

10TH MEETING OF THE SPRFMO COMMISSION

Held virtually, 24-28 January 2022

COMM 10 – Inf 03

Bottom Trawl Spatial Management Scenarios

Australia – New Zealand

South Pacific Regional Fisheries Management Organisation

10th Meeting of the Commission

Held virtually, 24 – 28 January 2022

Bottom trawl spatial management scenarios

Australia / New Zealand

December 2021

Table of Contents

Table of Contents	1
1. Purpose	2
2. Background	2
3. Summary of Methods	3
Spatial modelling of habitat suitability for VME indicator taxa	3
Accounting for historical fishing impacts on VME indicator taxa	4
Accounting for value to the fishery.....	5
Estimation of protection levels.....	5
Development of protection scenarios through boundary drawing.....	7
4. Results.....	7
Uncertainty	7
5. Discussion.....	21
Recommendations from other RFMOs or guidance documents.....	21
6. References	23
7. Appendix I: Summary results of scenarios for each FMA	24
8. Appendix II: Detailed results of scenarios for each FMA.....	34

1. Purpose

The purpose of this paper is to respond to the request made at the 9th meeting of the SPRFMO Commission to develop spatial management scenarios for bottom trawling that encompass protection levels of 70%, 80%, 90%, and 95% for the modelled vulnerable marine ecosystem (VME) indicator taxa using temporally static and temporally dynamic assessment methods.

These scenarios may support the Commission in its planned review of CMM03 noting that further analyses and consultation are necessary before any scenario is ready to be adopted, particularly in regards to:

- (i) the appropriate spatial scale at which to prevent significant adverse impacts on VMEs and
- (ii) the potential for unforeseen impacts on fishability of the scenarios.

2. Background

The Conservation and Management Measure for the Management of Bottom Fishing in the SPRFMO Convention Area ([CMM03-2021](#)) implements a spatial management regime designed to, inter alia, prevent Significant Adverse Impacts (SAI) on Vulnerable Marine Ecosystems (VMEs).

The spatial management regime was initially agreed by COMM7 (CMM03-2019) based on recommendations from the Scientific Committee (SC) that the process described in [SC6-DW11](#) to design the spatial management areas was appropriate.

An evaluation of the level of protection of VME indicator taxa provided by the spatial management regime initially implemented in CMM03-2019 was presented in the Cumulative Bottom Fishery Impact Assessment for Australia and New Zealand 2020 (BFIA, [SC8-DW07 Rev1](#)). Following review of the BFIA, the SC agreed that *“the proportion of suitable VME indicator taxa habitat [for which habitat suitability models exist] protected is uncertain but qualitatively favourable at most scales assessed. However, there are a number of areas at smaller scales (Fishery Management Areas) where the level of suitable habitat protected for some VME taxa is less favourable including Northwest Challenger, Central Louisville and Southern Louisville”*. SC8 also agreed that *“although the appropriate scale to assess and manage impacts on VMEs has not been defined in SPRFMO, the smaller scale of the Fishery Management Areas is likely to be a more biologically appropriate scale at which to assess and manage these impacts than larger scales”*.

At COMM9, Members noted ongoing discussions relating to the appropriate level of protection to prevent SAIs on VMEs in the SPRFMO Convention Area. Following discussions, Members agreed to specific tasking of the SC to ensure the information required to support the review of CMM03 in 2022 was provided, including:

“The SC to include in its workplan for 2021+ the development of spatial management scenarios for Bottom Trawling. This work will inform the Commission’s determination of the level of protection required to prevent SAI on VMEs in the SPRFMO Convention Area. Scenarios should encompass protection levels of 70%, 80%, 90%, 95% for the modelled VME indicator taxa using temporally static and temporally dynamic assessment methods. The SC should also explicitly account for uncertainties in current model predictions, the relative availability of VME indicator taxa in an area, and recommendations from other RFMOs or guidance documents when formulating its recommendations

to the Commission. Evaluations should be undertaken at spatial scales comparable to the Fisheries Management Areas described in SC8-DW07_rev1.”¹

The Australia and New Zealand jointly-developed methodology to develop the scenarios and to estimate protection levels was presented to the 9th meeting of the Scientific Committee ([SC9-DW06_rev1](#)). Following discussion at the deepwater workshop preceding the Scientific Committee meeting, the SC:

- **Noted** the metrics used to assess the protection levels for VME indicator taxa, ROC 0-linear and Power Mean, are representative of the metrics spectrum presented in the BFIA.
- **Noted** that protection level assessment was completed for all protection levels using both temporally static and a temporally dynamic methods, as requested by the Commission.
- **Agreed** that the approach taken to develop spatial management protection scenarios and report on their performance is appropriate and work will continue intersessionally to refine scenarios to meet all protection targets for presentation to Commission.
- **Recommended** that the Commission consider the results of the spatial protection scenarios including to inform its determination of the level of protection required to prevent SAI on VMEs in the SPRFMO Convention Area.
- **Noted** that ecologically relevant spatial scales for assessing protection levels to prevent SAIs on VME indicator taxa still remain to be agreed, but that the existing information at the [Fisheries Management Area] FMA is likely to be a more biologically appropriate compared with larger scales.

3. Summary of Methods

Spatial modelling of habitat suitability for VME indicator taxa

New Zealand and Australia have developed habitat suitability models (HSI) for VME indicator taxa through a series of projects over recent years. The spatial models have been progressively refined, and both the history of the developments and the detailed methods are described in the BFIA (SC8-DW07_Rev1). Models were available for 7 of the 13 VME indicator taxa identified in Annex 5 of CMM03-2021 (Table 1)

¹ Request from SC multi-year work plan (COMM9-Doc 06_Rev3): *Develop protection level options for VME indicator taxa at ecologically-meaningful spatial scales, using different approaches. Scenarios should encompass protection levels 70%, 80%, 90%, 95% for the modelled VME indicator taxa using temporally static and temporally static and dynamic assessment methods. The Scientific Committee should also explicitly account for uncertainties in current model predictions, the relative availability of VME indicator taxa in an area, and information from other RFMOs or guidance documents (if any) when formulating its recommendations to the Commission. Evaluations should be undertaken at spatial scales comparable to the Fisheries Management Areas described in SC8-DW07_rev1”* ([COMM9-Doc 06_rev3](#)).

Table 1: Matrix indicating VME indicator taxa identified in CMM03-2021 for which habitat suitability models have been created.

Phylum <i>Vulnerable taxa</i>	Lower taxonomic group	Qualifying taxa	Habitat suitability models	Code	
Porifera (Sponges)		All taxa of the classes Demospongiae and Hexactinellidae	Separate models for Demospongiae and Hexactinellida	DEM HEX	
	Cnidaria	Scleractinia (Stony corals)	All taxa within the following genera: <i>Solenosmilia</i> ; <i>Goniocorella</i> ; <i>Oculina</i> ; <i>Enallopsammia</i> ; <i>Madrepora</i> ; <i>Lophelia</i>	Separate models for <i>Enallopsammia rostrata</i> , <i>Madrepora oculata</i> , <i>Solenosmilia variabilis</i> , <i>Goniocorella dumosa</i>	ERO MOC SVA GDU COB
Antipatharia (Black corals)			All taxa	Modelled as a single group	
Alcyonacea (Soft corals)			All taxa excluding Gorgonian Alcyonacea	Modelled as a single group	SOC
Gorgonian					
Alcyonacea (Tree- like forms, sea fans, sea whips, bottlebrush)		All taxa within the following suborders: <i>Holaxonia</i> ; <i>Calaxonia</i> ; <i>Scleraxonia</i>	Modelled as a single group		
Pennatulacea (Sea pens)		All taxa	Modelled as a single group	PTU	
Actiniaria (Anemones)		All taxa	Not modelled		
Zoantharia (Hexacorals)		All taxa	Not modelled		
Bryozoa (Bryozoans)	Hydrozoa (Hydroids)	All taxa within the orders <i>Anthoathecata</i> and <i>Leptothecata</i> , excluding <i>Stylasteridae</i>	Not modelled		
	Stylasteridae (Hydrocorals)	All taxa	Modelled as a single group	COR	
		All taxa within the orders <i>Cheilostomatida</i> and <i>Ctenostomatida</i>	Not modelled		
Habitat Indicators					
Echinodermata	Brisingida (‘Armless’ stars)	All taxa	Not modelled		
	Crinoidea (Sea lillies)	All taxa	Not modelled		

Two metrics were derived from HSI values to represent the presence and abundance of VME taxa, respectively: the ROC 0-linear (“ROC”) and the Power Mean (“Power”) metrics. The ROC metric uses taxa-dependent thresholds to exclude areas with low likelihood of the presence of suitable habitat (below the threshold) and assumes that the higher the HSI values the higher the likelihood of VME indicator taxa presence (or abundance). The Power metric assumes that the mean power curve (mean in the range of low and high estimates for power relationships) represents the relationship between HSI values and the abundance of a VME indicator taxon. [SC8-DW07_Rev1](#) provides more information on these metrics.

Accounting for historical fishing impacts on VME indicator taxa

In the development of protection scenarios, both trawl-impacted and unimpacted baselines were investigated. Results are presented to enable a comparison of the relative effects of incorporating

historical fishing impacts. Using an unimpacted baseline provides information on VME indicator taxa protection levels for a pristine or pre-trawling state. Using impacted baselines provides information on protection of the VME indicator taxa that presumably remain following the impacts of historical trawling.

Accounting for value to the fishery

To account for the fishery value in addition to conservation value when evaluating the performance of spatial management, a spatial layer incorporating historical trawl catch and effort was developed by the New Zealand fishing industry to describe fisheries value. This layer used spatial catch records from over 54,000 fishing events to estimate the value of fisheries by 1km² cells. This layer represents the reported start and end positions of tows which are based on the position of the vessel when the net reaches/leaves fishing depth. It therefore does not provide information on run-in (time and distance) required for the net to leave the vessel and reach fishable depth or be returned to the surface. As a result, it likely underestimates the impact of some scenarios on fishing value.

Estimation of protection levels

As tasked, two different assessment methods representing temporally static (i.e., post-accounting) and temporally dynamic (i.e., RBS) approaches were used to calculate protection level statistics describing the performance of the spatial management regime and to support development of the requested potential spatial management scenarios.

Post accounting is a process that calculates the proportion of a VME indicator taxon within an FMA that occurs in areas closed to trawling (see Figures 1 and 2). This method, in effect, describes the level of protection that is provided by the area closed to trawling. It is defined as a ‘temporally static’ method because it does not consider future recovery of impacted taxa.

Alternatively, Relative Benthic Status (RBS) is defined as a ‘temporally dynamic’ method. RBS estimates the long-term relative abundance of biota as a fraction of its unimpacted level. The relative status of VME indicator taxa estimated through RBS depends on exposure to past trawling and to anticipated future trawling, and taxon-specific impact rates (depletion per trawl) and recovery rates (sensitivity). This means RBS can account for both past/future trawling effort and VME taxa recovery rates, allowing an estimation of protection levels at equilibrium (i.e., in the future) (Pitcher et al. 2017).

Both post-accounting and RBS methods assume that protection is afforded to VME indicator taxa outside of the areas open to bottom trawling, whereas taxa within the open areas are exposed to trawling impacts.

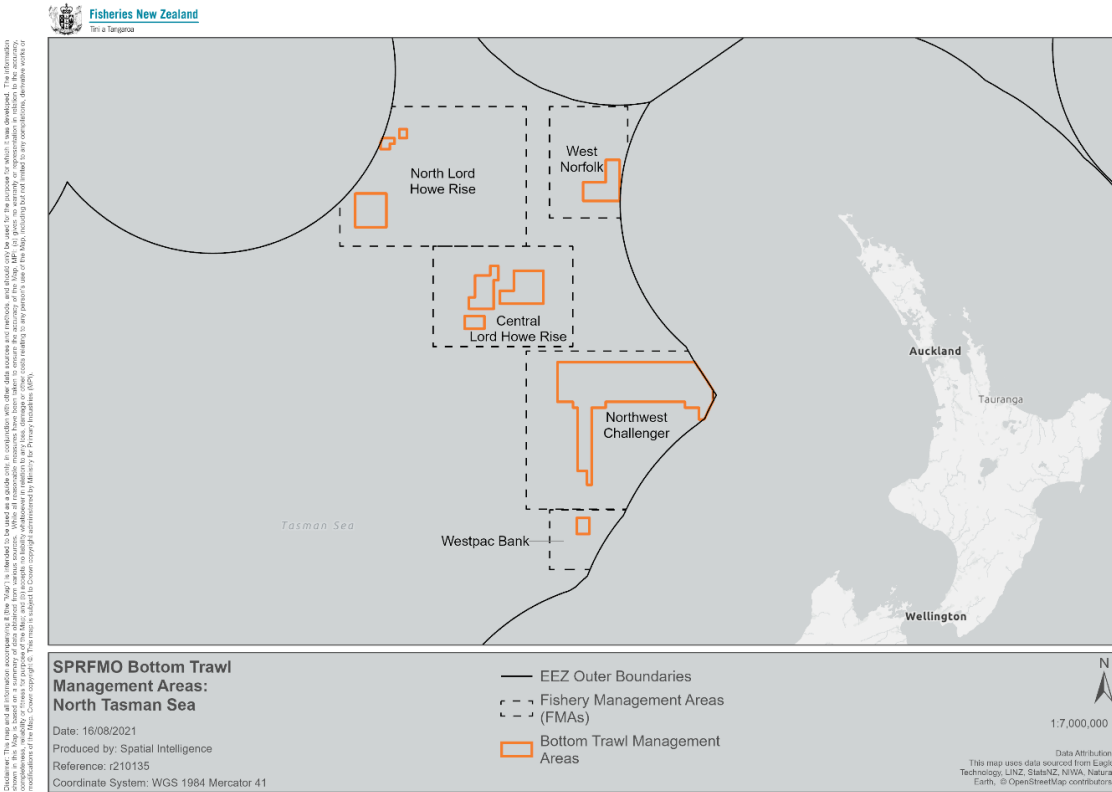


Figure 1: Bottom Trawl Management Areas and Fisheries Management Areas in the Tasman Sea.

