SPRFMO
South Pacific Regional Fisheries Management Organisation

9th MEETING OF THE SCIENTIFIC COMMITTEE

Held virtually, 27 September to 2 October 2021

SC9-DW06_rev1

Development of Spatial Management Scenarios for Bottom Trawling

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New Zealand / Australia

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1. Purpose

The purpose of this paper is to update the Scientific Committee on the methods being used and progress in developing spatial management scenarios for bottom trawling. This work is to inform the Commission's determination on the level of protection required to prevent Significant Adverse Impacts on Vulnerable Marine Ecosystems in the SPRFMO Convention Area.

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 spatial management areas was appropriate.

An evaluation of the level of protection for 10 of the 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).

In the BFIA, protection levels were assessed using two different approaches ('post accounting' and Relative Benthic Status (RBS)) to evaluate habitat suitability for different VME indicator taxa, adjusted to represent different ways to translate the habitat suitability index (HSI) into predictions of the presence or abundance of a VME indicator taxa on the seafloor. Importantly, evaluation of the level of protection provided by spatial management regimes is dependent on spatial scale, and the SC and COMM have indicated that estimation should be carried out at a scale comparable to that of the Fisheries Management Areas (FMAs) (Figures 1 & 2).

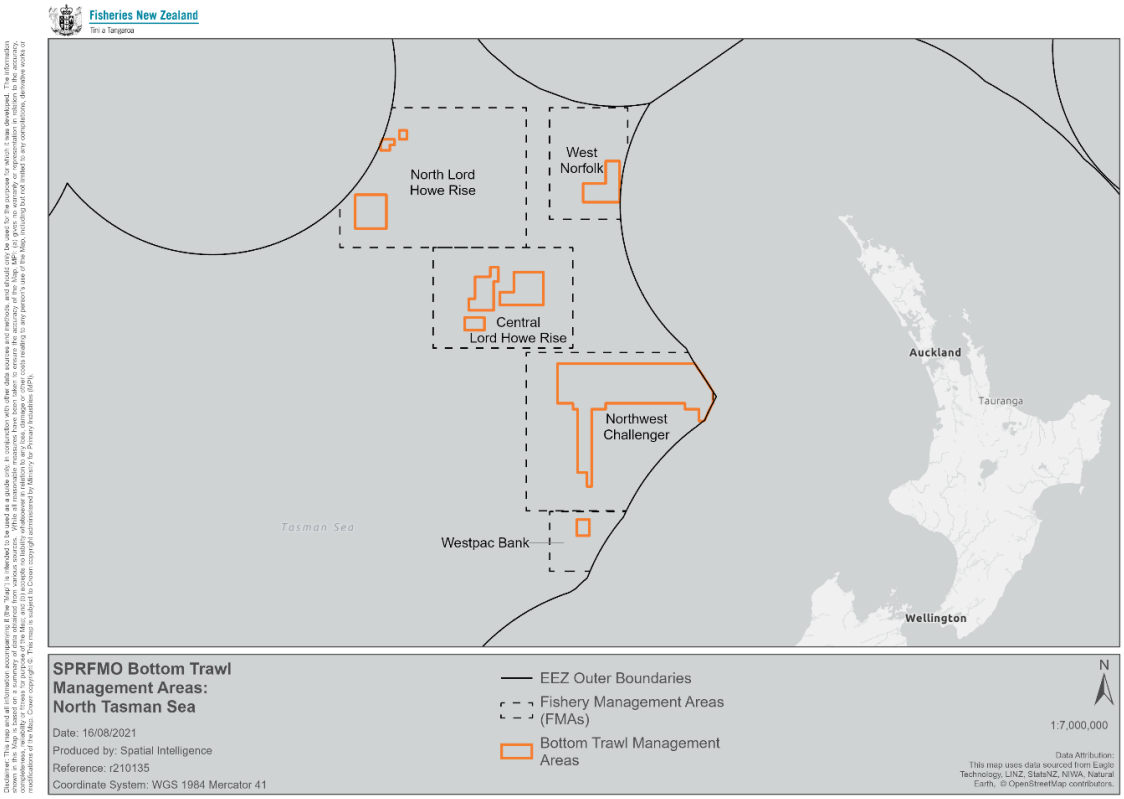


Figure 1: Bottom Trawl Management Areas and Fisheries Management Areas in the Tasman Sea.

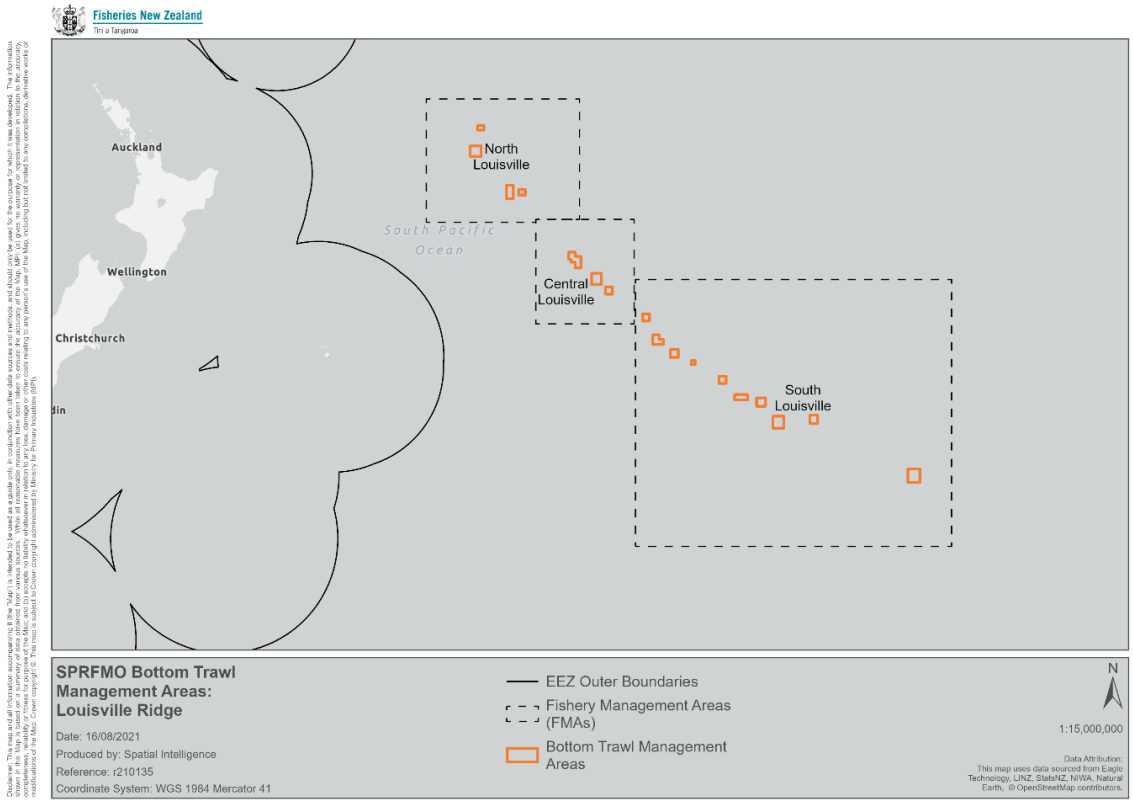


Figure 2: Bottom Trawl Management Areas and Fisheries Management Areas in the Tasman Sea.

The discussion on the appropriate scale at which to consider SAIs on VMEs, and consequently protection statistics describing the performance of the spatial management regime, has continued for several years. Following submission of a paper reviewing approaches taken in other RFMO/As (SC7-DW18), SC7 recommended that the SPRFMO Commission cooperate and coordinate with other RFMO/As and the FAO in refining or developing guidelines on the interpretation of appropriate scale of consideration and assessment of SAIs on VMEs. In so doing they should give consideration to the FAO's International Guidelines for the Management of Deep-sea Fisheries in the High Seas (FAO, 2009) and relevant United Nations General Assembly resolutions, and take into account efforts by RFMO/As to meet their obligations in this regard.

The issue of the scale of consideration and assessment of SAIs on VMEs was explored in the BFIA, but no specific resolution was found. Subsequently, SC8 agreed that, although the appropriate scale to assess and manage impacts on VMEs has not been defined in SPRFMO, the smaller scale of the FMAs is likely to be a more biologically appropriate scale at which to assess and manage these impacts than larger scales.

In general terms, there appears to be little scientific guidance from RFMOs for identifying the appropriate spatial scale for evaluating and preventing SAIs on VMEs. To date, no other RFMO has taken the same approach as SPRFMO, i.e., to close an entire area to bottom fishing and then open specifically designed areas that minimise interactions between bottom fishing and the predicted distribution of VMEs as the primary mechanism to prevent SAIs on VMEs.

To better enable the Commission to consider the appropriate level of spatial protection to prevent SAIs on VMEs, COMM9 tasked the SC as follows:

"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]

3. Methods

Spatial modelling of habitat suitability for VME indicator taxa

New Zealand and Australia have developed habitat suitability models 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).

We used the most recent suite of habitat suitability models, obtained through an ensemble of Random Forest, Boosted Regression Tree, and Maxent models based on records for 10 VME indicator taxa and data layers for 12 environmental variables (Stephenson et al. 2021) for depths down to 2000 m. These models represent the suitability of seafloor habitat in 1 km^2 cells for a subset of the VME indicator taxa identified in CMM03-2021 (excluding representation of Actinaria, Zoantharia, Hydrozoa, Bryozoa, Brisingida, and Crinoidea) (Table 1). 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).

