6A thresholds for Antipatharia and gorgonian Alcyonacea, including the 2024 tow triggering this encounter review, and two tows would have exceeded the Annex 6B (multiple VME indicator taxa) thresholds had this measure been in place at the time.
- A smaller number of the historical tows within the encounter area or on the UTF polygon would have exceeded the Annex 6A threshold for gorgonian Alcyonacea only (see Table 1).

Table 1: Summary of historical tows (2008-2024) from New Zealand vessels operating within the Central Lord Howe – East BTMA at the spatial scale of the BTMA, 5 nm buffer area around the encounter area, underwater topographic feature and encounter area. Number of tows with VME indicator taxa bycatch and number of tows that would have exceeded the threshold weights set in Annex 6A (single VME indicator taxa) of CMM03-2025 (N) at each spatial scale are provided. NB. this is a simplified version of Table 6 from SC13-DW09.

Area	Total number tows	Tows VME ind. Taxa bycatch	Number of tows which would have exceeded Annex 6A thresholds					
			Porifera	Scleractinia	Antipatharia	Gorgonian Alcyonacea	Zoantharia	Actinaria
BTMA	209	131	4	3	7	13	0	0
5nm buffer area	24	13	0	0	2	5	0	0
UTF Polygon	16	6	0	0	0	2	0	0
Encounter Area	14	5	0	0	0	1	0	0

[1] Some values have been corrected from those reported in SC13-DW09 due to the identification of an error in Table 5 of SC13-DW09. An updated version of Table 5 of SC13-DW09 can be found in Annex 1.

3.1.3 Predictive models for VME indicator taxa

The habitat suitability index (HSI) models (and associated estimates of uncertainty) for gorgonian Alcyonacea and Antipatharia as listed in Appendix E of the SPRFMO ERS were mapped overlaying the BTMA to visually assess the model predictions within the Encounter Area and the Surrounding Areas.

Predicted habitat suitability for gorgonian Alcyonacea and Antipatharia within the encounter area, UTF polygon and parts of the 5nm buffer area were found to be moderate-high.

A similar mapping exercise was done to overlay and assess against the relevant areas for predictive abundance models for VME indicator taxa. Abundance for gorgonian Alcyonacea and Antipatharia within the encounter area, UTF polygon and parts of the 5nm buffer area was predicted to be medium-low.

Some cells within the UTF polygon were classified more highly. The VME-index, which combines all existing HSI and abundance models for all VME indicator taxa, including their estimates of uncertainty, classified the 1 km x 1 km cells fully located within the UTF polygon as:

- High abundance-high richness (n=4)
- Low abundance-high richness (n=3)
- High abundance-low richness (n=1)

Overall, the indirect assessment noted that the data presented suggests the presence of a VME in the encounter area and nearby areas, but this cannot be categorically stated as definite VME presence.

3.2 Consideration of Direct Observational Data

Direct observational data was collected and analysed from within the encounter area by Greenpeace (COMM14-Obs05; SC14 Greenpeace Paper).

Greenpeace conducted four towed-camera transects within the encounter area. Continuous video footage was manually reviewed, and a subset of footage from three of the four transects was selected for detailed quantitative analysis using manually extracted still images ("frame grabs"). Each annotated image was assessed against the VME identification framework developed by Baco et al. (2023). While SPRFMO has not adopted a standard to identify VMEs, the Baco et al. (2023) framework is one of the few published approaches for identifying VMEs from still images. For the purpose of this review, its application was reviewed in detail.

A total of 94 images from three of the four transects were reviewed, of which 73 contained at least one individual belonging to a VME indicator taxon (as per Annex 5 of CMM03-2025). Of these 73 images, 33 (45.2%) images were classified by the authors as VMEs based on their application of the Baco et al. (2023) framework. Greenpeace concluded that the analysis confirmed the presence of vulnerable marine ecosystems within the encounter area.

COMM14-Obs05 confirmed the presence of seven VME indicator taxa within the encounter area, including three taxa (Crinoidea, Actiniaria and Stylasteridae) for which no bycatch records existed. This is broadly consistent with the results from the analysis of benthic bycatch data included in SC13-DW09 and summarised above, however the direct observation of three additional taxa represents confirmation of presence not previously available.