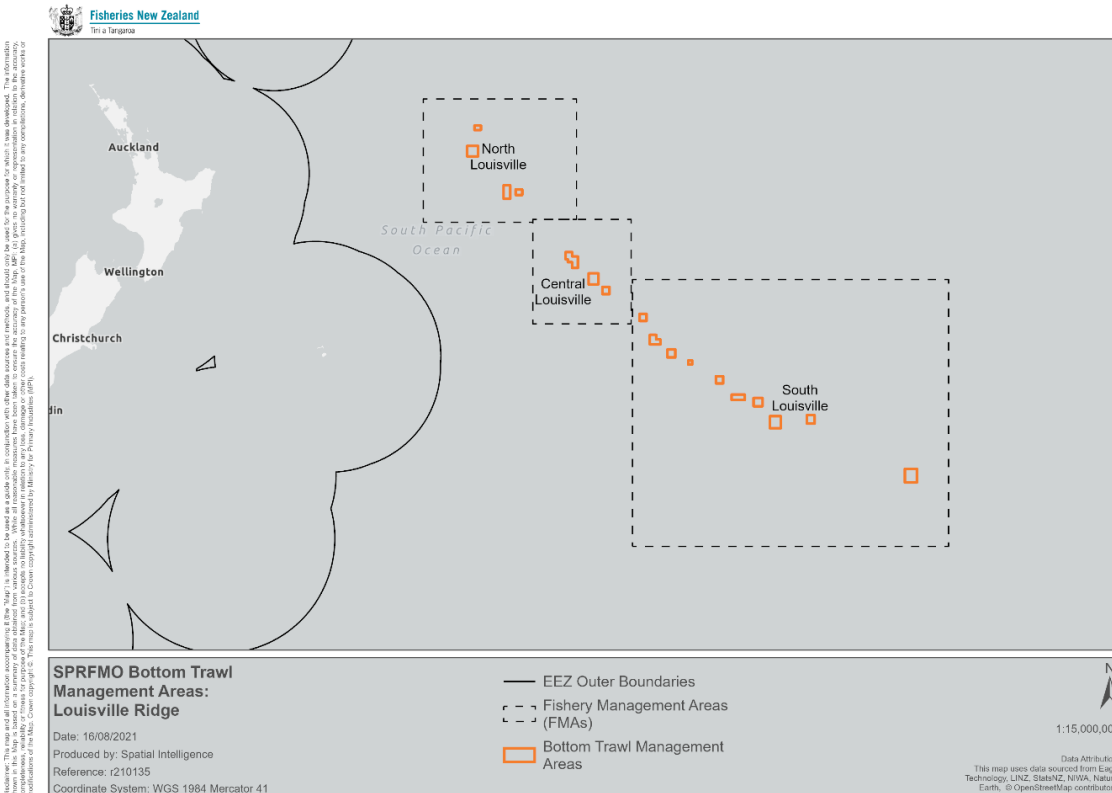


Figure 2: Bottom Trawl Management Areas and Fisheries Management Areas on the Louisville Ridge.

Development of protection scenarios through boundary drawing

To develop the scenarios requested by the Commission (*protection levels of 70%, 80%, 90%, 95% for the modelled VME indicator taxa*), the existing Bottom Trawl Management Areas were modified. These modifications define progressively smaller open areas, to achieve increasingly higher protection level targets for modelled VME indicator taxa.

Officials from New Zealand and Australia held two virtual workshops prior to SC9 that considered each FMA in turn, and iteratively refined open area boundaries to meet each of the protection targets specified by the Commission for all VME indicator taxa for which models exist with the aim of ensuring:

- minimum protection targets were met or exceeded according to both the ROC and Power metrics using an unimpacted baseline and the post accounting method;
- protection targets were met for all taxa that had more than 1% of their predicted distribution/abundance within the FMA across all metrics. This percentage was selected as a cut-off based on an assumption that FMAs with less than 1% of the overall distribution of a taxa are unlikely to be representative of the population;
- impacts on estimated historical fishery value were minimised while achieving the scenario protection targets; and
- the complexity of management boundaries was minimised for practicality purposes.

Following the SC meeting and confirmation of the appropriateness of the methodology, Australian and New Zealand officials undertook further work to refine the scenarios and ensure all targets were met.

In addition, representatives of the fishing industry² were engaged to provide further information on the time and distance required for the net to reach fishing depth and to be hauled back to the surface. Limited information was received, although it was noted that vessels likely require around 3 nautical miles from the edge of a management area for the gear to reach fishing depth.

4. Results

Results are summarised below for each FMA, and summary statistics are provided in Appendix I.

It was not possible to re-run the RBS assessment method post-Scientific Committee, and therefore RBS results are not provided below. RBS results may be found for the previous version of the scenarios, all of which had equivalent or lower levels of protection, in [SC9-DW06_rev1](#).

Uncertainty

The primary source of uncertainty in the scenarios is in the underlying estimates of VME indicator taxa abundance. The habitat suitability models have high statistical skill in classifying suitable VME indicator taxa habitat. However, there is great uncertainty in translating model outputs to estimates of abundance of VME indicator taxa on the seafloor, as well as issues of potential model over-prediction leading to over-optimistic estimates of protection for some taxa ([SC8 Report](#)).

² For clarity, the consultation with industry did not fully canvas the views of all industry participants.

There is also additional uncertainty associated with the assessment methods (post-accounting and RBS), but this is small relative to the uncertainty described above.

Due to the limited detailed information available on at-sea fishing operations, e.g. net sink rates, and direction of towing in key high value areas, the estimates of impacts on the historical fishing value available in this paper are likely significant underestimates, and some areas may no longer be fishable.

Additional detailed results including estimates of uncertainty are provided in Appendix II.

West Norfolk

In the West Norfolk FMA there is one area open to bottom trawling. The spatial management in CMM03-2021 does not currently meet the 70% protection target for three modelled VME taxa. The area currently open to bottom trawling was reduced to achieve the 70% protection target and reduced incrementally to achieve the 95% target (Figure 3).

Based on the available information on fishing value in the area, the Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of access to 2.59% of the estimated historical fishery value. The 70% scenario results in lost access to an additional 18.5% of estimated historical fishing value, increasing to 56.58% for the 95% scenario (Table 1). Anecdotal information on operational requirements for fishing suggests that lost fishery access may be greater than this analysis suggests.

Table 2: West Norfolk summary statistics

Unimpacted baseline											
	% in FMA		Current*	70%		80%		90%		95%	
Taxa	ROC	Power	ROC	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	3.16	1.87	47.6	80.80	73.60	89.01	86.25	94.81	93.73	98.45	99.38
GDU	1.26	2.99	38.4	80.17	91.74	84.56	93.53	92.07	96.13	95.12	99.10
MOC	5.62	6.03	77.5	93.82	93.88	96.67	97.06	98.30	98.51	99.60	99.67
SVA	2.39	0	67.9	87.79	98.87	88.59	98.90	92.54	99.28	98.47	100.00
COB	7.87	7.45	84.1	92.20	90.45	93.90	92.68	96.40	95.84	98.83	98.51
COR	13.79	35.2	98	98.80	99.76	99.37	99.92	99.69	99.95	99.97	99.99
DEM	9.76	38.27	99.6	99.57	99.99	99.61	99.99	99.62	99.99	99.94	100.00
HEX	2.62	1.7	91	94.90	99.46	95.35	99.49	96.87	99.61	99.53	99.95
PTU	1.54	0.02	90.8	94.20	95.99	94.88	96.23	96.66	96.62	99.57	99.97
SOC	4.88	5.75	87	94.20	89.61	95.72	91.86	97.46	94.88	99.14	97.69
Fishing value lost %			2.59	21.12		24.46		27.75		56.58	

* Values taken from SC8-DW07 rev1 and values may differ slightly as calculations used the impacted baseline

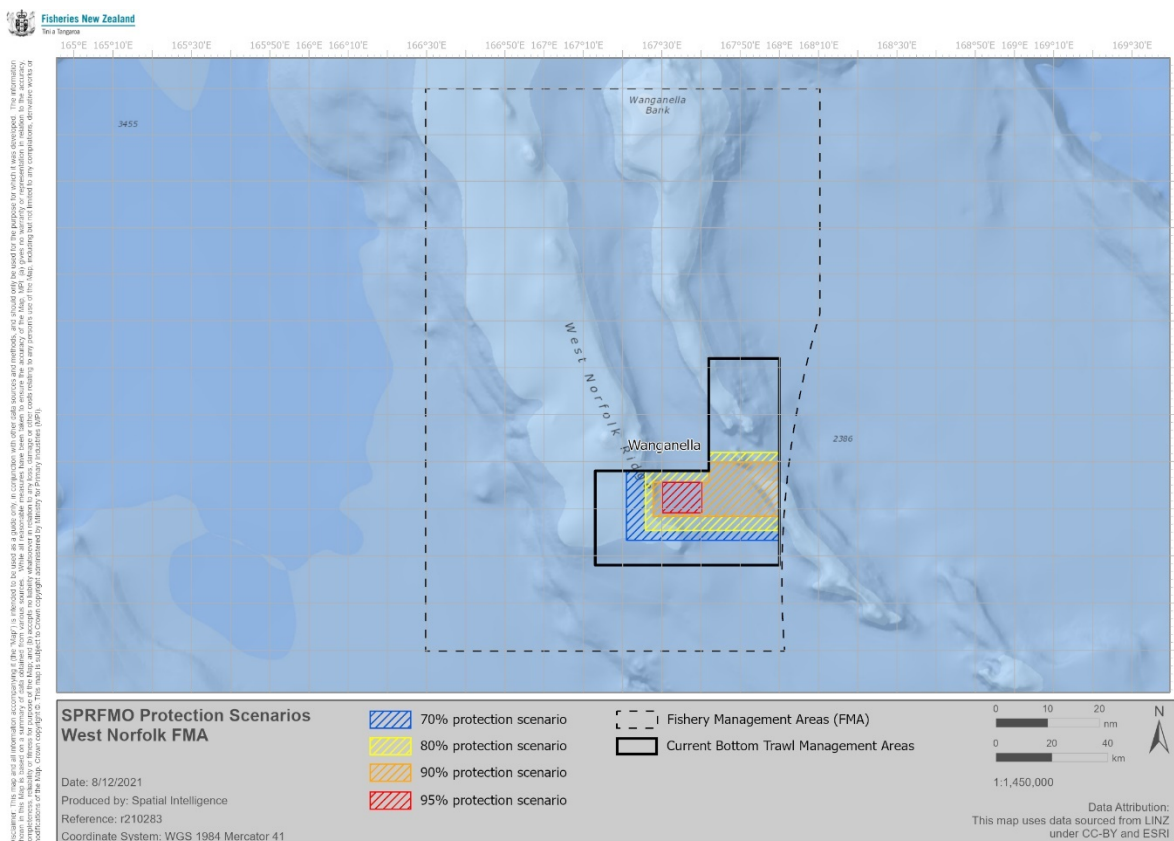


Figure 3: West Norfolk indicative map

North Lord Howe

In the North Lord Howe FMA, there are currently three areas open to bottom trawling. The spatial management currently achieves the 70% and 80% protection targets across all modelled VME indicator taxa. The North Lord Howe South management area was modified to achieve the 90% scenario, and the North Lord Howe South and North Lord Howe West management areas were modified to achieve the 95% scenario (Figure 4).

Based on the available information on fishing value in the area, the Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of accessibility to 19.8% of the estimated historical fishery value (Table 3). The 90% scenario results in lost access to an additional 0.4% of fishing value, increasing to 21.7% for the 95% scenario. Anecdotal information on operational requirements for fishing suggests that lost access may be greater than this analysis suggests.

Table 3: North Lord Howe summary statistics

Unimpacted baseline											
	% in FMA		Current	70%		80%		90%		95%	
Taxa	ROC	Power	ROC	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	12.16	8	89.7	87.44	96.71	87.44	96.71	90.84	97.55	96.23	98.97
GDU	0.12	5.48	12.5	56.47	90.43	56.47	90.43	86.14	94.69	90.74	97.32
MOC	0.76	0.95	99.3	98.87	96.77	98.87	96.77	100.00	99.01	100.00	99.60
SVA	0.79	0	100	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	18.76	13.56	85.1	84.20	83.59	84.20	83.59	90.42	90.34	95.09	95.07
COR	0.01	0.01	0	32.34	98.27	32.34	98.27	32.34	98.73	32.34	98.73
DEM	9.79	0.3	98.1	97.65	99.05	97.65	99.05	99.04	99.69	99.04	99.69
HEX	4.13	0.74	98.4	97.86	99.84	97.86	99.84	98.43	99.86	98.73	99.87
PTU	5.54	1.5	92.1	92.80	99.86	92.80	99.86	96.01	99.90	97.77	99.92
SOC	10.62	12.17	89.4	88.31	82.81	88.31	82.81	93.51	91.49	96.63	95.61
Fishing value lost %			19.8	19.8		19.8		20.24		21.68	

* Values taken from SC8-DW07 rev1 and values may differ slightly as calculations used the impacted baseline

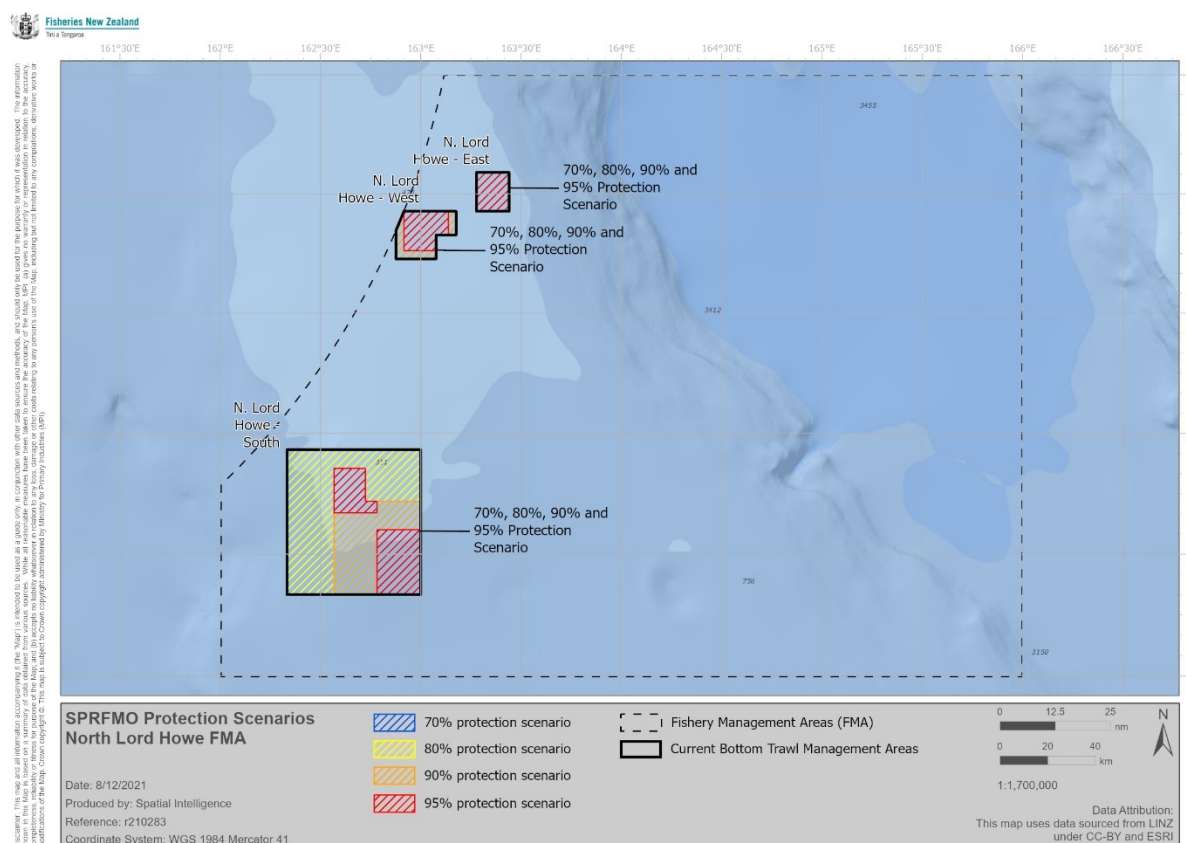


Figure 4: North Lord Howe indicative map

South Lord Howe

In the South Lord Howe FMA, there are currently three areas open to bottom trawling. The South Lord Howe South and South Lord Howe East management areas were modified to achieve the 70% scenario (Figure 5). Both the South Lord Howe-South and South Lord Howe-East management areas were closed and the South Lord Howe West management area modified to meet the 90% and 95% scenarios.

Based on the available information on fishing value in the area, the Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of accessibility to 6.24% of the estimated historical fishery value (Table 4). The 70% scenario resulted in lost access to an additional 15.15% of fishing value, increasing to 71.62% under the 95% scenario. Anecdotal information on operational requirements for fishing suggests that lost access may be greater than this analysis suggests.