[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 *Vulnerable taxa*	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: Solenosmilia; Goniocorella; Oculina; Enallopsammia; Madrepora; Lophelia	Separate models for *Enallopsammia rostrata, Madrepora oculata, Solenosmilia variabilis, Goniocorella dumosa*	ERO MOC SVA GDU
	Antipatharia (Black corals)	All taxa	Modelled as a single group	COB
	Alcyonacea (Soft corals)	All taxa excluding Gorgonian Alcyonacea	Modelled as a single group	
	Gorgonian Alcyonacea (Tree-like forms, sea fans, sea whips, bottlebrush)	All taxa within the following suborders: Holaxonia; Calaxonia; Scleraxonia	Modelled as a single group	SOC
	Pennatulacea (Sea pens)	All taxa	Modelled as a single group	PTU
	Actiniaria (Anemones)	All taxa	Not modelled	
	Zoantharia (Hexacorals)	All taxa	Not modelled	
	Hydrozoa (Hydroids)	All taxa within the orders Anthoathecata and Leptothecata, excluding Stylasteridae	Not modelled	
	Stylasteridae (Hydrocorals)	All taxa	Modelled as a single group	COR
Bryozoa (Bryozoans)		All taxa within the orders Cheilostomatida and Ctenostomatida	Not modelled	
Habitat Indicators				
Echinodermata	Brisingida ('Armless' stars)	All taxa	Not modelled	
	Crinoidea (Sea lillies)	All taxa	Not modelled	

Based on these habitat suitability models, different metrics have been developed to represent the likelihood of the presence or abundance of each modelled VME indicator taxon on the seafloor. The development of these metrics is discussed in detail within the BFIA (SC8-DW07_Rev1).

Following discussion at the South Pacific Fishery Assessment Working Group, a New Zealand-led scientific working group that is open to stakeholders and SC representatives from the EU, the USA and Australia, two metrics were selected as most representative of presence and abundance derived from HSI values, respectively: the ROC 0-linear ("ROC") and the Power Mean ("Power") metrics. The ROC metric uses taxa-dependent thresholds developed using the Receiver Operating Characteristic (ROC) curve to exclude areas with low likelihood of the presence of suitable habitat (below the threshold) and assumes that a linear relationship exists between the HSI values and the likelihood of VME indicator taxa presence (or abundance) above the threshold. 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 and results are presented to enable a comparison of the relative effects of incorporating 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 trawling. Under an unimpacted baseline not accounting for historical trawling impacts, protection levels provided by spatial management are expected to be more pessimistic. As historical trawling is expected to have reduced taxa abundance within Bottom Trawl Management Areas (i.e. areas open to trawling), using impacted baselines generally leads to more optimistic protection level estimates because of a smaller predicted taxa abundance within these open areas. However, results may vary depending on the distribution of historical fishing effort relative to the location of management areas boundaries, and where historic fishing effort is predominately located outside open areas within an FMA. The BFIA contains a detailed description of how the historical fishing footprint over the last 30 years was used to account for historical trawling impacts (also called 'naturalness') by spatially discounting values of HSI for VME indicator taxa proportionally to the intensity of 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 used in the analyses. Bottom and mid-water trawl spatial data from Australian and New Zealand high-seas fisheries in the SPRFMO area, including catch per each tow, was collated in 2017 to develop this layer (Cordue 2017, unpublished). These data included spatial catch records from over 54 000 fishing events. For tows with reliable data, the value to fisheries was assumed to be the sum of total catches for all species recorded, spread evenly across all 1 km^2 cells contacted by a tow. This layer allowed for the identification of areas of core fisheries value from historical catches.

Use of decision-support tools

The decision-support tool Zonation was used in SC6-DW11 to establish optimal areas for the protection of VMEs from SAIs while minimising costs to the fishery. Zonation outputs provide a representation of the optimal locations for biodiversity protection and were used to guide the development of the original CMM (SC6-DW11). Zonation also produces 'conservation curves' that provide an appraisal of the area required to meet certain protection targets for the individual VME indicator taxa. In 2020, Zonation was used to investigate how updated habitat suitability models and naturalness calculations would influence the effectiveness of the existing CMM (SC8-DW07_Rev1).

The input layers for the present Zonation analyses include biodiversity layers (i.e., spatial predictions of habitat suitability for VME indicator taxa), uncertainty (spatially explicit CV), naturalness, and a 'silent' layer representing fishery value. A silent layer is not used in the prioritisation of the high value areas for VMEs in the protection scenarios, but only used to assess the impact of any scenario on the value to fishery.

To address the task set by COMM9, Zonation was used to develop guidance on the optimal changes to the Bottom Trawl Management Area boundaries within CMM 03-2021 given the protection targets described in the task (i.e., 70%, 80%, 90%, 95% for each individual taxon, applied separately to each FMA). This guidance was developed by running Zonation analyses for individual FMAs and interrogating conservation curves to establish the minimum area of each FMA required to be closed to fishing to meet a protection target for all VME indicator taxa. Zonation scenarios were performed using habitat suitability layers for VME indicator taxa transformed to represent the two presence/abundance metrics, with the incorporation of uncertainty and naturalness while reporting on loss of fishery value. Outputs to guide any CMM re-appraisal included conservation curves for each protection scenario within each FMA, and maps depicting the optimal areas for protection across all VME indicator taxa (example in Figure 3).

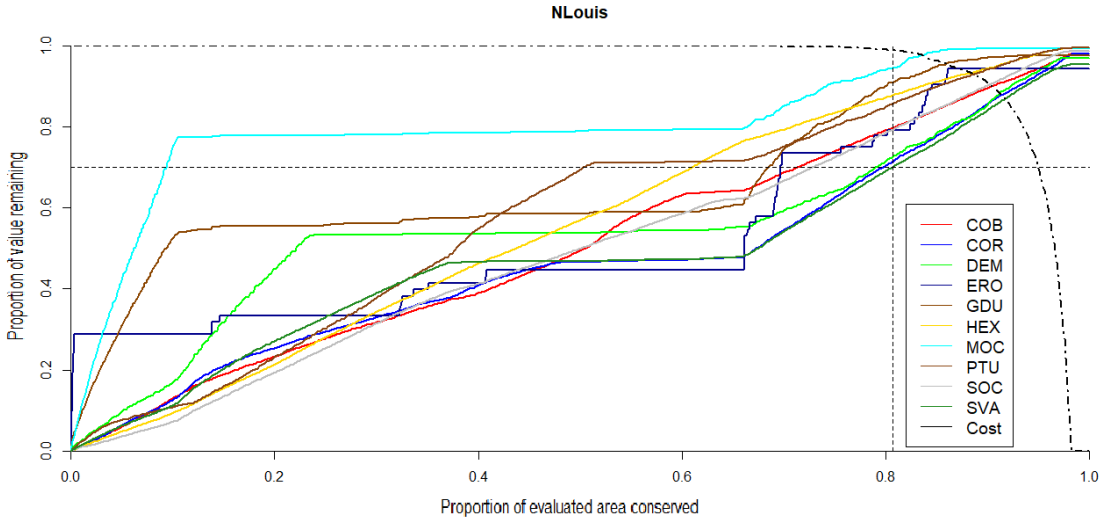


Figure 3: Example of a 'conservation curve' output from Zonation that can be used to establish the minimum area required to be closed to trawling to reach a given protection target. In this example on the North Louisville FMA, to achieve 70% protection for each VME indicator taxa, just over 80% of the FMA will need to be closed to trawling. The cost curve (dot and dashed line) indicates the loss of fishery value at a given proportion of the FMA closed.

Estimation of protection levels

As tasked, two different assessment methods representing a 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 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. 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. Post accounting estimates the fraction of VME indicator taxa presence (ROC 0-linear) or abundance (Power Mean) protected by spatial management measures, based on the location and extent of areas open to trawling in relation to the spatial distribution of VME indicator taxa presence (ROC 0-linear) or abundance (Power Mean). RBS estimates the fraction of VME indicator taxa protected by spatial management measures using the same metrics, but accounts for future trawling effort scenarios and allows for the recovery of the VME indicator taxa from historical impact.

Through the RBS method several assumptions were made to estimate future trawling effort and its distribution. First, the distribution of future trawling effort was assumed to be constrained within the historical footprint. Second, future trawling effort was assumed to redistribute within the (progressively smaller) open areas proportionally to the historical distribution of effort. Third, a linear relationship was assumed between effort (number of trawl tows) and catch, future trawling effort was thus estimated to inflate/decrease to reach the catch limits of different regions (Tasman Sea, Westpac Bank and Louisville Seamount Chain); a multiplier was calculated based on the mean historical catch over the last 10 years and its relationship with current catch limits (see SC8-DW07_Rev1). As mean trawling was below the current limit in all regions, future trawling is predicted to increase in the future.

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)*, new boundaries for the Bottom Trawl Management Areas were drawn. These boundaries define progressively smaller open areas, to exclude trawling and thus achieve increasingly higher protection level targets.

Spatial layers for the ROC 0-linear and Power Mean metrics for all 10 VME indicator taxa for which models were available, the fishery value layer (to enable visualisation of high-value areas for trawling activity), and Zonation outputs were used to inform the iterative development of boundaries based on each scenario. In the first instance an unimpacted baseline was used to define boundaries, with a successive step verifying protection levels with the impacted baseline.