Greenpeace selected a subset of video footage and still images for analysis, based on the verified presence of at least one VME indicator taxon in the image. This targeted subsampling could mean that results derived from this subset may not be representative of the entire transect.

Based on COMM14-Obs05 and the draft SC14 paper shared with New Zealand, the sub-sampled dataset does not meet the criteria represented in four of the first five qualitative decision steps of the Baco et al. (2023) framework. The analysed images do not appear to demonstrate the presence of reef structures, chemosynthetic ecosystem taxa, evidence of areas with significant ecological function (such as spawning sites), or threatened taxa.

One qualitative decision step (very large/old individuals of a VME taxon) was likely to be met in several individual images, as the size of some coral and sponge individuals might exceed the 100-years old benchmark from Baco et al. (2023). While this could support VME designation at the single image level, Baco et al. (2023) emphasised that additional spatial context involving the consideration of multiple images (if available) is required to determine whether a VME is present and to define its patchiness and extent.

Further, the taxon-specific mean densities presented do not reach or exceed the thresholds suggested in Baco et al. (2023) for a “Yes” determination of VME presence, in the context of potential over or under estimation of overall density resulting from the sub-sampling approach.

The direct observational data available and the resulting analysis reinforces the findings from SC13-DW09 and confirms the presence of VME indicator taxa in the encounter area. Overall, it suggests the presence of a VME in the encounter area but, for the reasons set out above, this cannot be categorically stated as definite VME presence.

3.3 Overall Updated Conclusion

While neither the indirect analysis in SC13-DW09, nor the direct observational data definitively show the presence of a VME in the encounter area, both do suggest the potential presence of a VME in the encounter area and nearby areas.

The original analysis of potential significant adverse impacts on potential VMEs was still undertaken based on a precautionary approach. The application of this approach in the subsequent stages of the encounter review protocol remains appropriate.

4. Determining if reopening the encounter area will expose any potential VMEs to Significant Adverse Impacts (SAIs)

4.1 Analysis and Conclusions in SC13-DW09

To help assess the current and future likelihood of SAI on potential VMEs, a quantitative impact assessment was performed using the dynamic relative benthic status (dRBS) approach (Pitcher et al., 2015, 2017). This methodology was applied in the most recent update of the Cumulative Bottom Fishery Impact Assessment for Australian and New Zealand bottom fisheries (SC12-DW12_rev1).

Benthic status for 2024 was calculated across multiple spatial scales, ranging from the largest, the Central Lord Howe Rise Fisheries Management Area (FMA), to the smallest, the encounter and UTF polygon areas.

The conclusions of the assessment at each of the relevant spatial scales are set out below.

4.1.1 Fisheries Management Area (FMA)

Based on the results of the benthic impact assessment, both from this review and from the cumulative Bottom Fishery Impact Assessment for Australian and New Zealand bottom fisheries (SC12-DW12_rev1), benthic status for 2024 for all analysed taxa in the review is estimated to be above the 0.8 SAI threshold at the scale of the FMA.

4.1.2 Bottom Trawl Management Area

Based on the results of the benthic impact assessment from this review, benthic status for 2024 for all analysed taxa is estimated to be above the 0.8 SAI threshold at the scale of the BTMA (noting there is no agreed SAI threshold to be applied at the scale of a BTMA).

4.1.3 Encounter Area and Underwater Topographical Feature

At finer spatial scales, the benthic impact assessment indicates that portions of the encounter area and the UTF have experienced impacts from cumulative historical fishing activity (subject to VME presence). However, there is currently no agreed SAI threshold for application at this scale. Impacts will not have been uniform across these areas because fishing effort has not been distributed homogeneously.

4.2 Consideration of Direct Observation Data

The direct observational data do not provide significant additional information for the analysis of potential SAIs as undertaken in SC13-DW09. Though some direct observations of VME indicator taxa (presence of old coral and sponge individuals) do align with the predictions of distribution and abundance in the models used for that analysis.

4.3 Overall Updated Conclusion

Reopening the encounter area is unlikely to result in SAIs at the scale of the BTMA or FMA.

Reopening the encounter area could lead to additional impacts at the scale of the encounter area or the UTF polygon, if a VME is present at that scale.

5. Identifying management actions to prevent SAIs on VMEs

The analysis of New Zealand benthic bycatch data for the 2008-2024 period indicates that less than 7% (14 of 209) of tows analysed within the BTMA took place within the encounter area (see Table 1). This is relevant to considering the likelihood of future impacts in this area, assuming that the distribution of future effort remains similar.