Table 4: South Lord Howe summary statistics

Unimpacted baseline											
	% in FMA		Current*	70%		80%		90%		95%	
Taxa	ROC	Power	ROC	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	34.12	47.52	74.5	76.21	75.07	85.97	86.18	93.44	93.50	96.17	96.22
GDU	1.55	5.69	79.8	75.24	84.35	90.26	90.74	97.04	97.06	97.18	98.36
MOC	7.99	6.78	76.6	78.30	74.89	84.44	82.29	99.92	99.82	99.92	99.83
SVA	1.15	0	72.9	71.87	84.68	81.19	88.54	100.00	100.00	100.00	100.00
COB	21.96	26.67	76.6	76.58	73.66	85.67	83.70	93.47	92.04	96.29	95.88
COR	0	0	0	0.00	44.49	100.00	93.01	100.00	99.13	100.00	99.56
DEM	1.15	0	99.8	99.85	75.99	100.00	100.00	100.00	100.00	100.00	100.00
HEX	3.5	3.78	97.5	97.37	99.96	98.15	99.98	99.93	100.00	99.93	100.00
PTU	3.07	1.47	93.7	95.87	99.58	96.23	99.58	100.00	100.00	100.00	100.00
SOC	6.8	9.44	74	75.17	71.13	84.55	81.01	93.02	91.29	96.33	96.96
Fishing value lost %			6.24	21.39		26.3		47.56		71.62	

* Values taken from SC8-DW07 rev1 and values may differ slightly as calculations used the impacted baseline

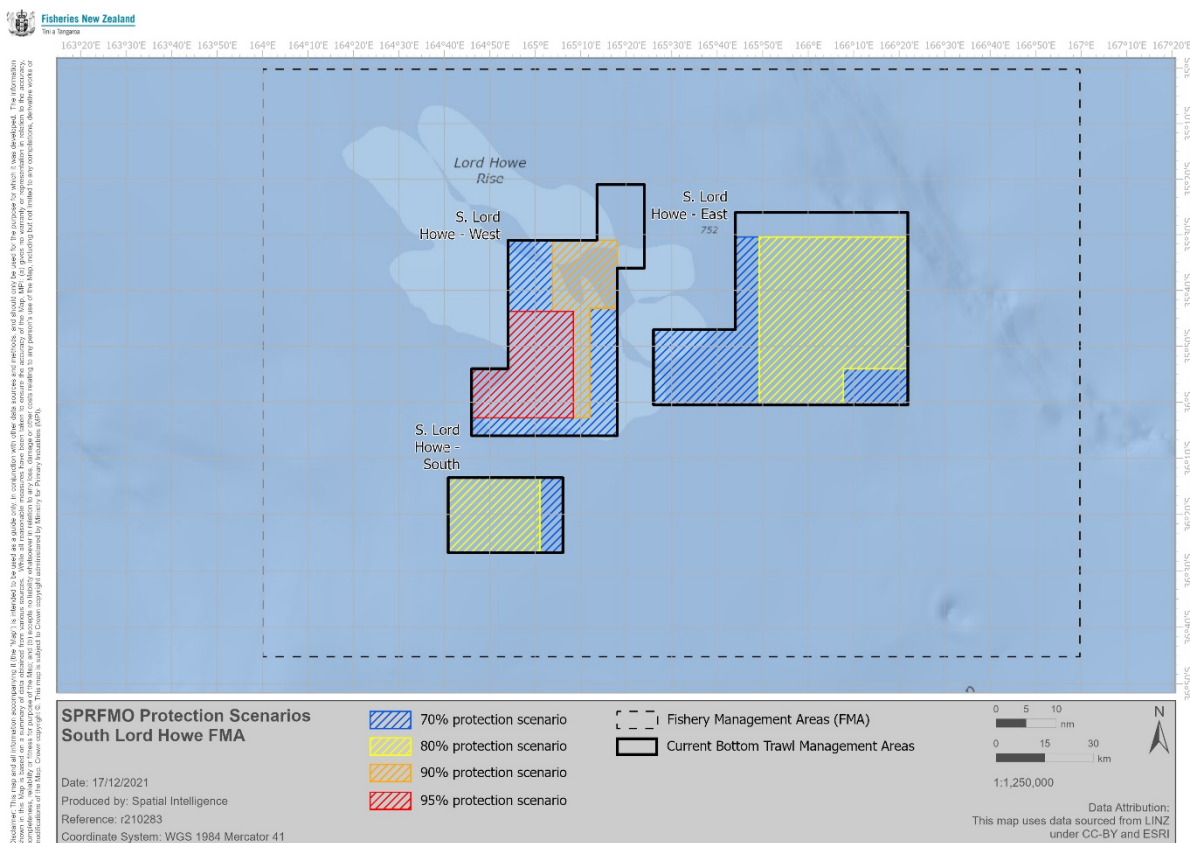


Figure 5: South Lord Howe indicative map

Northwest Challenger

In the Northwest Challenger FMA, there is currently one area open to bottom trawling. The spatial management currently does not meet the 70% protection target across five of the modelled VME indicator taxa. The area was significantly modified to achieve the 70% scenario, and the area available for fishing was progressively reduced to achieve the 95% scenario (Figure 6).

Based on the available information on fishing value in the area, the Bottom Trawl Management Area in CMM03-2021 has resulted in the loss of 1.08% of the estimated historical fishery value (Table 5). The 70% protection scenario resulted in loss of access to an additional 31.1% of estimated historical fishing value, increasing to 76.08% for the 95% protection scenario. Anecdotal information on operational requirements for fishing suggests that lost access may be greater than this analysis suggests.

Table 5: Northwest Challenger summary statistics

Unimpacted baseline											
	% in FMA		Current	70%		80%		90%		95%	
Taxa	ROC	Power	ROC	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	15.33	10.98	26.8	74.76	76.55	83.98	84.19	91.87	91.23	97.15	97.25
GDU	55.95	13.39	91.6	95.96	92.50	97.31	95.15	98.20	97.66	99.45	98.96
MOC	14.58	18.95	44.2	83.28	83.59	88.46	87.44	95.33	94.87	100.00	99.99
SVA	0.96	0	89.2	99.89	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	13.78	14.74	26.4	71.09	75.67	81.02	83.49	90.77	91.73	95.43	96.00
COR	0.65	0.23	99.5	99.60	99.52	99.60	99.59	99.60	99.68	99.60	99.74
DEM	10.62	3.04	95.5	99.52	99.93	99.79	100.00	99.94	100.00	100.00	100.00
HEX	6.23	0.94	52.5	89.36	88.34	93.32	90.63	96.73	96.67	97.77	97.34
PTU	7.47	10.32	73.4	96.89	99.89	98.31	99.92	99.50	99.98	99.65	99.98
SOC	4.89	4.41	64.5	91.75	93.07	93.35	94.17	96.85	96.71	98.40	97.82
Fishing value lost %			1.08	32.18		35.48		43.4		76.08	

* Values taken from SC8-DW07 rev1 and values may differ slightly as calculations used the impacted baseline

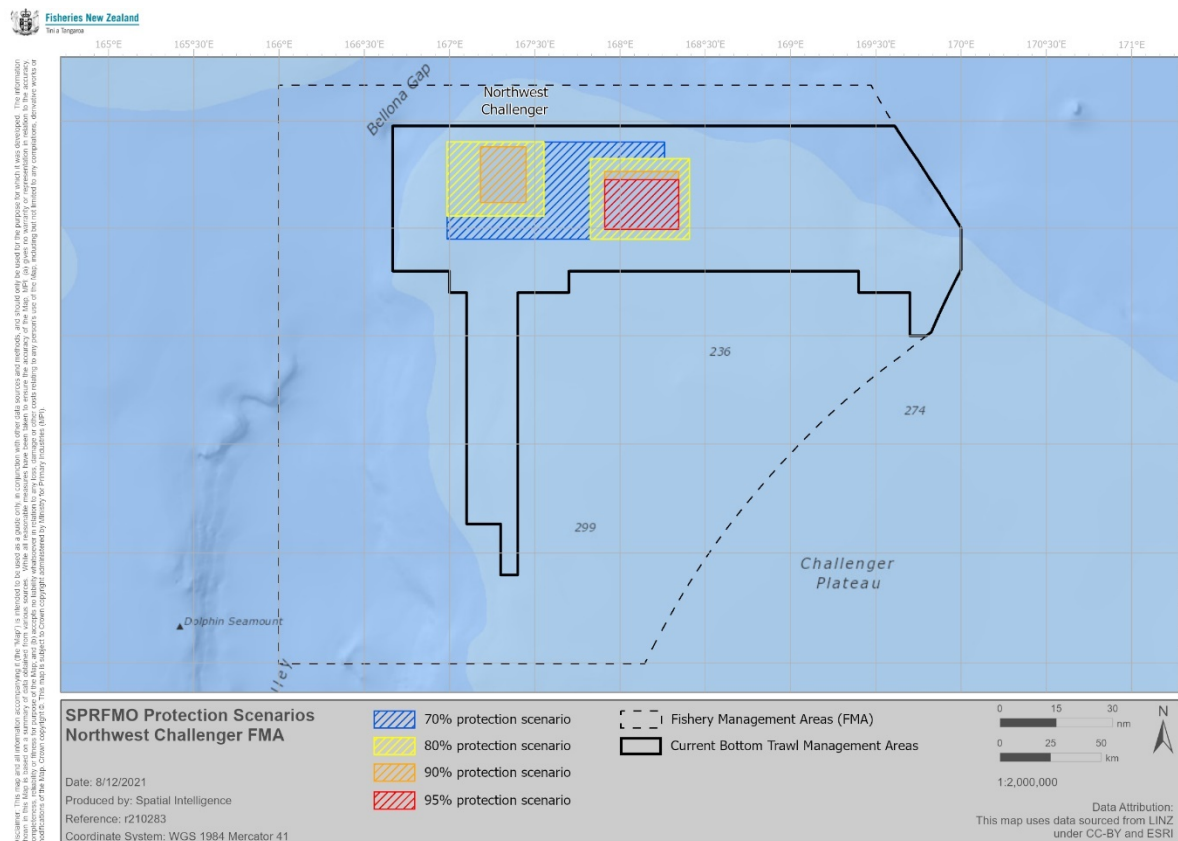


Figure 6: Northwest Challenger indicative map

Westpac Bank

In the Westpac Bank FMA, there is currently one area open to bottom trawling. The spatial management under CMM03-2021 meets the 70% protection target across all modelled VME indicator taxa. The current open area was reduced to achieve the 80% scenario and then modified further, taking into account known fishing patterns, to achieve the remaining scenarios (Figure 7).

Based on the available information on fishing value in the area, the Bottom Trawl Management Areas in CMM03-2021 have resulted in of the loss of accessibility to 1.28% of the estimated historical fishery value (Table 6). The 80% scenario resulted in the lost access to an additional 1.16% of estimated historical fishing value, increasing to 29.31% for the 95% scenario. Anecdotal information on operational requirements for fishing suggests that lost access may be greater than this analysis suggests.

Table 6: Westpac Bank summary statistics

Unimpacted baseline												
	% in FMA		Current*		70%		80%		90%		95%	
Taxa	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	4.67	3.96	88.7	87.3	87.51	87.05	89.29	89.30	94.73	94.61	98.06	98.35
GDU	0.38	1.25	85.8	92	85.24	91.17	87.41	93.68	93.26	97.28	98.49	98.87
MOC	3.43	4.45	86.6	89.2	86.41	88.27	91.40	91.48	96.91	97.65	99.28	99.35
SVA	2.35	0.02	77.6	67.8	75.58	73.71	85.60	89.94	95.39	99.99	97.91	100.00
COB	3.11	2.99	85.7	83.1	83.26	79.20	86.95	83.23	93.69	91.44	97.17	95.89
COR	0.01	0	90.4	84	85.94	85.11	85.94	91.71	85.94	94.74	85.94	95.80
DEM	0.88	0.24	100	100	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.61	0.03	99.8	99.9	99.82	99.97	100.00	99.99	100.00	100.00	100.00	100.00
PTU	0.89	0.88	98.9	100	99.14	100.00	99.71	100.00	99.98	100.00	99.99	100.00
SOC	1.95	2	89.5	85.5	87.42	73.44	91.38	81.91	96.06	90.64	98.24	95.22
Fishing value lost %			1.28 (current)		1.28		2.44		8.45		29.31	

*Current values taken from SC9-DW02 Addendum to the Cumulative BFIA (there may be slight differences as they were based on an impacted baseline)

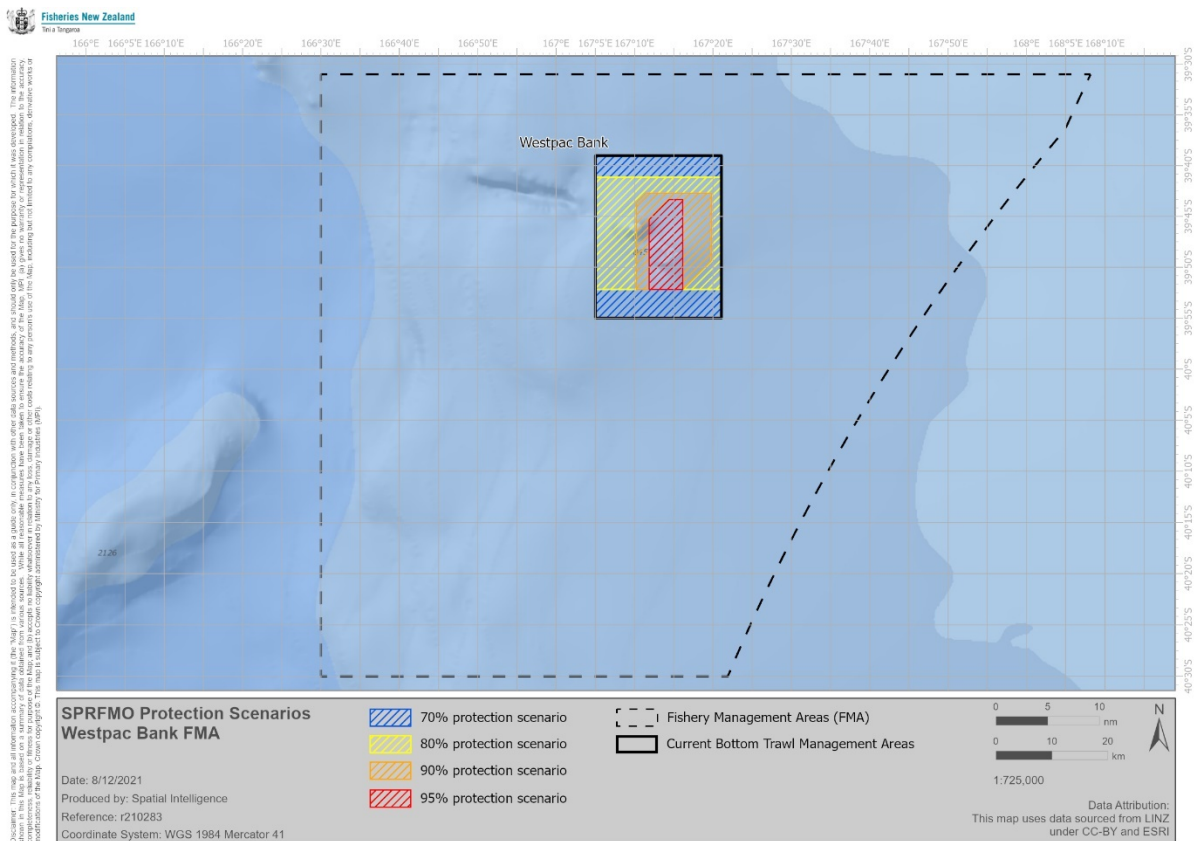


Figure 7: Westpac Bank indicative map

South Tasman Rise

In the South Tasman Rise FMA, there are currently three areas open to bottom trawling. The spatial management currently meets the 70% protection target across all modelled VME indicator taxa. Small changes to the boundaries of two management areas were required to achieve 80% protection targets (Figure 8), the most significant of which was a reduction in the size of the north eastern bottom trawl management area (S. Tasman Rise 2). Achieving the 90% and 95% protection targets required the closure of two of the three management areas, and a reduction in size of the remaining open area.