Officials from New Zealand and Australia held two virtual workshops, 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 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 represent a representative part of the population;

- impacts to historical trawling were minimised while achieving the scenario protection targets; and
- the complexity of management boundaries was minimised for practicality purposes.

For some taxa, protection targets were already met with the boundaries defined in the current CMM (e.g., Figure 4), so boundary refinement focussed on those taxa that did not meet a specified protection target, with priority given to those taxa that were least protected. Boundaries were refined so that protection targets were met for both the ROC 0-linear and Power Mean metrics. Once protection targets for the least protected taxa were met, the performance of the revised boundaries in protecting the other taxa was assessed, and where required, boundaries were refined further to ensure that all taxa met the specific protection target. In some cases, refining boundaries so that the least well-protected taxon met the protection target resulted in all other taxa also meeting the specified protection target. Where this wasn't the case, boundaries were iteratively refined until the protection targets were met by all taxa based on the GIS analysis (or in one case, the entire FMA was closed to fishing).

An example of the information used to prioritise VME indicator taxa from the BFIA is provided as Figure 4.

<70; 70-80; 80-90; 90-95; 95+

Table J.14: Estimated percentage of each modelled VME indicator taxon within the West Norfolk Ridge FMA and outside the areas open to fishing for each of three post-accounting methods. ROC = percent of suitable habitat estimated using a HSI cutoff estimated from the receiver operating characteristic (ROC) curve; Linear = percent of total abundance estimated by assuming a linear relationship between habitat suitability indices (HSI) and abundance; Power_High and Power_Low = percent of total abundance estimated by assuming power relationships between HSI and abundance where Power_Low is the mean estimated relationship minus 1 standard deviation and Power_High is the mean estimated relationship plus 1 standard deviation. Taxa within each group as in Table 33.

Group	Code	ROC		Power_Low		Power_High		Linear	
		% of taxon within region	% of taxon outside fishing areas	% of taxon within region	% of taxon outside fishing areas	% of taxon within region	% of taxon outside fishing areas	% of taxon within region	% of taxon outside fishing areas
Stony corals	ERO	3.26	47.55	2.33	53.62	1.27	43.71	3.44	84.23
	GDU	1.12	38.36	2.92	81.56	2.92	81.56	3.11	82.10
	MOC	5.72	77.51	4.91	80.43	5.38	79.10	3.63	86.62
	SVA	2.85	67.86	<0.01	89.09	<0.01	94.22	3.12	82.09
Other VME indicators	COB	8.02	84.07	6.68	82.32	6.69	76.72	4.58	86.47
	COR	15.09	97.98	22.06	98.83	30.87	99.71	4.66	89.65
	DEM	10.29	99.63	18.83	99.99	16.13	100.00	3.95	92.17
	HEX	2.65	90.96	1.18	95.32	0.38	98.22	2.94	88.98
	PTU	1.75	90.84	0.24	90.06	<0.01	90.68	2.26	90.14
	SOC	4.64	87.00	4.57	84.08	14.94	38.00	3.54	87.65

Figure 4: Example of statistics from the BFIA (using previously calculated metrics) used to prioritise taxa for visualisation in scenario development.

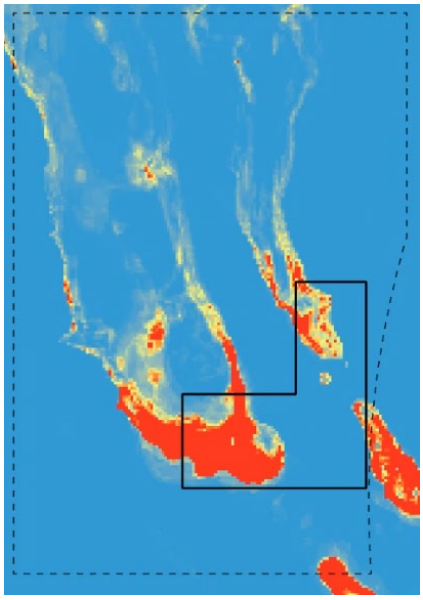
To prioritise which taxa to visualise, we began with those taxa that had more than 1% of their distribution in a particular FMA, and then identified those taxa that didn't meet a given target.

In the example above, all 10 VME indicator taxa have distributions above 1% in the area using the ROC 0-linear metric and ERO, GDO, MOC, COB, COR, DEM, and SOC have distributions above 1% using the Power High metric[2]. Of those, ERO and SOC had the lowest protection statistics and were therefore the initial taxa used to inform the design of the 70%, 80%, 90%, and 95% scenarios.

[2] Tables from the BFIA (which did not include the Power Mean metrics) were used in the initial prioritisation as the full statistics were readily available. All subsequent analyses were completed using ROC and Power.

As an example, within the West Norfolk Ridge FMA, we focussed on first revising boundaries to increase protection for ERO based on the Power metric, as that metric estimated lower protection compared to ROC (Figure 5). We then evaluated if meeting the target for ERO resulted in the targets also being met for the other taxa.

a)



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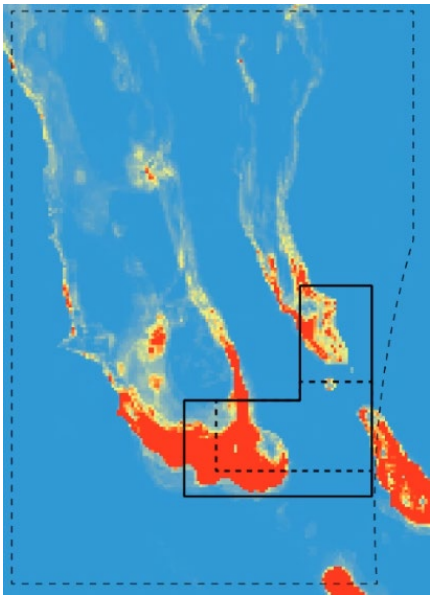

Figure 5: Distribution of ERO from Power Mean (yellow to red gradient), West Norfolk Ridge FMA (dashed outer polygon), current Bottom Trawl Management Area (a – solid black polygon) and amended Bottom Trawl Management Area (b – dashed black polygon) to meet 70% protection target.

To achieve the 70% protection level, areas with highest presence/abundance of ERO were identified and the Bottom Trawl Management Area adjusted to reduce the amount of those areas open to fishing.

This 'scenario' was then tested against the other VME indicator taxa that didn't meet the protection target (70%) to determine if achieving the protection level for ERO also achieved a corresponding level of protection for other taxa. In this case, adjusting the open area to meet the protection target for ERO meant that the protection target was also met for all the other taxa that didn't initially meet the protection target (Figure 6). Finally, the 'scenario' was tested to make sure that the protection target (70%) was met for all taxa using both the ROC and Power metrics.

This approach was undertaken iteratively to achieve the 80%, 90% and 95% protection targets (Figure 7).

SVA power	Total	0.000122		70%
		Current	%	
	1	1.06E-05	0.09	0.000001
	Open percentage		0.09	0.011314
	closed percentage		0.91	0.988686
SOC power	Total	706.3516		
		Current	%	
	1	1.55E+02	0.22	74.526414
	Open percentage		0.22	0.105509
	closed percentage		0.78	0.894491
MOC power	Total	113.1349		
		Current	%	
	1	2.32E+01	0.21	6.946067
	Open percentage		0.21	0.061396
	closed percentage		0.79	0.938604
GDU power	Total	4106.618		
		Current	%	
	1	7.59E+02	0.18	342.686228
	Open percentage		0.18	0.083447
	closed percentage		0.82	0.916553
ERO power	Total	79.88314		
		Current	%	
	1	44.04	0.55	21.722834
	Open percentage		0.55	0.271933
	closed percentage		0.45	0.728067

Figure 6: Estimated protection statistics for 5 VME indicator taxa based on Power Mean rasters from the 70% scenario shown above.

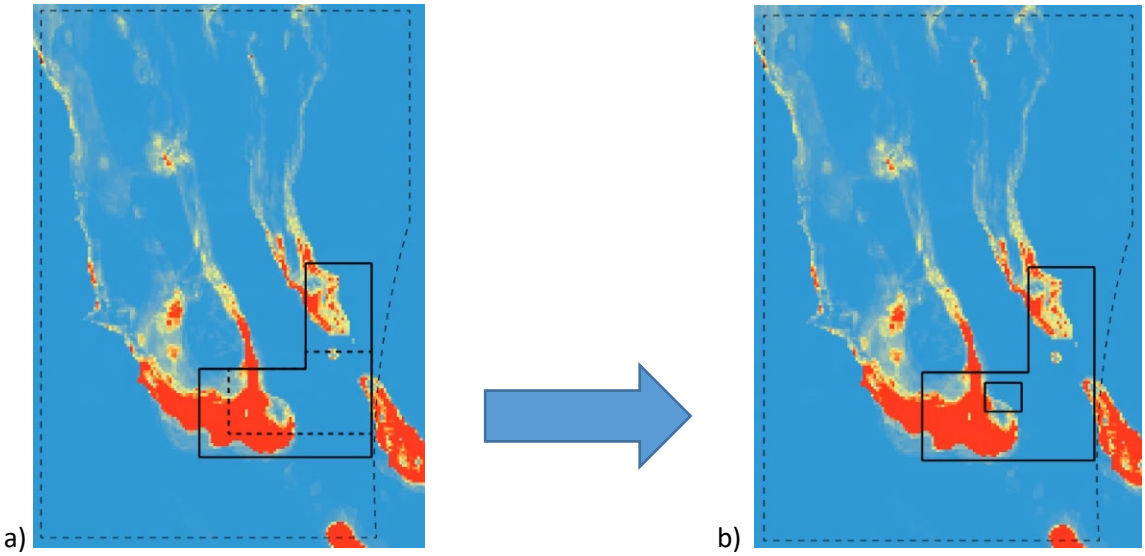

Figure 7: Distribution of ERO from the Power metric (yellow to red gradient), West Norfolk Ridge FMA (dashed outer polygon), current West Norfolk Ridge Bottom Trawl Management Area (solid black polygon) with the 70% scenario (dashed black polygon) (a) and amended Bottom Trawl Management Area (small black polygon) (b) to meet 95% protection target.