Analysis of the benthic bycatch data, for the 2008-2024 period from the New Zealand fleet bottom trawling in the encounter area, showed that there has been no incident of VME bycatch which would have triggered the threshold weights in Annex 6A of CMM03, prior to the 2024 encounter (noting the lack of reliable spatial information for some tows, as discussed in SC13-DW09).

As noted in SC13-DW09, there is uncertainty around VME taxa abundance arising from the low catchability of VME indicator taxa and the limited number of tows by the New Zealand fleet within the encounter area during the 2008-2024 period. While acknowledging these uncertainties our findings support a conclusion that re-opening the area presents a low risk of SAIs to potential VMEs.

Despite overall relatively light levels of fishing effort (based on the 2008-2024 New Zealand trawling dataset analysed) in the encounter area and surrounding 5nm buffer area, the majority of tows (14 of 16) which occurred within the UTF polygon appear to be within the encounter area (noting lack of reliable spatial information for some tows). This means that maintaining the closure of the encounter area could potentially risk the displacement of any future fishing effort, however light, into other areas which may not have already been subject to benthic impacts. The combination of the overall light fishing in the relevant area, and the concentration of those historical impacts in the encounter area support our assessment of a relatively low risk of SAIs to potential VMEs from re-opening the encounter area.

In addition to this, while recognising the need for a precautionary approach, it should also be acknowledged that the best available scientific information provided no definitive conclusion on the presence of a VME in the encounter area. This uncertainty about VME presence and the potential scale of any VME in the encounter area is a relevant consideration for the wider assessment of risk and appropriate management responses.

In conclusion, it is recommended that the encounter area be re-opened on the basis of a low risk that re-opening the area to fishing would expose a VME to SAIs, if VMEs were present.

Noting that, if re-opened, the encounter area will still be subject to the encounter protocol, and in line with CMM03-2025 and the Convention, SPRFMO should continue to review its management approaches on the basis of best available scientific information. Therefore, we also recommend that the Commission notes that this decision be reviewed by the SC should relevant new information become available.

6. Recommendations

It is recommended that the Scientific Committee:

1. **Notes** that direct footage of the encounter area has been collected, and that the analysis undertaken demonstrated the presence of VME indicator taxa in the encounter area,
2. **Notes** that this supports the finding in SC13-DW09 that suggested the potential presence of a VME,
3. **Notes** that VME presence was not definitively demonstrated by either the indirect analysis or direct observation data;
4. **Notes** that the analysis in SC13-DW09 relating to significant adverse impacts remains valid and the best available scientific information;

We further recommend that the SC recommends that the Commission:

1. **Agrees** that the 2024 Encounter Area is re-opened to fishing; and
2. **Notes** that this decision should be reviewed by the Scientific Committee if further relevant information is received.

7. Acknowledgements

We reiterate the thanks give in SC31-DW09 to those who contributed to the initial review of this encounter. We further thank Greenpeace, the scientists, paper authors, vessel crew and all others involved in the collection and analysis of the direct observational data considered in this updated review.

8. References

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9. Annex 1 – Corrected Table 5 from SC13-DW09

Table 1 Number of trawl tows from New Zealand vessels operating within the Central Lord Howe Rise FMA over the 2008 - 2024 period. Number and percentage of tows are given at the scale of the FMA, BTMA, the 5 nm buffer area, the 'SEAMOUNT' database polygon (UTF polygon) and the closed encounter area. Number and percentage of tows with VME indicator taxa bycatch weights exceeding those set in Annex 6A (single VME indicator taxa) and Annex 6B (multiple VME indicator taxa) at each spatial scale are also provided.

Spatial scale	Number of tows	Tows VME indicator taxa bycatch		Tows exceeding single-taxon thresholds		Tows exceeding multiple-taxon thresholds	
		N	%	N	%	N	%
FMA	1,565	537	34.2	23	1.5	12	0.8
BTMA	209	131	62.7	21	10.0	11~~2~~	5.2~~0.9~~
5 nm buffer area	24	13	54.2	6	25.0	2~~0~~	8.3~~0~~
UTF polygon	16	6	37.5	2	12.5	0	0
Encounter area	14	5	35.7	1	7.1	0	0