Based on the available information on fishing value in the area (known to be highly uncertain in this particular area), the Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of accessibility to 1.74% of the estimated historical fishery value in the FMA (Table 7). The 80% scenario results in lost access to an additional 0.03% of fishing value, while the 90% and 95% scenarios both result lost access to an additional 18.8% of estimated historical fishing value, for a total of 20.52% of the historical fishery value being unavailable under the 90% and 95% scenarios.

Table 7: South Tasman Rise summary statistics

Unimpacted baseline											
	% in FMA		Current*	70%		80%		90%		95%	
Taxa	ROC	Power	ROC	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	12.72	15.93	76.9	77.99	70.10	82.44	80.66	94.40	91.54	96.04	95.44
GDU	0.06	6.6	100	100.00	96.88	100.00	97.37	100.00	99.26	100.00	99.43
MOC	13.03	10.4	98.9	97.79	96.26	98.11	96.59	100.00	99.89	100.00	99.93
SVA	21.32	0.66	95.9	95.46	99.95	95.76	99.95	98.16	100.00	98.40	100.00
COB	1.16	2.33	86.9	86.74	91.38	87.79	92.25	97.58	97.89	97.64	98.37
COR	16.63	5.68	93.7	94.69	93.94	95.44	94.70	97.49	96.76	97.86	97.08
DEM	0.36	0.01	100	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.1	0	100	99.83	99.72	100.00	99.81	100.00	99.96	100.00	99.96
PTU	6.18	3.33	100	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	17.42	20.88	97.6	97.46	96.77	97.61	96.85	99.21	99.09	99.31	99.14
Fishing value lost %			1.74	1.74		1.77		20.52		20.52	

* Values taken from SC8-DW07 rev1 and values may differ slightly as calculations used the impacted baseline

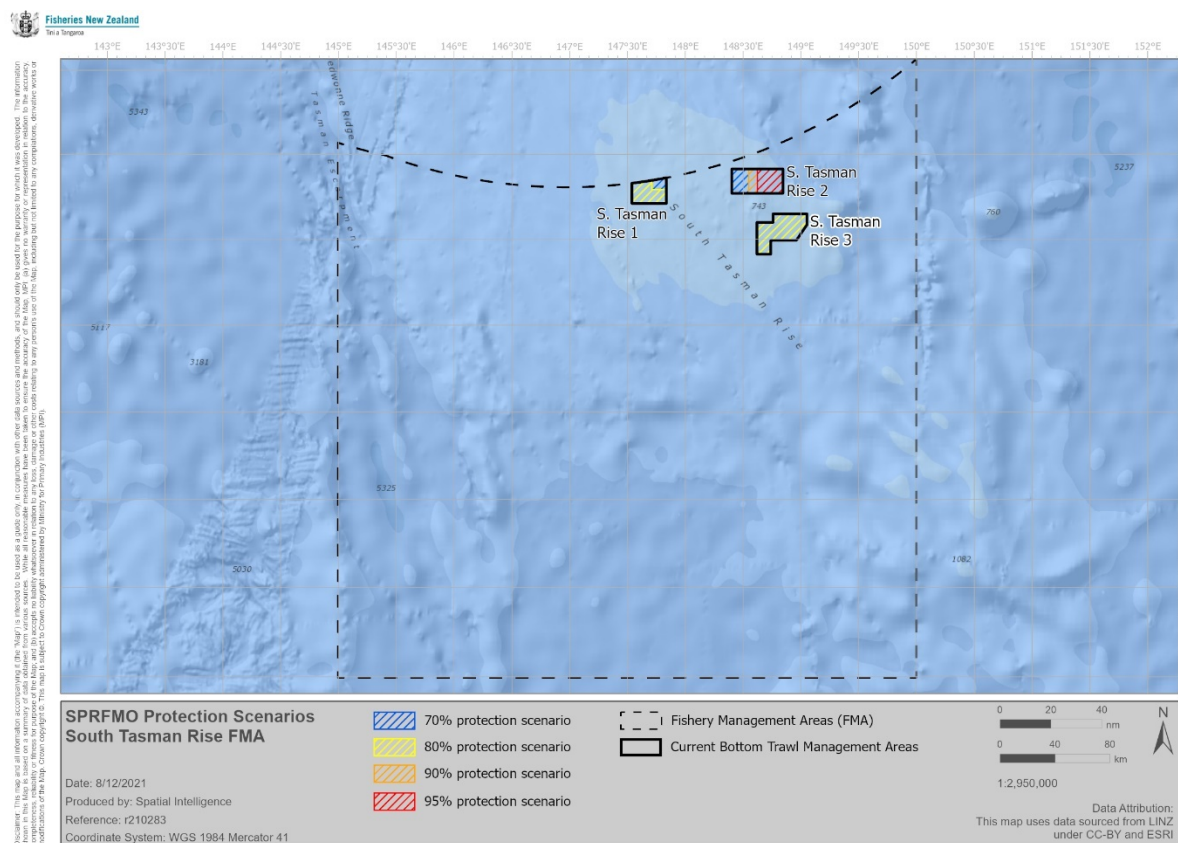


Figure 8: South Tasman Rise indicative map

North Louisville

In the North Louisville FMA, there are currently four areas (features) open to bottom trawling. Due to the nature of the Louisville Ridge, the overlap of fishing with modelled VME indicator taxa is quite high, and features were generally closed to meet the protection scenarios rather than boundaries being modified.

The spatial management currently meets the 70% protection target across all modelled VME indicator taxa. Two areas were closed, and one slightly modified, to meet the 80% target (Figure 9). To meet the 90% and 95% protection targets only one feature could be retained as being open to fishing.

Based on the available information on fishing value in the area, the Bottom Trawl Management Areas in CMM03-2021 have resulted in the lost access to 41.7% of the estimated historical fishery value (Table 8). The 80% scenario resulted in the lost access to an additional 16.36% of fishing value, increasing to 93.82% for the 90% and 95% scenarios.

Table 8: North Louisville summary statistics

Unimpacted baseline											
	% in FMA		Current*	70%		80%		90%		95%	
Taxa	ROC	Power	ROC	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	0	0.01	0	0.00	78.97	0.00	81.84	0.00	84.75	0.00	84.75
GDU	1.59	1.68	70.4	70.41	77.86	83.34	89.11	97.11	97.03	97.11	97.03
MOC	0.66	0.49	60.7	60.28	69.00	70.37	79.95	100.00	99.30	100.00	99.30
SVA	8.48	45.6	74.9	74.24	77.85	89.98	99.02	96.99	99.11	96.99	99.11
COB	4.42	2.94	81.9	81.75	76.66	89.01	86.04	97.28	97.78	97.28	97.78
COR	5.44	3.04	75.7	75.88	78.84	85.76	87.89	99.63	99.88	99.63	99.88
DEM	0.93	0.34	77.7	77.51	51.13	90.66	87.85	99.91	100.00	99.91	100.00
HEX	1.63	1.73	80.3	80.23	83.57	91.59	92.35	98.89	99.67	98.89	99.67
PTU	0.38	0.03	80.3	80.31	87.88	89.90	91.32	99.78	100.00	99.78	100.00
SOC	2.52	2.52	79.2	79.65	83.66	90.87	94.11	97.16	97.90	97.16	97.90
Fishing value lost %			41.7	41.7		58.06		93.82		93.82	

* Values taken from SC8-DW07 rev1 and values may differ slightly as calculations used the impacted baseline

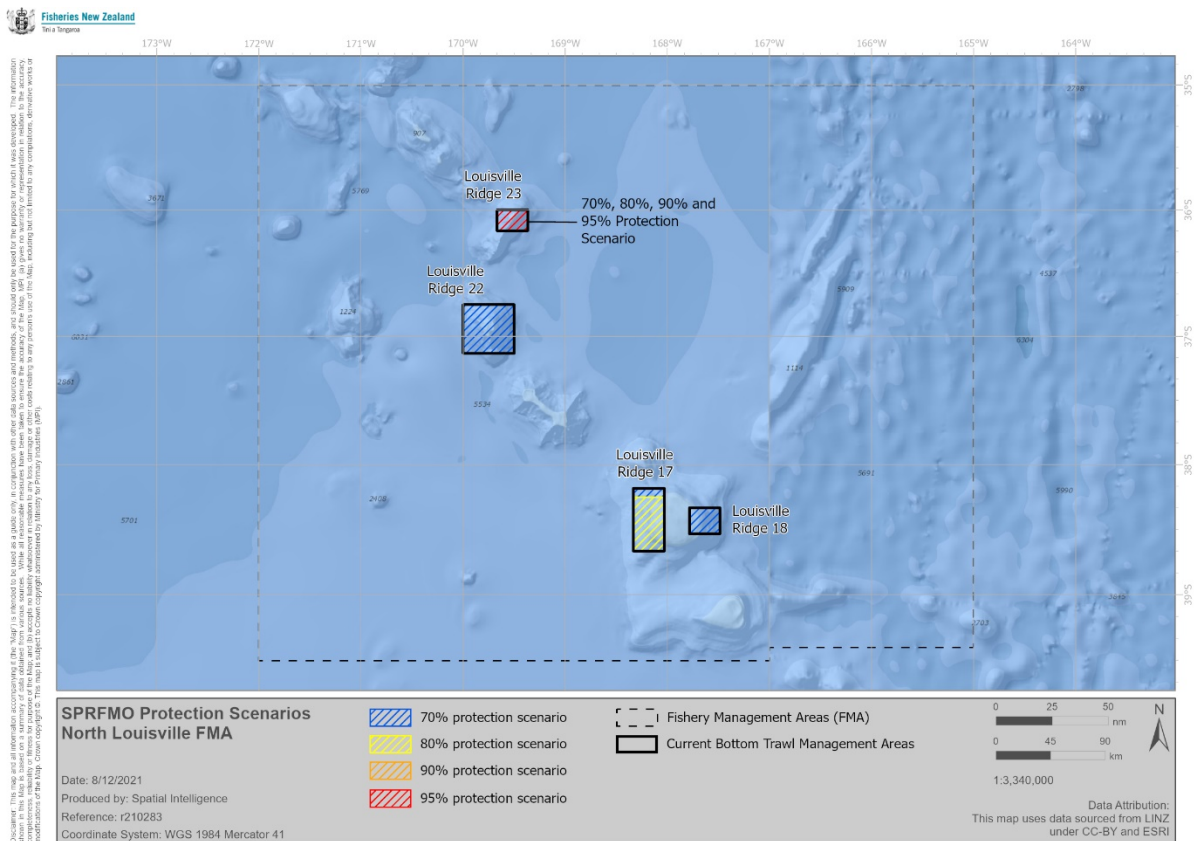


Figure 9: North Louisville indicative map

Central Louisville

In the Central Louisville FMA, there are currently three areas (features) open to bottom trawling. Due to the nature of the Louisville Ridge, the overlap of fishing with modelled depths and distribution of VME indicator taxa is high. Features are generally either open or closed, so areas are not heavily modified.

The spatial management under CMM03-2021 does not meet the 70% protection target for any modelled VME indicator taxa. The 70% and 80% scenarios required the closure of all but one feature, and no areas remained open to fishing under the 90% or 95% scenarios (Figure 10).

Based on the available information on fishing value in the area, the Bottom Trawl Management Areas in CMM03-2021 have resulted in the lost access to 1.56% of the estimated historical fishery value (Table 9). The 70% and 80% scenarios resulted in lost access to an additional 57.96% of fishing value. All fishing in the Central Louisville FMA would be prohibited to achieve the 90% and 95% scenarios.

Table 9: Central Louisville summary statistics

Unimpacted baseline											
	% in FMA		Current*	70%		80%		90%		95%	
Taxa	ROC	Power	ROC	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	0	0	0	100.00	99.88	100.00	99.88	100.00	100.00	100.00	100.00
GDU	5.22	1.46	45.3	90.30	91.19	90.30	91.19	100.00	100.00	100.00	100.00
MOC	0.29	0.25	76.1	100.00	97.57	100.00	97.57	100.00	100.00	100.00	100.00
SVA	7.14	21.66	55.9	92.75	96.15	92.75	96.15	100.00	100.00	100.00	100.00
COB	1.86	1.64	54.7	83.15	84.74	83.15	84.74	100.00	100.00	100.00	100.00
COR	1.85	1.3	24.1	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
DEM	0.05	0.01	26.8	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.52	0.24	61.7	99.57	99.95	99.57	99.95	100.00	100.00	100.00	100.00
PTU	0.04	0	67.8	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	1.1	0.69	63.9	91.77	92.33	91.77	92.33	100.00	100.00	100.00	100.00
Fishing value lost %			1.56	88.36		88.36		100		100	

* Values taken from SC8-DW07 rev1 and values may differ slightly as calculations used the impacted baseline

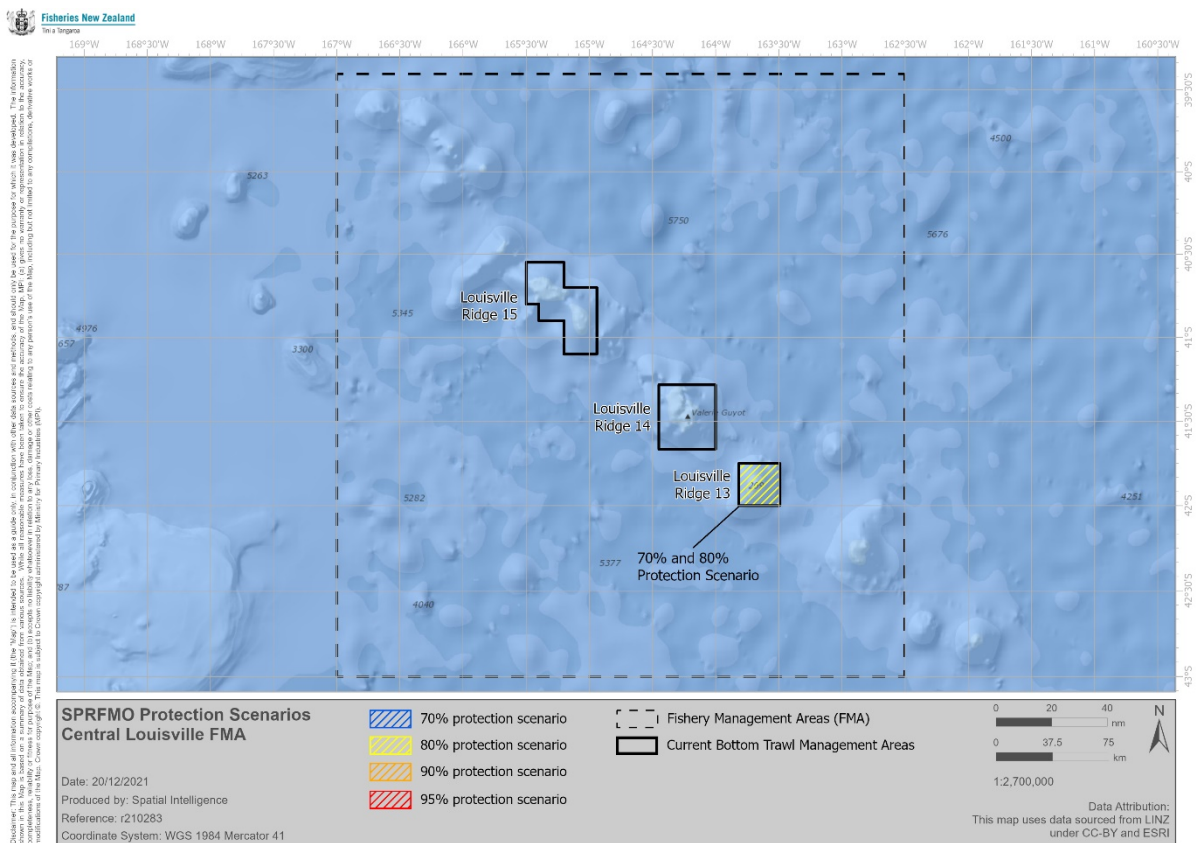


Figure 10: Central Louisville indicative map

South Louisville

In the South Louisville FMA, there are currently ten areas (features) open to bottom trawling. Due to the nature of the Louisville Ridge, the overlap of modelled VME indicator taxa is high, and features were generally closed to meet the protection scenarios rather than boundaries being modified.