The statistics across all four of the scenarios and the key taxa of interest for this FMA following this process, based on abundance metrics, are shown in Figure 8.

					70%	80%	90%	95%
SVA power	Total	0.000122						
		Current	%					
	1	1.06E-05	0.09		0.000001	0.000001	0.000001	0.000000
	Open percentage		0.09		0.011314	0.011081	0.007256	0.000024
	closed percentage		0.91		0.988686	0.988919	0.992744	0.999976
SOC power	Total	706.3516						
		Current	%					
	1	1.55E+02	0.22		74.526414	58.433841	36.720435	16.579605
	Open percentage		0.22		0.105509	0.082726	0.051986	0.023472
	closed percentage		0.78		0.894491	0.917274	0.948014	0.976528
MOC power	Total	113.1349						
		Current	%					
	1	2.32E+01	0.21		6.946067	3.339605	1.697420	0.369857
	Open percentage		0.21		0.061396	0.029519	0.015004	0.003269
	closed percentage		0.79		0.938604	0.970481	0.984996	0.996731
GDU power	Total	4106.618						
		Current	%					
	1	7.59E+02	0.18		342.686228	268.455116	160.544258	37.221830
	Open percentage		0.18		0.083447	0.065371	0.039094	0.009064
	closed percentage		0.82		0.916553	0.934629	0.960906	0.990936
ERO power	Total	79.88314						
		Current	%					
	1	44.04	0.55		21.722834	11.311791	5.156793	0.511078
	Open percentage		0.55		0.271933	0.141604	0.064554	0.006398
	closed percentage		0.45		0.728067	0.858396	0.935446	0.993602

Figure 8: Estimated protection statistics for 5 key VME indicator taxa based on Power rasters across the 70%, 80%, 90%, and 95% protection scenarios.

This process was repeated across all FMAs and all taxa with more than 1% of their distribution in a given FMA, using both presence and abundance metrics.

Protection statistics where then calculated with naturalness included for all modelled VME indicator taxa (including those with <1% of their distribution in the area) to check whether all protection targets were met using an impacted baseline. Finally, protection statistics for all scenarios were calculated using the RBS methodology and checked with the incorporation of uncertainty resulting from the presence/abundance modelling.

4. Results

For the majority of FMAs, developed scenarios were able to achieve the protection levels requested by the Commission, using both ROC and Power metrics for all modelled VME indicator taxa, assessed using the temporally static post-accounting and temporally dynamic RBS methods. In most cases, the protection targets were also achieved when uncertainty in the modelled predictions and historical fishing impacts were taken into consideration. Targets were achieved while retaining some parts of the open Bottom Trawl Management Areas, except for the Central Louisville FMA (Table 1). However, some of the remaining Bottom Trawl Management Areas are unlikely to be practically fishable, as they are potentially not large enough to provide for the 'run up' and/or 'hauling space' required for the deployment or retrieval of bottom trawl gear.

Results are summarised below for each FMA, and summary statistics are provided in Appendix I. Additional detailed results including estimates of uncertainty are provided in Appendix II.

North Lord Howe Rise

Unimpacted baseline

Post-accounting

Using the post-accounting method and an unimpacted baseline, targets were met for eight taxa/metric combinations. The 95% target was not met for either presence or absence metric for COB. The uncertainty for COB and SOC reduced confidence that the 90% target had been met, and that the 95% target had been met for SOC.

Of the nine taxa-metric combinations with less than 1% of their distribution within the FMA, one (COR) did not achieve the 80, 90 or 95% targets with the ROC metric, and did not achieve the 95% target with the Power metric. One further taxon with <1% distribution in the FMA (GDU) did not meet the 95% target under the ROC metric.

RBS

Using the RBS assessment method, all taxa with more than 1% of their distribution within the North Lord Howe Rise FMA met all protection targets.

For three taxa/metric combinations with less than 1% of their distribution in the FMA, one (COR) did not meet the 80% or 90% targets with the ROC metric and did not meet the 95% target with the Power metric. One further taxon (GDU) did not meet the 95% target under the ROC metric.

Impacted baseline

Post-accounting

For the post-accounting method using a fished baseline, the only difference was for SOC, where the uncertainty reduced confidence that the 80% target had been met.

Fishery value

The Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of 19.8% of the estimated historical fishery value in the FMA. The 95% scenario removes an additional 0.64% of the value and would result in a total of 20.44% of the historical fishery value being unavailable.

South Lord Howe Rise

Unimpacted baseline

Post-accounting

Using the post-accounting method and an unimpacted baseline, targets were met for 14 of the 16 taxa/metric combinations with more than 1% of their distribution in the South Lord Howe Rise FMA. The 80% target was not met for SVA with the ROC metric and the lower end of the confidence bound for SOC with the Power metric was below the 80% target.

For the four taxa-metric combinations with less than 1% of their distribution in the FMA, the 70% and 80% targets were not met for COR with either metric, and the 80% target was not met for DEM under the Power metric.

RBS

Using the RBS assessment method, all taxa with more than 1% of their distribution within the South Lord Howe Rise FMA met all protection targets.

Targets were met for two of the four taxa/metric combinations with less than 1% of their distribution in the FMA. The 70% and 80% targets were not met for COR with either ROC or Power metrics.

Impacted baseline

Post-accounting

For the post-accounting method using an impacted baseline, the only difference was for MOC, where the uncertainty reduced confidence that the 80% target had been met.

Fishery value

The Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of 6.24% of the estimated historical fishery value in the FMA. The 95% scenario removes an additional 65.4% of the value and would result in a total of 71.6% of the historical fishery value being unavailable.

Northwest Challenger

Unimpacted baseline

Post-accounting

Using the post-accounting method and an unimpacted baseline, all targets were met for 12 of the 15 taxa-metric combinations with more than 1% of their distribution in the Northwest Challenger FMA. No targets were met for COB with the ROC metric (all were within 2% of the target). In addition, the uncertainty for ERO and COB under the Power metric reduced confidence that the 90% target was met. Similarly, the uncertainty for COB under the Power metric reduced confidence that the 95% target had been met.

RBS

Using the RBS assessment method, all taxa within the Northwest Challenger FMA met all protection targets.

Impacted baseline

Post-accounting

Using the unimpacted baseline, all targets were met except for the 70% target for COB under the ROC metric.

Fishery value

The Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of 1.08% of the estimated historical fishery value in the FMA. The 95% scenario removes an additional 74% of the value and would result in a total of 75.12% of the historical fishery value being unavailable.

Westpac Bank

Unimpacted baseline

Post-accounting

Using the post-accounting method and an unimpacted baseline, targets were met for eight of the 10 taxa/metric combinations for those taxa with more than 1% of their distribution in the FMA. For COB and SOC, the 95% target was not met for the Power metric, and the uncertainty for the Power metric also reduced confidence that the 90% target had been achieved for either taxon.

Of the 10 taxa/metric combinations with less than 1% of their distribution in the FMA, seven met all targets. The 90% and 95% targets were not achieved for COR under the ROC metric, and the 95% target was not achieved for GDU under the ROC metric. In addition, the uncertainty for SVA under the Power metric reduced confidence that the 70% target had been met.

RBS

Using the unimpacted baseline, all targets were met for all but one of the taxa/metric combinations with more than 1% of their distribution in the FMA. The 95% target was not met for COR using the ROC metric.

Impacted baseline

Post accounting

Using the impacted baseline, the 95% target was not met for either COB or SOC under either metric, and the uncertainty for SOC may result in the 70%, 80% and 90% targets not being met with the Power metric.

Fishery value

The Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of 1.28% of the estimated historical fishery value in the FMA. The 95% scenario removes an additional 12% of the value and would result in a total of 13.24% of the historical fishery value being unavailable.

West Norfolk

Unimpacted baseline

Post accounting

Using the post-accounting method and unimpacted baseline, all targets were met, although the uncertainty for GDU using the ROC metric may result in the 95% target not being met.

RBS

Using the RBS assessment method and unimpacted baseline, all targets were met for all taxa.

Impacted baseline

The only difference when using an impacted baseline was that the uncertainty for ERO using the Power metric may result in the 70% and 80% targets not being met.

Fishery value

The Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of 2.59% of the estimated historical fishery value in the FMA. The 95% scenario removes an additional 54% of the value and would result in a total of 56.58% of the historical fishery value being unavailable.

South Tasman Rise

Unimpacted baseline

Post accounting

Using the post-accounting method and unimpacted baseline all targets were met for all taxa.