The spatial management under CMM03-2021 does not meet the 70% protection target for any modelled VME indicator taxa. The 70% scenario requires the closure of four currently open features, the 80% scenario requires the closure of six currently open features, and the 90% and 95% protection scenarios each require the closure of different combinations of seven features (Figure 11).

Based on the available information on fishing value in the area, the Bottom Trawl Management Areas in CMM03-2021 have resulted in lost access to 1.77% of the estimated historical fishery value (Table 10). The 70% scenario resulted in lost access to an additional 59.54% of estimated historical fishing value, increasing to 98.64% for the 95% scenario.

Table 10: South Louisville summary statistics

Unimpacted baseline											
	% in FMA		Current*	70%		80%		90%		95%	
Taxa	ROC	Power	ROC	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	0	0	0	NA	72.35	NA	72.54	NA	97.19	NA	90.20
GDU	5.22	1.46	44.3	82.33	79.11	86.81	84.17	95.73	92.28	96.54	95.43
MOC	0.29	0.25	95.9	98.89	88.47	100.00	92.06	98.89	95.64	98.89	95.42
SVA	7.14	21.66	42.4	80.57	90.99	88.53	99.88	92.51	99.90	96.34	99.97
COB	1.86	1.64	41.4	72.05	73.21	80.88	82.42	90.84	91.26	95.08	95.93
COR	1.85	1.3	13.6	99.71	98.72	99.71	98.80	99.71	99.64	100.00	99.35
DEM	0.05	0.01	100	100.00	99.78	100.00	99.78	100.00	99.98	100.00	99.84
HEX	0.52	0.24	63.2	89.23	96.78	90.75	97.47	93.75	98.28	96.58	98.94
PTU	0.04	0	67.6	76.75	90.94	76.75	91.38	78.12	91.08	98.60	98.94
SOC	1.1	0.69	39.7	85.19	89.00	90.31	92.58	95.61	96.42	93.69	95.69
Fishing value lost %			1.77	61.31		72.55		83.38		98.64	

* Values taken from SC8-DW07 rev1 and values may differ slightly as calculations used the impacted baseline

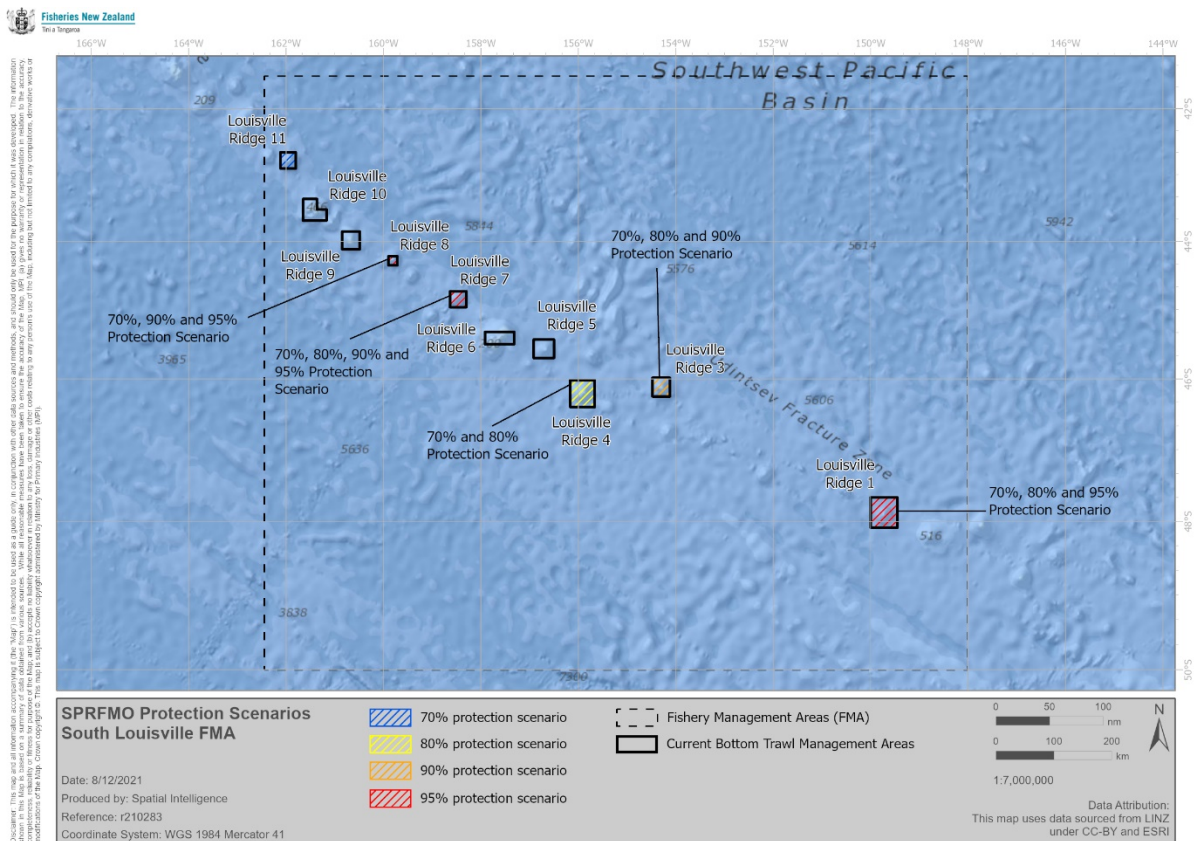


Figure 11: South Louisville indicative map

5. Discussion

The potential spatial management scenarios presented in this paper are intended to inform the Commission’s determination of the level of spatial protection required to prevent SAI on VMEs in the SPRFMO Convention Area. Additionally, we have presented information on the estimated loss of access to historical fishing value associated with the potential spatial management scenarios. This allows explicit consideration by the Commission of the trade-offs inherent in determining the level of spatial protection required to prevent SAI on VMEs and continued use of fisheries resources. In general, higher protection scenarios resulted in greater loss of access to estimated historical fishery value.

The tasking from the Commission included that consideration should be given to the amount of a VME indicator taxa within/outside of each FMA; consequently, protection was not prioritised for taxa with less than 1% of their overall ‘evaluated area’ distribution within an FMA in the scenario development process. Overall, the protection targets were still met for the majority of these taxa. For some of the taxa with negligible proportions of their distributions estimated to be within an FMA (e.g., 0.0% or 0.1%) protection targets were not met, and/or had outputs that did not appear to be meaningful.

Recommendations from other RFMOs or guidance documents

The Commission tasking also included a request to consider recommendations from other RFMOs or guidance documents when formulating recommendations on protection levels. There are no agreed targets for VME indicator taxa and/or habitat protection in SPRFMO or other RFMOs. Scientific guidance on protection targets for VMEs is limited, and only two protection targets are available from elsewhere. Both examples are taken from other contexts and may not be appropriate for the SPRFMO context or the objectives for the SPRFMO bottom fishing conservation and management measure.

The Department of Fisheries and Oceans Canada (DFO) suggested that, where 100% of VMEs cannot be protected due to compelling social and economic reasons, protection of 70% of the total extent of each VME (equivalent) in the Newfoundland and Labrador bioregion was expected to be enough to maintain ecosystem functionality (DFO 2017). The DFO recommendation was formulated as an expert opinion based on existing analyses, suggesting that low risk of SAI appears associated with protection of ~70% (or more) of each bioregion's VMEs.

The Marine Stewardship Council (MSC) has in its certification requirements that a VME habitat must be able to recover to 80% of its original structure and function within 20 years. The guidance for this includes that the assessment should consider all available information to determine the range and distribution of the habitat under consideration. The 20-year recovery period was based on the FAO (2009) guidelines, informed by discussions and decisions taken in CCAMLR. The 80% target was the result of a series of expert workshops between 2011 and 2014. A number of outputs informed these workshops, including outputs from a research consortium involving Jan Geert Hiddink, Ray Hilborn, Michael Kaiser, Simon Jennings et al., specifically commissioned work on benthic impacts (<https://prod.repository.oceanbestpractices.org/handle/11329/614>), development of the Consequence Spatial Analysis based on Ecological Risk Assessment Framework work of Alastair Hobday, stakeholder feedback received during consultation periods and input from the Technical Advisory Board and Stakeholder Council of the MSC.

It should be noted that both of these protection targets refer to ecologically relevant bioregional scales, which differs from the guidance provided by SC8 on the appropriate spatial scale for the assessment of protection levels (i.e. 'FMAs are likely to be a more biologically appropriate scale at which to assess and manage these impacts than larger scales')³. The approach taken in these analyses has followed the SC guidance, and tested protection targets at the FMA scale, noting that FMAs were not designed for this purpose and do not account for ecological characteristics of potential VMEs.

³ This statement was recorded in relation to 'larger scales' being bioregions.

6. References

Cordue P.L., 2017. Revised fishing value layers. Presentation at the Second SPRFMO Stakeholder workshop, 15 August 2017

DFO. 2017. Guidance on the level of protection of significant areas of coldwater corals and sponge-dominated communities in Newfoundland and Labrador waters. <https://waves-vagues.dfo-mpo.gc.ca/Library/40625722.pdf>

Georgian, S. E., O. F. Anderson, and A. A. Rowden. 2019. Ensemble habitat suitability modeling of vulnerable marine ecosystem indicator taxa to inform deep-sea fisheries management in the South Pacific Ocean. *Fisheries research* **211**:256-274.

Stephenson, F., Rowden, A. A., Anderson, O. F., Pitcher, C. R., Pinkerton, M. H., Petersen, G., & Bowden, D. A. (2021). Presence-only habitat suitability models for vulnerable marine ecosystem indicator taxa in the South Pacific have reached their predictive limit. *ICES Journal of Marine Science*.

7. Appendix I: Summary results of scenarios for each FMA

For each FMA tables are provided showing the outputs of the assessments using both the post accounting and RBS methods and both ROC and Power metrics. Separate tables are provided using an unimpacted (without naturalness) baseline and using an impacted (with naturalness) baseline, using the post accounting method. RBS results are for the 'medium' recovery rate sensitivity and only apply to the unimpacted baseline.

The percentage of the VME taxa estimated to occur within the FMA is provided in columns 2 and 3 of the tables. Blue shading indicates where a taxon is estimated to have less than 1% of its distribution within the FMA. Red shading indicates where a target has not been met. Those with red text are where a target has not been met for a taxon with more than 1% of its distribution within the FMA.

“ROC” = post accounting ROC 0-linear, “Power” = post accounting Power Mean, “RBS-ROC” = RBS ROC 0-linear, “RBS-Power” = RBS Power Mean.

North Lord Howe Rise

Unimpacted baseline

Taxa / Layer	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	12.16	8	87.44	96.71	87.44	96.71	90.84	97.55	96.23	98.97
GDU	0.12	5.48	56.47	90.43	56.47	90.43	86.14	94.69	90.74	97.32
MOC	0.76	0.95	98.87	96.77	98.87	96.77	100.00	99.01	100.00	99.60
SVA	0.79	0	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	18.76	13.56	84.20	83.59	84.20	83.59	90.42	90.34	95.09	95.07
COR	0.01	0.01	32.34	98.27	32.34	98.27	32.34	98.73	32.34	98.73
DEM	9.79	0.3	97.65	99.05	97.65	99.05	99.04	99.69	99.04	99.69
HEX	4.13	0.74	97.86	99.84	97.86	99.84	98.43	99.86	98.73	99.87
PTU	5.54	1.5	92.80	99.86	92.80	99.86	96.01	99.90	97.77	99.92
SOC	10.62	12.17	88.31	82.81	88.31	82.81	93.51	91.49	96.63	95.61

Impacted baseline

Taxa / Layer	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	12.16	8	87.53	96.74	87.53	96.74	90.91	97.57	96.28	98.98
GDU	0.12	5.48	58.91	90.59	58.91	90.59	86.89	94.80	91.67	97.43
MOC	0.76	0.95	98.90	96.80	98.90	96.80	100.00	99.03	100.00	99.62
SVA	0.79	0	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	18.76	13.56	84.40	83.90	84.40	83.90	90.57	90.60	95.24	95.34
COR	0.01	0.01	37.93	98.54	37.93	98.54	37.93	99.01	37.93	99.01
DEM	9.79	0.3	97.66	99.08	97.66	99.08	99.04	99.70	99.04	99.70
HEX	4.13	0.74	97.89	99.85	97.89	99.85	98.46	99.86	98.75	99.88
PTU	5.54	1.5	92.84	99.86	92.84	99.86	96.05	99.90	97.80	99.92
SOC	10.62	12.17	88.45	83.12	88.45	83.12	93.62	91.74	96.74	95.87
Fishing value lost %	19.80 (Current)		19.8		19.8		20.24		21.68	

South Lord Howe Rise

Unimpacted baseline

Taxa	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	34.12	47.52	76.21	75.07	85.97	86.18	93.44	93.50	96.17	96.22
GDU	1.55	5.69	75.24	84.35	90.26	90.74	97.04	97.06	97.18	98.36
MOC	7.99	6.78	78.30	74.89	84.44	82.29	99.92	99.82	99.92	99.83
SVA	1.15	0	71.87	84.68	81.19	88.54	100.00	100.00	100.00	100.00
COB	21.96	26.67	76.58	73.66	85.67	83.70	93.47	92.04	96.29	95.88
COR	0	0	0.00	44.49	100.00	93.01	100.00	99.13	100.00	99.56
DEM	1.15	0	99.85	75.99	100.00	100.00	100.00	100.00	100.00	100.00
HEX	3.5	3.78	97.37	99.96	98.15	99.98	99.93	100.00	99.93	100.00
PTU	3.07	1.47	95.87	99.58	96.23	99.58	100.00	100.00	100.00	100.00
SOC	6.8	9.44	75.17	71.13	84.55	81.01	93.02	91.29	96.33	96.96

Impacted baseline

Taxa / Layer	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	34.12	47.52	77.61	76.40	87.11	87.28	94.28	94.17	96.65	96.59
GDU	1.55	5.69	77.03	85.22	90.40	91.32	97.14	97.49	97.14	98.59
MOC	7.99	6.78	79.81	76.46	85.22	83.15	99.92	99.83	99.92	99.83
SVA	1.15	0	73.67	85.09	80.87	88.53	100.00	100.00	100.00	100.00
COB	21.96	26.67	77.36	74.62	86.31	84.51	93.96	92.67	96.57	96.20
COR	0	0	0.00	59.09	100.00	91.00	100.00	99.07	100.00	99.43
DEM	1.15	0	99.95	95.95	100.00	100.00	100.00	100.00	100.00	100.00
HEX	3.5	3.78	97.41	99.96	98.17	99.99	99.94	100.00	99.94	100.00
PTU	3.07	1.47	95.87	99.58	96.23	99.58	100.00	100.00	100.00	100.00
SOC	6.8	9.44	75.97	72.34	85.18	81.95	93.51	91.96	96.59	97.08

Fishing value lost %	6.24 (Current)	21.39	26.3	47.56	71.62
-----------------------------	----------------	-------	------	-------	-------

Northwest Challenger

Unimpacted baseline

	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
Taxa	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	15.33	10.98	74.76	76.55	83.98	84.19	91.87	91.23	97.15	97.25
GDU	55.95	13.39	95.96	92.50	97.31	95.15	98.20	97.66	99.45	98.96
MOC	14.58	18.95	83.28	83.59	88.46	87.44	95.33	94.87	100.00	99.99
SVA	0.96	0	99.89	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	13.78	14.74	71.09	75.67	81.02	83.49	90.77	91.73	95.43	96.00
COR	0.65	0.23	99.60	99.52	99.60	99.59	99.60	99.68	99.60	99.74
DEM	10.62	3.04	99.52	99.93	99.79	100.00	99.94	100.00	100.00	100.00
HEX	6.23	0.94	89.36	88.34	93.32	90.63	96.73	96.67	97.77	97.34
PTU	7.47	10.32	96.89	99.89	98.31	99.92	99.50	99.98	99.65	99.98
SOC	4.89	4.41	91.75	93.07	93.35	94.17	96.85	96.71	98.40	97.82

Impacted baseline

Taxa / Layer	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	15.33	10.98	78.21	81.00	87.67	88.79	94.77	94.90	98.49	98.67
GDU	55.95	13.39	96.81	94.04	98.12	96.46	98.91	98.51	99.74	99.38
MOC	14.58	18.95	86.13	86.86	91.11	90.49	97.09	96.80	100.00	100.00
SVA	0.96	0	99.92	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	13.78	14.74	72.93	77.79	82.99	85.62	92.34	93.45	96.20	96.84
COR	0.65	0.23	99.79	99.70	99.79	99.77	99.79	99.86	99.79	99.88
DEM	10.62	3.04	99.58	99.93	99.84	100.00	99.99	100.00	100.00	100.00
HEX	6.23	0.94	90.35	89.89	94.15	92.01	97.20	97.12	98.16	97.76

PTU	7.47	10.32	97.06	99.90	98.43	99.93	99.53	99.98	99.67	99.98
SOC	4.89	4.41	92.89	94.20	94.42	95.24	97.57	97.54	98.70	98.37
Fishing value lost %	1.08 (Current)		32.18		35.48		43.4		76.08	

Westpac Bank

Unimpacted baseline

Taxa	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	4.67	3.96	87.51	87.05	89.29	89.30	94.73	94.61	98.06	98.35
GDU	0.38	1.25	85.24	91.17	87.41	93.68	93.26	97.28	98.49	98.87
MOC	3.43	4.45	86.41	88.27	91.40	91.48	96.91	97.65	99.28	99.35
SVA	2.35	0.02	75.58	73.71	85.60	89.94	95.39	99.99	97.91	100.00
COB	3.11	2.99	83.26	79.20	86.95	83.23	93.69	91.44	97.17	95.89
COR	0.01	0	85.94	85.11	85.94	91.71	85.94	94.74	85.94	95.80
DEM	0.88	0.24	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.61	0.03	99.82	99.97	100.00	99.99	100.00	100.00	100.00	100.00
PTU	0.89	0.88	99.14	100.00	99.71	100.00	99.98	100.00	99.99	100.00
SOC	1.95	2	87.42	73.44	91.38	81.91	96.06	90.64	98.24	95.22

Impacted baseline

Taxa / Layer	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	4.67	3.96	88.45	87.76	90.25	90.02	95.59	95.26	98.71	98.85
GDU	0.38	1.25	86.14	91.77	88.32	94.30	93.92	97.84	98.87	99.31
MOC	3.43	4.45	86.70	88.53	91.70	91.76	97.19	97.91	99.48	99.54
SVA	2.35	0.02	76.69	73.73	86.84	89.95	96.59	99.99	98.87	100.00
COB	3.11	2.99	84.01	80.31	87.73	84.39	94.44	92.57	97.81	96.89
COR	0.01	0	89.13	86.12	89.13	92.80	89.13	95.81	89.13	96.82

DEM	0.88	0.24	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.61	0.03	99.82	99.97	100.00	99.99	100.00	100.00	100.00	100.00
PTU	0.89	0.88	99.14	100.00	99.71	100.00	99.98	100.00	99.99	100.00
SOC	1.95	2	87.88	74.62	91.86	83.23	96.52	92.02	98.63	96.51
Fishing value lost %	1.28 (Current)		1.28		2.44		8.45		29.31	

West Norfolk

Unimpacted baseline

Taxa	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	3.16	1.87	80.80	73.60	89.01	86.25	94.81	93.73	98.45	99.38
GDU	1.26	2.99	80.17	91.74	84.56	93.53	92.07	96.13	95.12	99.10
MOC	5.62	6.03	93.82	93.88	96.67	97.06	98.30	98.51	99.60	99.67
SVA	2.39	0	87.79	98.87	88.59	98.90	92.54	99.28	98.47	100.00
COB	7.87	7.45	92.20	90.45	93.90	92.68	96.40	95.84	98.83	98.51
COR	13.79	35.2	98.80	99.76	99.37	99.92	99.69	99.95	99.97	99.99
DEM	9.76	38.27	99.57	99.99	99.61	99.99	99.62	99.99	99.94	100.00
HEX	2.62	1.7	94.90	99.46	95.35	99.49	96.87	99.61	99.53	99.95
PTU	1.54	0.02	94.20	95.99	94.88	96.23	96.66	96.62	99.57	99.97
SOC	4.88	5.75	94.20	89.61	95.72	91.86	97.46	94.88	99.14	97.69

Impacted baseline

Taxa / Layer	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	3.16	1.87	81.25	74.11	89.39	86.53	95.13	93.91	98.73	99.48
GDU	1.26	2.99	81.17	91.93	85.72	93.70	93.01	96.27	95.90	99.19
MOC	5.62	6.03	93.97	94.06	96.73	97.13	98.37	98.56	99.64	99.71
SVA	2.39	0	88.00	98.88	88.80	98.90	92.75	99.28	98.49	100.00

COB	7.87	7.45	92.32	90.62	94.02	92.85	96.50	95.97	98.88	98.59
COR	13.79	35.2	98.81	99.76	99.38	99.92	99.69	99.95	99.98	99.99
DEM	9.76	38.27	99.57	99.99	99.61	99.99	99.62	99.99	99.94	100.00
HEX	2.62	1.7	94.91	99.46	95.36	99.50	96.88	99.61	99.53	99.95
PTU	1.54	0.02	94.20	96.00	94.88	96.23	96.66	96.63	99.57	99.97
SOC	4.88	5.75	94.29	89.90	95.80	92.15	97.53	95.14	99.18	97.86
Fishing value lost %	2.59 (Current)		21.12		24.46		27.75		56.58	

South Tasman Rise

Unimpacted baseline

	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
Taxa	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	12.72	15.93	77.99	70.10	82.44	80.66	94.40	91.54	96.04	95.44
GDU	0.06	6.6	100.00	96.88	100.00	97.37	100.00	99.26	100.00	99.43
MOC	13.03	10.4	97.79	96.26	98.11	96.59	100.00	99.89	100.00	99.93
SVA	21.32	0.66	95.46	99.95	95.76	99.95	98.16	100.00	98.40	100.00
COB	1.16	2.33	86.74	91.38	87.79	92.25	97.58	97.89	97.64	98.37
COR	16.63	5.68	94.69	93.94	95.44	94.70	97.49	96.76	97.86	97.08
DEM	0.36	0.01	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.1	0	99.83	99.72	100.00	99.81	100.00	99.96	100.00	99.96
PTU	6.18	3.33	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	17.42	20.88	97.46	96.77	97.61	96.85	99.21	99.09	99.31	99.14

Impacted baseline

	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
Taxa / Layer	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	12.72	15.93	78.90	70.98	83.36	81.59	94.88	91.93	96.50	95.82
GDU	0.06	6.6	100.00	97.08	100.00	97.56	100.00	99.33	100.00	99.50

MOC	13.03	10.4	97.80	96.30	98.12	96.63	100.00	99.90	100.00	99.95
SVA	21.32	0.66	95.90	99.96	96.20	99.96	98.39	100.00	98.62	100.00
COB	1.16	2.33	88.25	91.86	89.32	92.73	98.61	98.13	98.67	98.62
COR	16.63	5.68	94.92	94.36	95.67	95.13	97.69	97.18	98.07	97.49
DEM	0.36	0.01	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.1	0	99.83	99.73	100.00	99.82	100.00	99.97	100.00	99.97
PTU	6.18	3.33	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	17.42	20.88	97.56	96.95	97.71	97.02	99.27	99.24	99.37	99.29
Fishing value lost %	1.74 (Current)		1.74		1.77		20.52		20.52	

North Louisville

Unimpacted baseline

Taxa	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	0	0.01	0.00	78.97	0.00	81.84	0.00	84.75	0.00	84.75
GDU	1.59	1.68	70.41	77.86	83.34	89.11	97.11	97.03	97.11	97.03
MOC	0.66	0.49	60.28	69.00	70.37	79.95	100.00	99.30	100.00	99.30
SVA	8.48	45.6	74.24	77.85	89.98	99.02	96.99	99.11	96.99	99.11
COB	4.42	2.94	81.75	76.66	89.01	86.04	97.28	97.78	97.28	97.78
COR	5.44	3.04	75.88	78.84	85.76	87.89	99.63	99.88	99.63	99.88
DEM	0.93	0.34	77.51	51.13	90.66	87.85	99.91	100.00	99.91	100.00
HEX	1.63	1.73	80.23	83.57	91.59	92.35	98.89	99.67	98.89	99.67
PTU	0.38	0.03	80.31	87.88	89.90	91.32	99.78	100.00	99.78	100.00
SOC	2.52	2.52	79.65	83.66	90.87	94.11	97.16	97.90	97.16	97.90

Impacted baseline

Taxa / Layer	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power

ERO	0	0.01	0.00	79.03	0.00	81.93	0.00	84.80	0.00	84.80
GDU	1.59	1.68	71.28	78.43	84.30	89.63	97.57	97.17	97.57	97.17
MOC	0.66	0.49	60.45	69.24	70.37	80.07	100.00	99.30	100.00	99.30
SVA	8.48	45.6	75.04	79.03	90.69	98.99	97.00	99.07	97.00	99.07
COB	4.42	2.94	82.24	77.18	89.51	86.59	97.41	97.91	97.41	97.91
COR	5.44	3.04	76.19	79.16	86.09	88.26	99.62	99.88	99.62	99.88
DEM	0.93	0.34	77.60	48.36	90.76	88.56	99.91	100.00	99.91	100.00
HEX	1.63	1.73	80.36	83.58	91.67	92.36	98.88	99.67	98.88	99.67
PTU	0.38	0.03	80.37	87.87	89.91	91.32	99.78	100.00	99.78	100.00
SOC	2.52	2.52	79.75	83.71	90.98	94.19	97.21	97.93	97.21	97.93
Fishing value lost %	41.70 (Current)		41.7		58.06		93.82		93.82	

Central Louisville

Unimpacted baseline

	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	0	0	100.00	40.31	100.00	99.88	100.00	100.00	100.00	100.00
GDU	5.22	1.46	90.30	73.80	90.30	91.19	100.00	100.00	100.00	100.00
MOC	0.29	0.25	100.00	80.47	100.00	97.57	100.00	100.00	100.00	100.00
SVA	7.14	21.66	92.75	71.26	92.75	96.15	100.00	100.00	100.00	100.00
COB	1.86	1.64	83.15	77.76	83.15	84.74	100.00	100.00	100.00	100.00
COR	1.85	1.3	100.00	97.84	100.00	100.00	100.00	100.00	100.00	100.00
DEM	0.05	0.01	100.00	94.62	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.52	0.24	99.57	93.78	99.57	99.95	100.00	100.00	100.00	100.00
PTU	0.04	0	100.00	99.50	100.00	100.00	100.00	100.00	100.00	100.00
SOC	1.1	0.69	91.77	87.89	91.77	92.33	100.00	100.00	100.00	100.00

Impacted baseline

Taxa / Layer	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	0	0	0.00	39.48	100.00	99.90	100.00	100.00	100.00	100.00
GDU	5.22	1.46	60.84	75.40	90.22	91.16	100.00	100.00	100.00	100.00
MOC	0.29	0.25	84.86	80.75	100.00	97.56	100.00	100.00	100.00	100.00
SVA	7.14	21.66	81.49	72.85	92.63	95.79	100.00	100.00	100.00	100.00
COB	1.86	1.64	76.81	77.97	82.91	84.59	100.00	100.00	100.00	100.00
COR	1.85	1.3	95.99	97.75	100.00	100.00	100.00	100.00	100.00	100.00
DEM	0.05	0.01	81.27	94.63	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.52	0.24	93.02	93.81	99.57	99.95	100.00	100.00	100.00	100.00
PTU	0.04	0	98.85	99.50	100.00	100.00	100.00	100.00	100.00	100.00
SOC	1.1	0.69	86.26	88.21	91.94	92.68	100.00	100.00	100.00	100.00
Fishing value lost %	1.56 (Current)		59.52		88.36		100		100	

South Louisville

Unimpacted baseline

Taxa	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	0	0	NA	72.35	NA	72.54	NA	97.19	NA	90.20
GDU	5.22	1.46	82.33	79.11	86.81	84.17	95.73	92.28	96.54	95.43
MOC	0.29	0.25	98.89	88.47	100.00	92.06	98.89	95.64	98.89	95.42
SVA	7.14	21.66	80.57	90.99	88.53	99.88	92.51	99.90	96.34	99.97
COB	1.86	1.64	72.05	73.21	80.88	82.42	90.84	91.26	95.08	95.93
COR	1.85	1.3	99.71	98.72	99.71	98.80	99.71	99.64	100.00	99.35
DEM	0.05	0.01	100.00	99.78	100.00	99.78	100.00	99.98	100.00	99.84
HEX	0.52	0.24	89.23	96.78	90.75	97.47	93.75	98.28	96.58	98.94
PTU	0.04	0	76.75	90.94	76.75	91.38	78.12	91.08	98.60	98.94
SOC	1.1	0.69	85.19	89.00	90.31	92.58	95.61	96.42	93.69	95.69

Impacted baseline

Taxa / Layer	% in FMA		70%		80%		90%		95%	
	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	0	0	NA	72.02	NA	72.21	NA	97.23	NA	90.03
GDU	5.22	1.46	82.48	79.14	86.82	84.11	95.85	92.30	96.53	95.41
MOC	0.29	0.25	98.89	88.50	100.00	92.08	98.89	95.67	98.89	95.44
SVA	7.14	21.66	80.68	91.05	88.50	99.87	92.59	99.90	96.39	99.97
COB	1.86	1.64	72.01	73.14	80.81	82.25	90.86	91.23	95.08	95.92
COR	1.85	1.3	99.71	98.71	99.71	98.79	99.71	99.64	100.00	99.35
DEM	0.05	0.01	100.00	99.78	100.00	99.78	100.00	99.98	100.00	99.84
HEX	0.52	0.24	89.22	96.78	90.74	97.47	93.75	98.28	96.57	98.95
PTU	0.04	0	76.75	90.94	76.75	91.38	78.13	91.08	98.61	98.94
SOC	1.1	0.69	85.18	88.96	90.31	92.54	95.64	96.42	93.69	95.66
Fishing value lost %	1.77 (Current)		61.31		72.55		83.38		98.64	

8. Appendix II: Detailed results of scenarios for each FMA

For each FMA tables are provided showing the outputs of the assessments using both the post accounting and RBS methods and both ROC and Power metrics. Separate tables are provided using an unimpacted (without naturalness) baseline and using an impacted (with naturalness) baseline, using the post accounting method. RBS results are for the ‘medium’ recovery rate sensitivity and only apply to the unimpacted baseline.