RBS

Using the RBS assessment method and unimpacted baseline, all targets were met for all taxa.

Impacted baseline

Post accounting

The only different when using an impacted baseline was that the uncertainty for ERO using the Power metric reduced confidence that the 70% target had been met.

Fishery value

The Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of 1.74% of the estimated historical fishery value in the FMA. The 95% scenario removes an additional 18.8% of the value and would result in a total of 20.52% of the historical fishery value being unavailable.

North Louisville

Unimpacted baseline

Post accounting

Using the post-accounting method and unimpacted baseline, targets were met for 11 of the 12 taxa/metric combinations with more than 1% of their distribution in the North Louisville FMA. The 80% and 90% targets were not met for SVA with the Power metric.

For the eight taxa/metric combinations with less than 1% of their distribution in the FMA, targets were met for three. The 70%, 80% and 90% targets were not met for DEM using the Power metric. The 70% target was not met for MOC under either metric, and the 80% target was not met for MOC using the Power metric. In addition, the 95% target was not met for ERO under the Power metric.

RBS

Using the RBS assessment method and unimpacted baseline, all targets were met for all taxa.

Impacted baseline

Post accounting

The only difference in using an impacted baseline is that the 80% target was not met for MOC using both ROC and Power metrics, rather than just for the Power metric.

Fishery value

The Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of 41.70% of the estimated historical fishery value in the FMA. The 95% scenario removes an additional 52.2% of the value and would result in a total of 93.82% of the historical fishery value being unavailable.

Central Louisville

Unimpacted baseline

Post accounting

Using the post-accounting method and unimpacted baseline, all targets were met with the except of the 70% target for GDU under the ROC metric.

The 70% target was also not met for ERO with either metric, but ERO has 0% of its distribution modelled to be within the FMA.

RBS

Using the RBS assessment method and unimpacted baseline, all targets were met for all taxa.

Impacted baseline

The only difference when using the impacted baseline is that the uncertainty for SVA under the Power metric reduces confidence that the 70% target had been met.

Fishery value

The Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of 1.56% of the estimated historical fishery value in the FMA. This FMA is unique in that 100% of the historical fishery value was made unavailable to achieve both the 90% and 95% scenarios.

South Louisville

Unimpacted baseline

Post accounting

Using the post-accounting method and unimpacted baseline, targets were achieved for five of the eight taxa/metric combinations with more than 1% of their distribution in the FMA. The 80% and 90% targets were not met for COB using the ROC metric. The uncertainty bounds for COB using the Power metric reduced confidence that the 90% and 95% targets had been met. Similarly, the uncertainty bounds for GDU using the Power metric reduced confidence that the 90% target had been met.

For the twelve taxa/metric combinations with less than 1% of their distribution in the FMA, targets were met for seven. Only one target was met for ERO for which the distribution is so low that statistics were not able to be calculated for the ROC metric. The 80% and 90% targets were not met for PTU, and the 95% target was not met for SOC.

RBS

With the exception of ERO using the ROC metric, all targets were met for all taxa/metric combinations using the RBS method.

Impacted baseline

The only difference in the results using the impacted baseline is that the 95% target was met for SOC under the ROC metric.

Fishery value

The Bottom Trawl Management Areas in CMM03-2021 have resulted in the loss of 1.77% of the estimated historical fishery value in the FMA. The 95% scenario removes an additional 96.9% of the value and would result in a total of 98.64% of the historical fishery value being unavailable.

Three Kings

There are no Bottom Trawl Management Areas in the Three Kings FMAs and therefore all protection targets were met by the current spatial management.

5. Discussion

Spatial management scenarios within all FMAs were developed to try and meet each of the protection targets for both VME indicator taxa metrics developed. In most FMAs these scenarios retained some areas open to bottom trawling, with the exception of Central Louisville where the entire FMA would have to be closed to meet the 90% and 95% protection targets.

In general, higher protection targets resulted in more significant impacts on the estimated fishery value. Those impacts may be underestimated in the results provided, as the scenarios have not been tested for practical 'fishability'. These protection scenarios will support explicit consideration by the Commission of the trade-offs inherent in ensuring the long-term sustainable use of fisheries resources and the safeguarding of the marine ecosystems in which those resources occur.

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

For those taxa/modelling approaches with less than 1% but more than 0.2% in an FMA, protection targets were met for all but three taxa – the stony coral *Madrepora oculata* in the North Louisville, Demospongiae in the North Louisville, and Gorgonian Alcyonacea in the South Louisville.

Work on fine-tuning the scenarios to increase the achievement of all protection targets will continue between SC9 and the meeting of the Commission. The results provided in this document will continue to be updated as the spatial scenarios are further refined to meet the protection targets specified by the Commission.

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. These are discussed briefly below.

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'). 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.

6. Recommendations

It is recommended that the Scientific Committee:

- **Notes** the metrics used to assess the protection levels for VME indicator taxa, ROC 0-linear and Power Mean, are representative of the majority of the metrics spectrum presented in the BFIA.
- **Notes** that protection level assessment was completed for all protection levels using both temporally static and a temporally dynamic methods, as requested by the Commission.
- **Agrees** 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.
- **Recommends** 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.
- **Notes** 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 FMA is likely to be a more biologically appropriate compared with larger scales.

7. 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*.

8. 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. 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

	% in FMA		70%				80%				90%				95%			
Taxa	ROC	Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS – ROC	RBS - Power
ERO	12.16	8.00	87.4	96.7	99.8	99.9	87.4	96.7	99.8	99.9	90.8	97.6	99.8	99.9	96.2	99.0	99.7	99.9
GDU	0.12	5.48	56.5	90.4	88.8	99.7	56.5	90.4	86.9	99.6	86.1	94.7	95.5	99.7	90.7	97.1	94.1	99.6
MOC	0.76	0.95	98.9	96.8	100.0	99.9	98.9	96.8	100.0	99.9	100.0	99.0	100.0	99.9	100.0	99.6	100.0	100.0
SVA	0.79	0.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
COB	18.76	13.56	84.2	83.6	99.6	99.5	84.2	83.6	99.6	99.5	90.4	90.3	99.6	99.5	94.4	94.3	99.5	99.3
COR	0.01	0.01	32.3	98.3	75.9	98.0	32.3	98.3	71.9	97.6	32.3	98.7	56.8	96.5	32.3	98.7	49.7	94.8
DEM	9.79	0.30	97.7	99.1	99.9	99.9	97.7	99.1	99.9	99.9	99.0	99.7	99.9	99.9	99.0	99.7	100.0	100.0
HEX	4.13	0.74	97.9	99.8	99.9	99.9	97.9	99.8	99.9	99.9	98.4	99.9	99.9	99.9	98.6	99.9	100.0	100.0
PTU	5.54	1.50	92.8	99.9	99.9	99.9	92.8	99.9	99.9	99.9	96.0	99.9	99.9	99.9	97.4	99.9	99.9	100.0
SOC	10.62	12.17	88.3	82.8	99.7	99.1	88.3	82.8	99.7	99.0	93.5	91.5	99.6	98.8	96.2	95.2	99.6	98.8

Impacted baseline

	% in FMA		70%		80%		90%		95%	
Taxa / Layer	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	12.16	8.00	87.5	96.7	87.5	96.7	90.9	97.6	99.0	99.0
GDU	0.12	5.48	58.9	90.6	58.9	90.6	86.9	94.8	97.3	97.3
MOC	0.76	0.95	98.9	96.8	98.9	96.8	100.0	99.0	99.6	99.6
SVA	0.79	0.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
COB	18.76	13.56	84.4	83.9	84.4	83.9	90.6	90.6	94.6	94.6
COR	0.01	0.01	37.9	98.5	37.9	98.5	37.9	99.0	99.0	99.0
DEM	9.79	0.30	97.7	99.1	97.7	99.1	99.0	99.7	99.7	99.7
HEX	4.13	0.74	97.9	99.9	97.9	99.9	98.5	99.9	99.9	99.9
PTU	5.54	1.50	92.8	99.9	92.8	99.9	96.1	99.9	99.9	99.9
SOC	10.62	12.17	88.5	83.1	88.5	83.1	93.6	91.7	95.5	95.5

Fishing value lost %	19.80 (Current)	19.8	19.8	20.24	20.44

South Lord Howe Rise

Unimpacted baseline

	% in FMA		70%				80%				90%				95%			
Taxa	ROC	Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS – ROC	RBS - Power
ERO	34.12	47.52	76.2	75.1	97.7	97.8	85.9	86.2	98.1	98.2	93.4	93.5	98.3	98.8	96.2	96.2	98.6	98.9
GDU	1.55	5.69	75.2	84.4	98.8	98.6	90.1	90.2	99.3	98.9	97.0	97.1	99.7	99.1	97.2	98.4	99.9	99.3
MOC	7.99	6.78	78.3	74.9	97.2	97.6	83.1	81.1	98.0	98.3	99.9	99.8	100.0	100.0	99.9	99.8	100.0	100.0
SVA	1.15	0.00	71.9	84.7	100.0	100.0	72.7	84.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
COB	21.96	26.67	76.6	73.7	98.6	98.3	85.3	83.4	98.8	98.5	93.5	92.0	98.9	98.6	96.3	95.9	99.1	98.9
COR	0.00	0.00	0.0	44.5	22.4	62.5	0.0	46.2	16.2	60.3	100.0	99.1	100.0	99.8	100.0	99.6	100.0	100.0
DEM	1.15	0.00	99.9	76.0	99.9	99.0	99.9	76.0	99.9	99.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
HEX	3.50	3.78	97.4	100.0	100.0	100.0	97.4	100.0	100.0	100.0	99.9	100.0	100.0	100.0	99.9	100.0	100.0	100.0
PTU	3.07	1.47	95.9	99.6	100.0	100.0	95.9	99.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SOC	6.80	9.44	75.2	71.1	98.2	97.2	83.9	80.1	98.4	97.4	93.0	91.3	98.6	98.0	96.3	97.0	98.9	99.3