Uncertainty bounds (upper and lower) are provided for each protection level estimate. Uncertainty stems from the HSI layer and is calculated as the weighted means of the standard error of each fit of the model on the environmental variables.

The percentage of the VME taxa estimated to occur within the FMA is provided in columns 2 and 3 of the tables. Grey shading indicates where a taxon is estimated to have less than 1% of its distribution within the FMA. Red shading indicates where a target has not been met. Those with red text are where a target has not been met for a taxon with more than 1% of its distribution within the FMA.

“ROC” = post accounting ROC 0-linear, “Power” = post accounting Power Mean, “RBS-ROC” = RBS ROC 0-linear, “RBS-Power” = RBS Power Mean.

North Lord Howe Rise

Unimpacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	12.16	8	87.17	87.71	93.43	100.00	87.17	87.71	93.43	100.00	90.64	91.03	95.10	100.00	96.12	96.33	97.93	100.00
GDU	0.12	5.48	55.51	57.43	87.38	93.48	55.51	57.43	87.38	93.48	85.97	86.32	93.11	96.26	90.73	90.76	96.92	97.73
MOC	0.76	0.95	98.76	98.99	93.54	100.00	98.76	98.99	93.54	100.00	100.00	100.00	98.02	100.00	100.00	100.00	99.19	100.00
SVA	0.79	0	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
COB	18.76	13.56	84.14	84.27	81.71	85.47	84.14	84.27	81.71	85.47	90.39	90.45	89.23	91.46	95.08	95.10	94.74	95.40
COR	0.01	0.01	31.48	33.21	0.00	0.00	31.48	33.21	0.00	0.00	31.48	33.21	0.00	0.00	31.48	33.21	0.00	0.00
DEM	9.79	0.3	97.64	97.66	0.00	0.00	97.64	97.66	0.00	0.00	99.01	99.06	0.00	0.00	99.01	99.06	0.00	0.00
HEX	4.13	0.74	97.82	97.91	99.68	100.00	97.82	97.91	99.68	100.00	98.40	98.47	99.71	100.00	98.70	98.76	99.75	100.00
PTU	5.54	1.5	92.70	92.89	99.72	100.00	92.70	92.89	99.72	100.00	95.96	96.06	99.81	100.00	97.73	97.81	99.85	100.00
SOC	10.62	12.17	88.17	88.44	75.36	90.26	88.17	88.44	75.36	90.26	93.45	93.56	89.07	93.91	96.62	96.64	94.67	96.55

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	12.16	8	87.26	87.80	93.48	100.00	87.26	87.80	93.48	100.00	90.72	91.10	95.14	100.00	96.18	96.38	97.96	100.00
GDU	0.12	5.48	57.99	59.83	87.55	93.63	57.99	59.83	87.55	93.63	86.73	87.05	93.23	96.37	91.66	91.67	97.03	97.83
MOC	0.76	0.95	98.79	99.01	93.61	100.00	98.79	99.01	93.61	100.00	100.00	100.00	98.07	100.00	100.00	100.00	99.24	100.00
SVA	0.79	0	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
COB	18.76	13.56	84.33	84.46	82.09	85.71	84.33	84.46	82.09	85.71	90.54	90.59	89.56	91.65	95.23	95.26	95.09	95.59
COR	0.01	0.01	36.96	38.90	0.00	0.00	36.96	38.90	0.00	0.00	36.96	38.90	0.00	0.00	36.96	38.90	0.00	0.00
DEM	9.79	0.3	97.65	97.67	0.00	0.00	97.65	97.67	0.00	0.00	99.02	99.07	0.00	0.00	99.02	99.07	0.00	0.00
HEX	4.13	0.74	97.85	97.94	99.69	100.00	97.85	97.94	99.69	100.00	98.42	98.50	99.73	100.00	98.72	98.79	99.76	100.00
PTU	5.54	1.5	92.75	92.94	99.72	100.00	92.75	92.94	99.72	100.00	96.00	96.10	99.81	100.00	97.77	97.84	99.85	100.00
SOC	10.62	12.17	88.32	88.58	75.85	90.40	88.32	88.58	75.85	90.40	93.56	93.67	89.49	93.98	96.73	96.75	95.13	96.60

Fishing value lost %	19.80 (Current)	19.8	19.8	20.24	21.68
----------------------	-----------------	------	------	-------	-------

South Lord Howe Rise

Unimpacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Taxa																		
ERO	34.12	47.52	76.19	76.22	74.79	75.35	85.93	86.01	85.99	86.36	93.41	93.48	93.18	93.81	96.16	96.18	96.14	96.30
GDU	1.55	5.69	75.11	75.36	83.18	85.51	90.22	90.29	89.96	91.52	96.99	97.09	96.51	97.62	97.12	97.23	98.07	98.65
MOC	7.99	6.78	78.10	78.49	67.21	82.56	84.31	84.57	73.47	91.10	99.92	99.92	99.65	100.00	99.92	99.92	99.65	100.00
SVA	1.15	0	71.78	71.96	0.00	0.00	81.15	81.23	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
COB	21.96	26.67	76.44	76.71	72.49	74.83	85.60	85.75	83.03	84.38	93.41	93.54	91.54	92.54	96.26	96.32	95.65	96.12
COR	0	0	0.00	0.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
DEM	1.15	0	99.84	99.86	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
HEX	3.5	3.78	97.32	97.43	99.92	100.00	98.10	98.20	99.97	100.00	99.92	99.93	100.00	100.00	99.92	99.93	100.00	100.00
PTU	3.07	1.47	95.81	95.93	99.16	100.00	96.18	96.28	99.16	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	6.8	9.44	75.05	75.28	69.00	73.26	84.50	84.60	78.94	83.09	92.97	93.06	90.22	92.36	96.32	96.33	96.39	97.52

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Taxa																		
ERO	34.12	47.52	77.60	77.61	76.08	76.73	87.08	87.15	87.15	87.42	94.25	94.31	93.97	94.38	96.63	96.66	96.56	96.62
GDU	1.55	5.69	76.90	77.16	84.12	86.33	90.37	90.42	90.65	91.99	97.08	97.19	97.03	97.95	97.08	97.20	98.33	98.85
MOC	7.99	6.78	79.63	79.99	68.74	84.18	85.10	85.34	74.40	91.91	99.92	99.92	99.66	100.00	99.92	99.92	99.67	100.00
SVA	1.15	0	73.58	73.76	0.00	0.00	80.83	80.91	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
COB	21.96	26.67	77.23	77.48	73.49	75.74	86.24	86.37	83.88	85.14	93.90	94.01	92.21	93.13	96.54	96.60	95.98	96.41
COR	0	0	0.00	0.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
DEM	1.15	0	99.95	99.95	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
HEX	3.5	3.78	97.35	97.46	99.92	100.00	98.12	98.21	99.97	100.00	99.94	99.94	100.00	100.00	99.94	99.94	100.00	100.00

PTU	3.07	1.47	95.81	95.93	99.16	100.00	96.18	96.28	99.16	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	6.8	9.44	75.87	76.08	70.43	74.24	85.13	85.23	80.07	83.84	93.46	93.55	91.00	92.92	96.58	96.59	96.61	97.56
Fishing value lost %	6.24 (Current)		21.39				26.3				47.56				71.62			

Northwest Challenger

Unimpacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	15.33	10.98	74.67	74.84	70.34	82.75	83.93	84.02	80.21	88.17	91.85	91.88	89.86	92.60	97.14	97.16	96.67	97.83
GDU	55.95	13.39	95.73	96.18	92.05	92.94	97.18	97.44	94.84	95.46	98.12	98.28	97.64	97.69	99.43	99.48	98.86	99.05
MOC	14.58	18.95	83.27	83.28	81.26	85.93	88.40	88.52	86.82	88.06	95.31	95.35	94.24	95.50	100.00	100.00	99.98	100.00
SVA	0.96	0	99.89	99.89	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
COB	13.78	14.74	71.08	71.10	72.12	79.23	81.02	81.03	80.94	86.03	90.76	90.78	90.21	93.24	95.42	95.44	95.37	96.63
COR	0.65	0.23	99.59	99.62	99.04	100.00	99.59	99.62	99.19	100.00	99.59	99.62	99.36	100.00	99.59	99.62	99.47	100.00
DEM	10.62	3.04	99.52	99.52	0.00	0.00	99.79	99.79	0.00	0.00	99.94	99.95	0.00	0.00	100.00	100.00	0.00	0.00
HEX	6.23	0.94	89.33	89.40	81.43	95.24	93.31	93.32	81.59	99.67	96.73	96.73	93.67	99.68	97.76	97.78	95.01	99.68
PTU	7.47	10.32	96.81	96.97	99.78	100.00	98.26	98.35	99.85	100.00	99.49	99.51	99.96	100.00	99.64	99.65	99.96	100.00
SOC	4.89	4.41	91.68	91.82	90.04	96.10	93.30	93.40	92.20	96.13	96.84	96.87	96.70	96.71	98.39	98.41	96.87	98.76

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	15.33	10.98	78.11	78.32	74.90	87.11	87.61	87.73	85.07	92.50	94.77	94.78	93.59	96.21	98.49	98.49	98.27	99.07
GDU	55.95	13.39	96.62	96.99	93.71	94.36	98.03	98.21	96.25	96.68	98.86	98.96	98.49	98.53	99.72	99.75	99.31	99.45
MOC	14.58	18.95	86.12	86.14	84.12	89.60	91.06	91.15	89.35	91.63	97.08	97.11	95.98	97.63	100.00	100.00	99.99	100.00
SVA	0.96	0	99.92	99.92	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
COB	13.78	14.74	72.90	72.95	74.45	81.12	82.97	83.00	83.36	87.87	92.34	92.34	92.26	94.63	96.19	96.21	96.37	97.32
COR	0.65	0.23	99.78	99.80	99.40	100.00	99.78	99.80	99.54	100.00	99.78	99.80	99.71	100.00	99.78	99.80	99.76	100.00

DEM	10.62	3.04	99.58	99.58	0.00	0.00	99.84	99.84	0.00	0.00	99.99	99.99	0.00	0.00	100.00	100.00	0.00	0.00
HEX	6.23	0.94	90.31	90.38	83.94	95.84	94.14	94.15	84.09	99.92	97.20	97.20	94.51	99.74	98.15	98.17	95.78	99.74
PTU	7.47	10.32	96.99	97.14	99.80	100.00	98.38	98.47	99.86	100.00	99.52	99.55	99.97	100.00	99.66	99.68	99.97	100.00
SOC	4.89	4.41	92.84	92.95	91.21	97.18	94.38	94.46	93.29	97.20	97.56	97.58	97.34	97.74	98.69	98.70	97.85	98.89
Fishing value lost %	1.08 (Current)		32.18				35.48				43.4				76.08			

Westpac Bank

Unimpacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper		
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper		
ERO	4.67	3.96	87.50	87.51	86.86	87.24	89.29	89.30	88.97	89.62	94.72	94.73	94.58	94.63	98.03	98.08	98.09	98.62
GDU	0.38	1.25	84.87	85.60	86.96	95.37	87.12	87.69	90.29	97.08	93.14	93.38	95.83	98.72	98.46	98.51	98.37	99.37
MOC	3.43	4.45	86.38	86.45	83.87	92.66	91.33	91.46	89.77	93.20	96.91	96.92	95.86	99.44	99.28	99.28	99.03	99.67
SVA	2.35	0.02	75.39	75.78	0.00	0.00	85.52	85.67	0.00	0.00	95.38	95.41	0.00	0.00	97.90	97.93	0.00	0.00
COB	3.11	2.99	83.02	83.50	74.73	83.68	86.75	87.15	79.37	87.10	93.59	93.80	89.38	93.51	97.12	97.21	94.89	96.90
COR	0.01	0	85.38	86.49	0.00	0.00	85.38	86.49	0.00	0.00	85.38	86.49	0.00	0.00	85.38	86.49	0.00	0.00
DEM	0.88	0.24	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
HEX	0.61	0.03	99.82	99.82	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
PTU	0.89	0.88	99.12	99.17	100.00	100.00	99.70	99.71	100.00	100.00	99.98	99.98	100.00	100.00	99.99	99.99	100.00	100.00
SOC	1.95	2	87.17	87.67	58.88	87.99	91.23	91.54	72.44	91.38	95.99	96.14	85.23	96.05	98.20	98.27	92.17	98.26

Impacted baseline – Post Accounting method

	% in FMA		0.70				0.80				0.90				0.95			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	4.67	3.96	88.43	88.46	87.41	88.10	90.23	90.27	89.86	90.18	95.57	95.61	95.09	95.43	98.71	98.72	98.70	98.99
GDU	0.38	1.25	85.79	86.49	87.80	95.74	88.05	88.58	91.16	97.45	93.81	94.03	96.63	99.04	98.85	98.89	98.99	99.63
MOC	3.43	4.45	86.66	86.73	84.32	92.73	91.64	91.76	90.25	93.27	97.19	97.19	96.28	99.53	99.48	99.48	99.31	99.77
SVA	2.35	0.02	76.49	76.90	0.00	0.00	86.75	86.93	0.00	0.00	96.58	96.60	0.00	0.00	98.86	98.88	0.00	0.00

COB	3.11	2.99	83.77	84.24	76.04	84.57	87.54	87.92	80.76	88.02	94.35	94.53	90.75	94.38	97.78	97.85	96.12	97.66
COR	0.01	0	88.69	89.58	0.00	0.00	88.69	89.58	0.00	0.00	88.69	89.58	0.00	0.00	88.69	89.58	0.00	0.00
DEM	0.88	0.24	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
HEX	0.61	0.03	99.82	99.82	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
PTU	0.89	0.88	99.12	99.17	100.00	100.00	99.70	99.71	100.00	100.00	99.98	99.98	100.00	100.00	99.99	99.99	100.00	100.00
SOC	1.95	2	87.64	88.12	60.51	88.74	91.72	92.01	74.43	92.03	96.45	96.58	87.47	96.57	98.60	98.65	94.37	98.66
Fishing value lost %	1.28 (Current)		1.28				2.44				8.45				29.31			