Impacted baseline

	% in FMA		70%		80%		90%		95%	
Taxa / Layer	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	34.12	47.52	77.6	76.4	87.0	87.3	94.3	94.2	96.6	96.6
GDU	1.55	5.69	77.0	85.2	90.3	90.8	97.1	97.5	98.6	98.6
MOC	7.99	6.78	79.8	76.5	84.0	82.0	99.9	99.8	99.8	99.8
SVA	1.15	0.00	73.7	85.1	73.8	85.1	100.0	100.0	100.0	100.0
COB	21.96	26.67	77.4	74.6	86.0	84.2	94.0	92.7	96.2	96.2
COR	0.00	0.00	0.0	59.1	0.0	60.6	100.0	99.1	99.4	99.4
DEM	1.15	0.00	100.0	96.0	100.0	96.0	100.0	100.0	100.0	100.0

HEX	3.50	3.78	97.4	100.0	97.5	100.0	99.9	100.0	100.0	100.0
PTU	3.07	1.47	95.9	99.6	95.9	99.6	100.0	100.0	100.0	100.0
SOC	6.80	9.44	76.0	72.3	84.6	81.2	93.5	92.0	97.1	97.1
Fishing value lost %	6.24 (current)		21.39		23.47		47.56		71.62	

Northwest Challenger

Unimpacted baseline

	% in FMA		70%				80%				90%				95%			
Taxa	ROC	Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS – ROC	RBS - Power
ERO	15.33	10.98	70.9	74.5	92.1	92.2	81.7	82.7	94.6	94.3	90.6	90.2	94.0	93.5	96.3	96.4	96.5	96.4
GDU	55.95	13.39	95.5	91.2	98.9	97.6	97.2	94.7	98.9	97.7	98.1	97.4	98.9	98.3	99.1	98.7	99.3	98.8
MOC	14.58	18.95	79.7	78.6	94.8	94.8	86.0	85.8	94.9	95.0	94.0	93.5	96.7	96.7	100.0	100.0	100.0	100.0
SVA	0.96	0.00	99.9	100.0	100.0	100.0	99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
COB	13.78	14.74	68.3	73.5	94.7	95.1	79.0	81.9	94.9	95.1	89.5	90.5	95.5	95.5	94.4	95.3	96.4	96.6
COR	0.65	0.23	99.6	99.5	99.3	99.6	99.6	99.5	99.5	99.6	99.6	99.7	99.2	99.5	99.6	99.7	99.2	99.6
DEM	10.62	3.04	99.2	99.9	99.9	100.0	99.8	100.0	99.9	100.0	99.9	100.0	99.9	100.0	100.0	100.0	100.0	100.0
HEX	6.23	0.94	88.2	88.2	98.2	97.9	92.8	90.3	98.3	97.7	96.5	96.7	98.7	99.0	97.2	96.8	98.3	98.4
PTU	7.47	10.32	96.2	99.9	99.8	100.0	98.1	99.9	99.8	100.0	99.4	100.0	99.9	100.0	99.6	100.0	99.9	100.0
SOC	4.89	4.41	91.5	92.8	97.7	97.8	92.7	93.8	97.6	97.7	96.3	96.2	97.9	97.7	98.2	97.7	98.6	98.0

Impacted baseline

	% in FMA		70%		80%		90%		95%	
Taxa / layer	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	15.33	10.98	73.9	78.8	85.4	87.3	93.6	93.9	98.0	98.0
GDU	55.95	13.39	96.4	92.8	98.0	96.1	98.8	98.3	99.1	99.1
MOC	14.58	18.95	82.3	81.7	88.8	89.0	95.9	95.5	100.0	100.0
SVA	0.96	0.00	99.9	100.0	99.9	100.0	100.0	100.0	100.0	100.0

COB	13.78	14.74	70.0	75.5	80.9	84.0	91.1	92.3	96.1	96.1
COR	0.65	0.23	99.8	99.7	99.8	99.7	99.8	99.9	99.9	99.9
DEM	10.62	3.04	99.3	99.9	99.8	100.0	100.0	100.0	100.0	100.0
HEX	6.23	0.94	89.2	89.7	93.6	91.7	97.0	97.1	97.2	97.2
PTU	7.47	10.32	96.4	99.9	98.2	99.9	99.4	100.0	100.0	100.0
SOC	4.89	4.41	92.7	94.0	93.7	94.9	97.0	97.1	98.2	98.2
Fishing value lost	1.08 (current)		31.52		34.59		42.75		75.12	

Westpac Bank

Unimpacted baseline

	% in FMA		**70%**				**80%**				**90%**				**95%**			
Taxa	ROC	Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS – ROC	RBS - Power
ERO	4.67	3.96	87.5	87.1	98.9	99.2	89.3	89.3	98.9	99.2	94.7	94.6	99.1	99.2	96.6	96.9	99.1	99.3
GDU	0.38	1.25	85.2	91.2	99.5	99.1	87.4	93.7	99.5	99.1	93.3	97.3	99.8	99.1	94.8	98.0	99.8	99.2
MOC	3.43	4.45	86.4	88.3	99.3	99.4	91.4	91.5	99.3	99.5	96.9	97.7	99.3	99.5	98.4	98.7	99.4	99.5
SVA	2.35	0.02	75.6	73.7	100.0	100.0	85.6	89.9	100.0	100.0	95.4	100.0	98.3	100.0	96.4	100.0	98.4	100.0
COB	3.11	2.99	83.3	79.2	98.8	98.3	87.0	83.2	98.8	98.3	93.7	91.4	98.8	98.3	95.4	93.6	98.9	98.4
COR	0.01	0.00	85.9	85.1	93.7	96.8	85.9	91.7	93.7	96.8	85.9	94.7	92.9	96.5	85.9	95.2	92.4	96.3
DEM	0.88	0.24	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
HEX	0.61	0.03	99.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PTU	0.89	0.88	99.1	100.0	100.0	100.0	99.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SOC	1.95	2.00	87.4	73.4	99.1	97.5	91.4	81.9	99.1	97.5	96.1	90.6	99.1	97.4	97.1	92.7	99.2	97.4

Impacted baseline

	% in FMA		**70%**		**80%**		**90%**		**95%**	
Taxa / Layer	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	4.67	3.96	88.5	87.8	90.3	90.0	95.6	95.3	97.5	97.5

GDU	0.38	1.25	86.1	91.8	88.3	94.3	93.9	97.8	98.6	98.6
MOC	3.43	4.45	86.7	88.5	91.7	91.8	97.2	97.9	98.9	98.9
SVA	2.35	0.02	76.7	73.7	86.8	90.0	96.6	100.0	100.0	100.0
COB	3.11	2.99	84.0	80.3	87.7	84.4	94.4	92.6	94.7	94.7
COR	0.01	0.00	89.1	86.1	89.1	92.8	89.1	95.8	96.2	96.2
DEM	0.88	0.24	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
HEX	0.61	0.03	99.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PTU	0.89	0.88	99.1	100.0	99.7	100.0	100.0	100.0	100.0	100.0
SOC	1.95	2.00	87.9	74.6	91.9	83.2	96.5	92.0	94.1	94.1
Fishing value lost	1.28 (Current)		1.28		2.44		8.45		13.24	

West Norfolk

Unimpacted baseline

	% in FMA		70%				80%				90%				95%			
Taxa	ROC	Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS – ROC	RBS - Power
ERO	3.16	1.87	80.8	73.6	99.0	98.9	89.0	86.3	99.2	99.4	94.8	93.7	99.2	99.5	98.5	99.4	99.3	99.7
GDU	1.26	2.99	80.2	91.7	96.9	99.7	84.6	93.5	96.4	99.7	92.1	96.1	96.4	99.6	95.1	99.1	96.3	99.7
MOC	5.62	6.03	93.8	93.9	99.7	99.7	96.7	97.1	99.8	99.9	98.3	98.5	99.8	99.8	99.6	99.7	99.9	99.9
SVA	2.39	0.00	87.8	98.9	99.7	100.0	88.6	98.9	99.6	100.0	92.5	99.3	99.5	100.0	98.5	100.0	99.9	100.0
COB	7.87	7.45	92.2	90.5	99.8	99.7	93.9	92.7	99.7	99.6	96.4	95.8	99.7	99.6	98.8	98.5	99.7	99.6
COR	13.79	35.20	98.8	99.8	100.0	100.0	99.4	99.9	100.0	100.0	99.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0
DEM	9.76	38.27	99.6	100.0	100.0	99.8	99.6	100.0	100.0	99.8	99.6	100.0	100.0	99.8	99.9	100.0	100.0	99.8
HEX	2.62	1.70	94.9	99.5	100.0	100.0	95.4	99.5	100.0	100.0	96.9	99.6	100.0	100.0	99.5	100.0	100.0	100.0
PTU	1.54	0.02	94.2	96.0	100.0	100.0	94.9	96.2	100.0	100.0	96.7	96.6	100.0	100.0	99.6	100.0	100.0	100.0
SOC	4.88	5.75	94.2	89.6	99.8	99.4	95.7	91.9	99.8	99.3	97.5	94.9	99.8	99.2	99.1	97.7	99.8	99.1

Impacted baseline

	% in FMA		70%		80%		90%		95%	
Taxa / Layer	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	3.16	1.87	81.3	74.1	89.4	86.5	95.1	93.9	99.5	99.5
GDU	1.26	2.99	81.2	91.9	85.7	93.7	93.0	96.3	99.2	99.2
MOC	5.62	6.03	94.0	94.1	96.7	97.1	98.4	98.6	99.7	99.7
SVA	2.39	0.00	88.0	98.9	88.8	98.9	92.8	99.3	100.0	100.0
COB	7.87	7.45	92.3	90.6	94.0	92.9	96.5	96.0	98.6	98.6
COR	13.79	35.20	98.8	99.8	99.4	99.9	99.7	100.0	100.0	100.0
DEM	9.76	38.27	99.6	100.0	99.6	100.0	99.6	100.0	100.0	100.0
HEX	2.62	1.70	94.9	99.5	95.4	99.5	96.9	99.6	100.0	100.0
PTU	1.54	0.02	94.2	96.0	94.9	96.2	96.7	96.6	100.0	100.0
SOC	4.88	5.75	94.3	89.9	95.8	92.2	97.5	95.1	97.9	97.9
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%			
Taxa	ROC	Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS – ROC	RBS - Power
ERO	12.72	15.93	78.0	70.1	99.1	99.1	82.4	80.7	99.1	99.2	94.4	91.5	99.4	99.5	96.0	95.4	99.4	99.6
GDU	0.06	6.60	100.0	96.9	100.0	99.9	100.0	97.4	100.0	99.9	100.0	99.3	100.0	99.9	100.0	99.4	100.0	99.9
MOC	13.03	10.40	97.8	96.3	100.0	100.0	98.1	96.6	100.0	100.0	100.0	99.9	100.0	100.0	100.0	99.9	100.0	100.0
SVA	21.32	0.66	95.5	100.0	100.0	100.0	95.8	100.0	100.0	100.0	98.2	100.0	100.0	100.0	98.4	100.0	99.7	100.0
COB	1.16	2.33	86.7	91.4	98.8	99.6	87.8	92.3	98.7	99.6	97.6	97.9	99.0	99.7	97.6	98.4	99.0	99.7
COR	16.63	5.68	94.7	93.9	99.8	99.8	95.4	94.7	99.8	99.8	97.5	96.8	99.8	99.6	97.9	97.1	99.8	99.6
DEM	0.36	0.01	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
HEX	0.10	0.00	99.8	99.7	100.0	100.0	100.0	99.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PTU	6.18	3.33	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SOC	17.42	20.88	97.5	96.8	99.9	99.8	97.6	96.9	99.9	99.8	99.2	99.1	99.9	99.8	99.3	99.1	99.9	99.8

Impacted baseline

	% in FMA		70%		80%		90%		95%	
Taxa / Layer	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	12.72	15.93	78.9	71.0	83.4	81.6	94.9	91.9	95.8	95.8
GDU	0.06	6.60	100.0	97.1	100.0	97.6	100.0	99.3	99.5	99.5
MOC	13.03	10.40	97.8	96.3	98.1	96.6	100.0	99.9	100.0	100.0
SVA	21.32	0.66	95.9	100.0	96.2	100.0	98.4	100.0	100.0	100.0
COB	1.16	2.33	88.3	91.9	89.3	92.7	98.6	98.1	98.6	98.6
COR	16.63	5.68	94.9	94.4	95.7	95.1	97.7	97.2	97.5	97.5
DEM	0.36	0.01	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
HEX	0.10	0.00	99.8	99.7	100.0	99.8	100.0	100.0	100.0	100.0
PTU	6.18	3.33	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SOC	17.42	20.88	97.6	97.0	97.7	97.0	99.3	99.2	99.3	99.3
Fishing value lost	1.74 (Current)		1.74		1.77		20.52		20.52	

North Louisville

Unimpacted baseline

	% in FMA		70%				80%				90%				95%			
Taxa	ROC	Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS – ROC	RBS - Power
ERO	0.00	0.01	0.0	79.0	NaN	99.1	0.0	80.2	NaN	98.4	100.0	98.3	NaN	99.7	0.0	84.8	NaN	93.9
GDU	1.59	1.68	70.4	77.9	98.3	98.8	83.2	84.3	97.8	98.4	99.9	95.2	99.9	99.4	97.1	97.0	97.9	99.4
MOC	0.66	0.49	60.3	69.0	99.8	99.6	70.4	78.9	99.7	99.7	100.0	98.9	100.0	100.0	100.0	99.3	100.0	100.0
SVA	8.48	45.60	74.2	77.9	97.9	97.3	81.1	78.8	97.3	96.0	91.2	79.8	98.1	92.6	97.0	99.1	99.5	99.9
COB	4.42	2.94	81.8	76.7	99.0	98.9	86.7	83.6	98.4	98.4	97.7	97.6	99.8	99.7	97.3	97.8	99.4	99.5
COR	5.44	3.04	75.9	78.8	99.0	98.8	81.6	84.1	98.4	98.1	95.9	96.2	99.5	99.3	99.6	99.9	100.0	100.0
DEM	0.93	0.34	77.5	51.1	99.1	95.6	81.7	58.2	98.5	92.1	91.1	70.3	98.8	91.9	99.9	100.0	100.0	100.0
HEX	1.63	1.73	80.2	83.6	99.7	99.9	85.1	89.0	99.7	100.0	93.5	96.7	99.8	100.0	98.9	99.7	100.0	100.0

PTU	0.38	0.03	80.3	87.9	99.9	100.0	85.9	91.1	99.8	100.0	96.0	99.8	99.5	100.0	99.8	100.0	100.0	100.0
SOC	2.52	2.52	79.7	83.7	99.5	99.6	85.1	89.0	99.4	99.5	94.3	94.9	99.7	99.8	97.2	97.9	99.6	99.7

Impacted baseline

	% in FMA		70%		80%		90%		95%	
Taxa / Layer	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	0.00	0.01	0.0	79.0	0.0	80.2	100.0	98.3	0.00	84.8
GDU	1.59	1.68	71.3	78.4	84.2	84.8	99.9	95.2	97.6	97.2
MOC	0.66	0.49	60.5	69.2	70.4	79.0	100.0	98.9	100.0	99.3
SVA	8.48	45.60	75.0	79.0	82.0	80.0	91.3	81.0	97.0	99.1
COB	4.42	2.94	82.2	77.2	87.2	84.2	97.7	97.6	97.4	97.9
COR	5.44	3.04	76.2	79.2	82.0	84.5	95.9	96.2	99.6	99.9
DEM	0.93	0.34	77.6	48.4	81.8	56.5	91.1	67.9	99.9	100.0
HEX	1.63	1.73	80.4	83.6	85.1	89.0	93.5	96.7	98.9	99.7
PTU	0.38	0.03	80.4	87.9	86.0	91.1	96.1	99.8	99.8	100.0
SOC	2.52	2.52	79.8	83.7	85.2	89.0	94.2	94.8	97.2	97.9
Fishing value lost	41.70 (Current)		41.7		45.44		87.37		93.82	

Central Louisville

Unimpacted baseline

	% in FMA		70%				80%				90%				95%			
Taxa	ROC	Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS – ROC	RBS - Power
ERO	0.00	0.00	0.0	40.3	98.7	98.9	100.0	99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
GDU	5.22	1.46	59.3	73.8	91.8	95.9	90.3	91.2	97.9	98.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
MOC	0.29	0.25	84.7	80.5	99.7	99.5	100.0	97.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SVA	7.14	21.66	80.5	71.3	97.4	93.8	92.8	96.2	99.2	99.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
COB	1.86	1.64	76.5	77.8	98.2	98.4	83.2	84.7	98.8	98.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

COR	1.85	1.30	96.2	97.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
DEM	0.05	0.01	82.4	94.6	99.9	99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
HEX	0.52	0.24	93.0	93.8	99.9	100.0	99.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PTU	0.04	0.00	98.9	99.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SOC	1.10	0.69	86.1	87.9	99.4	99.2	91.8	92.3	99.2	98.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Impacted baseline

	% in FMA		**70%**		**80%**		**90%**		**95%**	
Taxa / Layer	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	0.00	0.00	0.0	39.5	100.0	99.9	100.0	100.0	100.0	100.0
GDU	5.22	1.46	60.8	75.4	90.2	91.2	100.0	100.0	100.0	100.0
MOC	0.29	0.25	84.9	80.8	100.0	97.6	100.0	100.0	100.0	100.0
SVA	7.14	21.66	81.5	72.9	92.6	95.8	100.0	100.0	100.0	100.0
COB	1.86	1.64	76.8	78.0	82.9	84.6	100.0	100.0	100.0	100.0
COR	1.85	1.30	96.0	97.8	100.0	100.0	100.0	100.0	100.0	100.0
DEM	0.05	0.01	81.3	94.6	100.0	100.0	100.0	100.0	100.0	100.0
HEX	0.52	0.24	93.0	93.8	99.6	100.0	100.0	100.0	100.0	100.0
PTU	0.04	0.00	98.9	99.5	100.0	100.0	100.0	100.0	100.0	100.0
SOC	1.10	0.69	86.3	88.2	91.9	92.7	100.0	100.0	100.0	100.0
Fishing value lost	1.56 (Current)		59.52		88.36		100		100	