West Norfolk

Unimpacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	3.16	1.87	80.55	81.04	58.98	88.22	88.96	89.06	79.28	93.23	94.81	94.82	89.99	97.48	98.40	98.49	98.82	99.93
GDU	1.26	2.99	79.88	80.46	88.58	94.89	84.33	84.78	91.22	95.83	91.88	92.26	94.94	97.32	94.97	95.28	98.70	99.50
MOC	5.62	6.03	93.75	93.90	90.85	96.91	96.66	96.67	94.12	100.00	98.30	98.31	97.01	97.01	99.60	99.61	99.35	100.00
SVA	2.39	0	87.64	87.95	0.00	0.00	88.45	88.73	0.00	0.00	92.45	92.63	0.00	0.00	98.44	98.50	0.00	0.00
COB	7.87	7.45	91.97	92.42	88.20	92.70	93.72	94.09	90.81	94.55	96.30	96.50	94.83	96.84	98.79	98.87	98.08	98.94
COR	13.79	35.2	98.79	98.81	99.55	99.97	99.37	99.38	99.84	100.00	99.69	99.70	99.90	99.90	99.97	99.97	99.99	100.00
DEM	9.76	38.27	99.57	99.57	0.00	0.00	99.61	99.61	0.00	0.00	99.62	99.62	0.00	0.00	99.94	99.94	0.00	0.00
HEX	2.62	1.7	94.87	94.92	98.91	100.00	95.33	95.37	98.99	100.00	96.85	96.88	99.22	99.22	99.53	99.53	99.91	100.00
PTU	1.54	0.02	94.06	94.34	0.00	0.00	94.75	95.00	0.00	0.00	96.57	96.75	0.00	0.00	99.57	99.58	0.00	0.00
SOC	4.88	5.75	94.10	94.29	85.53	93.69	95.64	95.80	88.32	95.39	97.41	97.51	92.63	97.13	99.12	99.16	96.37	99.01

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	3.16	1.87	81.00	81.50	59.60	88.61	89.34	89.45	79.39	93.67	95.13	95.14	90.05	97.77	98.70	98.76	99.01	99.94
GDU	1.26	2.99	80.91	81.43	88.87	94.99	85.52	85.92	91.49	95.91	92.85	93.16	95.15	97.38	95.78	96.02	98.86	99.53

MOC	5.62	6.03	93.90	94.04	91.11	97.00	96.73	96.74	94.25	100.00	98.36	98.37	97.12	100.00	99.63	99.64	99.41	100.00
SVA	2.39	0	87.85	88.15	0.00	0.00	88.66	88.93	0.00	0.00	92.66	92.84	0.00	0.00	98.46	98.51	0.00	0.00
COB	7.87	7.45	92.10	92.54	88.42	92.82	93.84	94.20	91.03	94.67	96.40	96.59	95.01	96.93	98.85	98.92	98.18	98.99
COR	13.79	35.2	98.80	98.82	99.56	99.97	99.38	99.39	99.84	100.00	99.69	99.70	99.91	100.00	99.97	99.98	99.99	100.00
DEM	9.76	38.27	99.57	99.58	0.00	0.00	99.61	99.62	0.00	0.00	99.62	99.62	0.00	0.00	99.94	99.94	0.00	0.00
HEX	2.62	1.7	94.89	94.94	98.91	100.00	95.34	95.38	98.99	100.00	96.87	96.89	99.22	100.00	99.53	99.53	99.91	100.00
PTU	1.54	0.02	94.07	94.34	0.00	0.00	94.76	95.00	0.00	0.00	96.57	96.75	0.00	0.00	99.57	99.58	0.00	0.00
SOC	4.88	5.75	94.19	94.38	85.95	93.86	95.72	95.88	88.75	95.54	97.48	97.57	93.02	97.25	99.16	99.20	96.64	99.08
Fishing value lost %	2.59 (Current)		21.12				24.46				27.75				56.58			

South Tasman Rise

Unimpacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	12.72	15.93	77.73	78.24	67.17	73.03	82.35	82.53	80.53	80.80	94.31	94.50	90.39	92.69	96.01	96.07	95.33	95.54
GDU	0.06	6.6	100.00	100.00	95.78	97.98	100.00	100.00	96.44	98.30	100.00	100.00	99.18	99.35	100.00	100.00	99.38	99.48
MOC	13.03	10.4	97.74	97.84	76.60	115.92	98.06	98.16	76.60	116.57	100.00	100.00	99.77	100.00	100.00	100.00	99.86	100.00
SVA	21.32	0.66	95.44	95.47	0.00	0.00	95.75	95.77	0.00	0.00	98.16	98.17	0.00	0.00	98.40	98.40	0.00	0.00
COB	1.16	2.33	86.66	86.82	87.79	94.97	87.70	87.89	88.87	95.62	97.55	97.61	97.65	98.12	97.61	97.67	98.34	98.40
COR	16.63	5.68	94.69	94.69	92.10	95.78	95.43	95.44	93.62	95.78	97.48	97.50	95.78	97.75	97.85	97.87	95.78	98.37
DEM	0.36	0.01	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
HEX	0.1	0	99.83	99.84	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
PTU	6.18	3.33	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	17.42	20.88	97.46	97.47	96.20	97.33	97.61	97.61	96.21	97.48	99.21	99.21	98.98	99.19	99.31	99.31	99.00	99.27

Impacted baseline – Post Accounting method

	% in FMA		0.70				0.80				0.90				0.95			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper

ERO	12.72	15.93	78.65	79.15	67.95	74.00	83.27	83.44	81.38	81.80	94.79	94.97	90.70	93.16	96.48	96.53	95.64	96.00
GDU	0.06	6.6	100.00	100.00	96.07	98.09	100.00	100.00	96.72	98.40	100.00	100.00	99.24	99.42	100.00	100.00	99.44	99.56
MOC	13.03	10.4	97.75	97.85	76.64	115.97	98.07	98.17	76.64	116.62	100.00	100.00	99.81	100.00	100.00	100.00	99.89	100.00
SVA	21.32	0.66	95.89	95.91	0.00	0.00	96.20	96.21	0.00	0.00	98.38	98.39	0.00	0.00	98.62	98.62	0.00	0.00
COB	1.16	2.33	88.19	88.31	88.79	94.93	89.24	89.39	89.88	95.58	98.60	98.62	97.75	98.52	98.66	98.68	98.43	98.81
COR	16.63	5.68	94.92	94.93	91.99	96.73	95.66	95.67	93.52	96.73	97.68	97.71	96.73	97.62	98.06	98.08	96.73	98.24
DEM	0.36	0.01	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
HEX	0.1	0	99.83	99.84	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
PTU	6.18	3.33	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	17.42	20.88	97.56	97.56	96.45	97.44	97.70	97.71	96.46	97.59	99.27	99.27	99.22	99.26	99.37	99.37	99.23	99.34
Fishing value lost %	1.74 (Current)		1.74				1.77				20.52				20.52			

North Louisville

Unimpacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
	ROC	Power	ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0	0.01	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GDU	1.59	1.68	70.35	70.47	77.27	78.46	82.204	84.472	89.011	89.213	96.866	97.352	96.302	97.763	96.866	97.352	96.302	97.763
MOC	0.66	0.49	60.07	60.49	0.00	0.00	70.174	70.564	0.000	0.000	100.000	100.000	0.000	0.000	100.000	100.000	0.000	0.000
SVA	8.48	45.6	74.15	74.32	75.92	79.78	89.810	90.160	98.155	99.877	96.971	97.013	98.337	99.877	96.971	97.013	98.337	99.877
COB	4.42	2.94	81.65	81.85	72.72	80.60	88.972	89.053	82.820	89.254	97.273	97.294	97.577	97.979	97.273	97.294	97.577	97.979
COR	5.44	3.04	75.84	75.92	67.67	90.01	85.763	85.767	79.959	95.819	99.618	99.633	99.756	100.000	99.618	99.633	99.756	100.000
DEM	0.93	0.34	77.46	77.56	0.00	0.00	90.630	90.681	0.000	0.000	99.909	99.914	0.000	0.000	99.909	99.914	0.000	0.000
HEX	1.63	1.73	80.21	80.25	79.99	87.14	91.581	91.592	90.694	94.007	98.865	98.906	99.354	99.992	98.865	98.906	99.354	99.992
PTU	0.38	0.03	80.29	80.33	0.00	0.00	89.900	89.903	0.000	0.000	99.773	99.780	0.000	0.000	99.773	99.780	0.000	0.000
SOC	2.52	2.52	79.62	79.68	79.82	87.50	90.731	91.009	91.178	97.045	97.143	97.180	97.151	98.651	97.143	97.180	97.151	98.651

Impacted baseline – Post Accounting method

	% in FMA	70%	80%	90%	95%
--	----------	-----	-----	-----	-----

Taxa	ROC		Power		ROC		Power		ROC		Power		ROC		Power			
	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper		
ERO	0	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
GDU	1.59	1.68	71.08	71.48	77.82	79.04	83.35	85.25	89.54	89.72	97.38	97.77	96.49	97.85	97.38	97.77	96.49	97.85
MOC	0.66	0.49	60.24	60.67	0.00	0.00	70.17	70.56	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
SVA	8.48	45.6	74.94	75.14	76.77	81.29	90.54	90.85	98.10	99.87	96.97	97.02	98.27	99.87	96.97	97.02	98.27	99.87
COB	4.42	2.94	82.14	82.33	73.31	81.05	89.47	89.55	83.52	89.67	97.41	97.42	97.67	98.15	97.41	97.42	97.67	98.15
COR	5.44	3.04	76.15	76.22	67.95	90.38	86.08	86.09	80.40	96.11	99.61	99.63	99.75	100.00	99.61	99.63	99.75	100.00
DEM	0.93	0.34	77.55	77.64	0.00	0.00	90.72	90.79	0.00	0.00	99.91	99.91	0.00	0.00	99.91	99.91	0.00	0.00
HEX	1.63	1.73	80.34	80.38	80.03	87.14	91.67	91.68	90.72	94.00	98.86	98.90	99.35	99.99	98.86	98.90	99.35	99.99
PTU	0.38	0.03	80.35	80.39	0.00	0.00	89.91	89.91	0.00	0.00	99.78	99.78	0.00	0.00	99.78	99.78	0.00	0.00
SOC	2.52	2.52	79.72	79.77	79.95	87.47	90.85	91.11	91.31	97.06	97.19	97.22	97.20	98.66	97.19	97.22	97.20	98.66
Fishing value lost %	41.70 (Current)		41.7				58.06				93.82				93.82			

Central Louisville

Unimpacted baseline – Post Accounting method

Taxa	% in FMA		70%				80%				90%				95%			
	ROC	Power	ROC		Power		ROC		Power		ROC		Power		ROC		Power	
	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0	0	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
GDU	5.22	1.46	90.20	90.39	90.30	92.07	90.20	90.39	90.30	92.07	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MOC	0.29	0.25	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
SVA	7.14	21.66	92.58	92.92	92.29	100.00	92.58	92.92	92.29	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	1.86	1.64	83.04	83.26	80.63	88.86	83.04	83.26	80.63	88.86	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COR	1.85	1.3	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
DEM	0.05	0.01	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
HEX	0.52	0.24	99.56	99.58	99.90	100.00	99.56	99.58	99.90	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
PTU	0.04	0	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
SOC	1.1	0.69	91.57	91.97	90.44	94.21	91.57	91.97	90.44	94.21	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0	0	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
GDU	5.22	1.46	90.15	90.28	90.19	92.12	90.15	90.28	90.19	92.12	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MOC	0.29	0.25	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
SVA	7.14	21.66	92.47	92.78	91.58	100.00	92.47	92.78	91.58	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	1.86	1.64	82.81	83.02	80.26	88.92	82.81	83.02	80.26	88.92	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COR	1.85	1.3	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
DEM	0.05	0.01	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
HEX	0.52	0.24	99.56	99.58	99.90	100.00	99.56	99.58	99.90	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
PTU	0.04	0	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
SOC	1.1	0.69	91.74	92.14	91.39	93.97	91.74	92.14	91.39	93.97	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Fishing value lost %	1.56 (Current)		88.36				88.36				100				100			

South Louisville

Unimpacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0
GDU	5.22	1.46	82.08	82.59	78.41	79.82	86.67	86.94	83.57	84.76	95.64	95.82	91.57	93.00	96.42	96.66	95.18	95.67
MOC	0.29	0.25	98.88	98.90	0.00	0.00	100.00	100.00	0.00	0.00	98.88	98.90	0.00	0.00	98.88	98.90	0.00	0.00
SVA	7.14	21.66	80.46	80.69	81.98	100.00	88.53	88.53	99.76	100.00	92.39	92.63	99.80	100.00	96.25	96.42	99.95	100.00
COB	1.86	1.64	72.02	72.08	71.85	74.57	80.88	80.88	81.95	82.88	90.77	90.92	89.80	92.71	95.02	95.15	94.73	97.14
COR	1.85	1.3	99.71	99.71	97.43	100.00	99.71	99.71	97.59	100.00	99.71	99.71	99.29	100.00	100.00	100.00	98.70	100.00
DEM	0.05	0.01	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00	100.00	0.00	0.00
HEX	0.52	0.24	89.00	89.47	0.00	0.00	90.53	90.97	0.00	0.00	93.60	93.91	0.00	0.00	96.51	96.65	0.00	0.00
PTU	0.04	0	75.99	77.52	0.00	0.00	75.99	77.52	0.00	0.00	77.38	78.87	0.00	0.00	98.60	98.61	0.00	0.00

SOC	1.1	0.69	85.08	85.29	78.79	99.20	90.28	90.35	85.78	99.37	95.55	95.68	93.27	99.58	93.67	93.70	91.98	99.39
------------	-----	------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
	ROC	Power	ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	Power	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0	0	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GDU	5.22	1.46	82.23	82.74	78.42	79.86	86.689	86.944	83.516	84.702	95.757	95.933	91.579	93.028	96.416	96.646	95.171	95.648
MOC	0.29	0.25	98.87	98.90	0.00	0.00	100.000	100.000	0.000	0.000	98.875	98.902	0.000	0.000	98.875	98.902	0.000	0.000
SVA	7.14	21.66	80.57	80.80	82.09	100.00	88.489	88.516	99.747	100.000	92.471	92.700	99.793	100.000	96.314	96.475	99.946	100.000
COB	1.86	1.64	71.98	72.05	71.71	74.58	80.799	80.816	81.884	82.610	90.786	90.937	89.760	92.692	95.018	95.151	94.696	97.140
COR	1.85	1.3	99.71	99.71	97.42	100.00	99.707	99.712	97.577	100.000	99.707	99.712	99.285	100.000	100.000	100.000	98.695	100.000
DEM	0.05	0.01	100.00	100.00	0.00	0.00	100.000	100.000	0.000	0.000	100.000	100.000	0.000	0.000	100.000	100.000	0.000	0.000
HEX	0.52	0.24	88.98	89.45	0.00	0.00	90.514	90.962	0.000	0.000	93.593	93.904	0.000	0.000	96.507	96.643	0.000	0.000
PTU	0.04	0	75.99	77.52	0.00	0.00	75.990	77.519	0.000	0.000	77.380	78.872	0.000	0.000	98.599	98.616	0.000	0.000
SOC	1.1	0.69	85.08	85.29	78.73	99.19	90.277	90.346	85.725	99.363	95.577	95.707	93.261	99.576	93.673	93.707	91.938	99.380
Fishing value lost %	1.77(Current)		61.31				72.55				83.38				98.64			