South Louisville

Unimpacted baseline

	% in FMA		**70%**				**80%**				**90%**				**95%**			
Taxa	ROC	Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS-ROC	RBS - Power	ROC	Power	RBS – ROC	RBS - Power
ERO	0.00	0.00	NA	72.4	NA	99.6	NA	72.5	NA	99.3	NA	87.5	NA	98.7	NA	90.2	NA	100.0
GDU	12.08	2.36	82.3	79.1	99.1	99.4	85.8	82.9	99.0	99.3	93.7	90.4	98.7	99.0	96.5	95.4	99.5	99.4

MOC	0.38	0.43	98.9	88.5	100.0	99.9	98.9	90.0	100.0	99.9	98.9	93.7	100.0	99.7	98.9	95.4	100.0	99.8
SVA	5.49	8.18	80.6	91.0	99.3	99.5	87.4	99.9	99.3	100.0	91.4	99.9	98.5	100.0	96.3	100.0	99.1	100.0
COB	3.22	2.49	72.1	73.2	99.5	99.4	79.3	81.2	98.8	98.6	90.0	90.3	98.7	98.8	95.1	95.9	99.3	99.4
COR	0.39	0.19	99.7	98.7	100.0	100.0	99.7	98.8	100.0	100.0	99.7	99.0	100.0	100.0	100.0	99.4	100.0	100.0
DEM	0.00	0.00	100.0	99.8	100.0	100.0	100.0	99.8	100.0	100.0	100.0	99.8	100.0	100.0	100.0	99.8	100.0	100.0
HEX	0.20	0.02	89.2	96.8	100.0	100.0	90.7	97.4	100.0	100.0	91.0	97.5	99.9	100.0	96.6	98.9	100.0	100.0
PTU	0.01	0.00	76.8	90.9	100.0	100.0	76.8	91.0	100.0	100.0	78.1	91.1	99.9	100.0	98.6	98.9	100.0	100.0
SOC	0.99	0.59	85.2	89.0	99.8	99.8	89.1	91.8	99.7	99.8	93.0	94.6	99.3	99.5	93.7	95.7	99.3	99.5

Impacted baseline

	% in FMA		70%		80%		90%		95%	
Taxa / Layer	ROC	Power	ROC	Power	ROC	Power	ROC	Power	ROC	Power
ERO	0.00	0.00	NA	72.0	NA	72.2	NA	87.3	90.0	90.0
GDU	12.08	2.36	82.5	79.1	85.8	82.9	93.8	90.3	95.4	95.4
MOC	0.38	0.43	98.9	88.5	98.9	90.0	98.9	93.8	95.4	95.4
SVA	5.49	8.18	80.7	91.1	87.4	99.9	91.5	99.9	100.0	100.0
COB	3.22	2.49	72.0	73.1	79.2	81.0	90.0	90.3	95.9	95.9
COR	0.39	0.19	99.7	98.7	99.7	98.8	99.7	99.0	99.4	99.4
DEM	0.00	0.00	100.0	99.8	100.0	99.8	100.0	99.8	99.8	99.8
HEX	0.20	0.02	89.2	96.8	90.7	97.4	91.0	97.5	99.0	99.0
PTU	0.01	0.00	76.8	90.9	76.8	91.0	78.1	91.1	98.9	98.9
SOC	0.99	0.59	85.2	89.0	89.1	91.7	93.0	94.6	95.7	95.7
Fishing value lost	1.77 (Current)		61.31		72.48		83.35		98.64	

9. 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	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	12.16	8.00	87.17	87.71	96.71	96.71	87.17	87.71	96.71	96.71	90.65	91.03	95.10	100.00	96.13	96.33	97.94	100.00
GDU	0.12	5.48	55.51	57.43	87.14	93.72	55.51	57.43	87.14	93.72	85.97	86.31	93.12	96.26	90.72	90.76	96.89	97.39
MOC	0.76	0.95	98.76	98.98	93.72	99.82	98.76	98.98	93.72	99.82	100.00	100.00	98.02	100.00	100.00	100.00	99.20	100.00
SVA	0.79	0.00	100.00	100.00	96.77	100.00	100.00	100.00	96.77	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	18.76	13.56	84.13	84.27	83.59	83.59	84.13	84.27	83.59	83.59	90.39	90.45	89.22	91.46	94.44	94.44	93.83	94.79
COR	0.01	0.01	31.47	33.21	96.39	100.00	31.47	33.21	96.39	100.00	31.47	33.21	98.73	98.73	31.47	33.21	98.73	98.73
DEM	9.79	0.30	97.64	97.66	99.05	99.05	97.64	97.66	99.05	99.05	99.02	99.06	99.69	99.69	99.02	99.06	99.69	99.69
HEX	4.13	0.74	97.81	97.91	99.84	99.84	97.81	97.91	99.84	99.84	98.39	98.47	99.72	100.00	98.61	98.67	99.74	100.00
PTU	5.54	1.50	92.70	92.90	99.70	100.00	92.70	92.90	99.70	100.00	95.96	96.06	99.80	100.00	97.40	97.48	99.84	100.00
SOC	10.62	12.17	88.18	88.44	82.67	82.95	88.18	88.44	82.67	82.95	93.45	93.57	89.07	93.91	96.17	96.19	94.30	96.16

Unimpacted baseline – RBS method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	12.16	8.00	99.75	99.90	99.92	99.97	99.70	99.89	99.90	99.96	99.65	99.87	99.89	99.96	99.58	99.82	99.88	99.95
GDU	0.12	5.48	81.64	93.03	99.60	99.82	78.62	91.88	99.55	99.79	94.39	97.23	99.61	99.80	92.38	95.12	99.49	99.72
MOC	0.76	0.95	100.00	100.00	99.94	99.97	100.00	100.00	99.93	99.97	100.00	100.00	99.96	99.97	100.00	100.00	99.95	99.96
SVA	0.79	0.00	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	100.00
COB	18.76	13.56	99.52	99.78	99.36	99.70	99.46	99.75	99.29	99.65	99.49	99.73	99.31	99.61	99.31	99.61	99.09	99.44
COR	0.01	0.01	61.23	84.87	96.79	98.73	54.80	82.36	96.30	98.52	49.65	72.84	95.24	97.74	49.65	49.65	93.70	95.82
DEM	9.79	0.30	99.98	99.99	100.00	100.00	99.98	99.99	100.00	100.00	99.97	99.99	100.00	100.00	99.95	99.98	100.00	100.00
HEX	4.13	0.74	99.96	99.98	99.99	100.00	99.96	99.98	99.99	100.00	99.96	99.97	99.99	100.00	99.93	99.96	99.99	99.99
PTU	5.54	1.50	99.89	99.96	100.00	100.00	99.87	99.95	100.00	100.00	99.88	99.95	100.00	100.00	99.82	99.92	99.99	100.00
SOC	10.62	12.17	99.58	99.81	98.78	99.42	99.54	99.78	98.66	99.33	99.57	99.78	98.79	99.31	99.41	99.68	98.43	99.01

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	12.16	8.00	87.26	87.80	93.48	100.00	87.26	87.80	93.48	100.00	90.72	91.10	95.14	100.00	96.38	100.00	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	91.67	100.00	97.00	97.50
MOC	0.76	0.95	98.79	99.01	93.60	100.00	98.79	99.01	93.60	100.00	100.00	100.00	98.06	100.00	99.24	100.00	99.24	100.00
SVA	0.79	0.00	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	100.00
COB	18.76	13.56	84.34	84.46	82.09	85.71	84.34	84.46	82.09	85.71	90.54	90.60	89.55	91.65	94.56	94.60	94.17	94.99
COR	0.01	0.01	36.96	38.90	98.54	98.54	36.96	38.90	98.54	98.54	36.96	38.90	99.01	99.01	38.90	100.00	99.01	99.01
DEM	9.79	0.30	97.65	97.67	99.08	99.08	97.65	97.67	99.08	99.08	99.02	99.06	99.70	99.70	99.07	100.00	99.70	99.70
HEX	4.13	0.74	97.85	97.93	99.70	100.00	97.85	97.93	99.70	100.00	98.42	98.50	99.72	100.00	98.70	100.00	99.74	100.00
PTU	5.54	1.50	92.74	92.94	99.72	100.00	92.74	92.94	99.72	100.00	96.00	96.10	99.80	100.00	97.51	100.00	99.84	100.00
SOC	10.62	12.17	88.32	88.58	75.85	90.39	88.32	88.58	75.85	90.39	93.57	93.67	89.49	93.99	94.69	96.29	94.76	96.22
Fishing value lost %	19.80 (Current)		19.8				19.8				20.24				20.44			

South Lord Howe Rise

Unimpacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	34.12	47.52	76.20	76.22	75.07	75.07	85.81	85.91	86.17	86.17	93.40	93.48	93.18	93.82	96.16	96.18	96.14	96.30
GDU	1.55	5.69	75.12	75.36	84.07	84.63	90.10	90.18	89.96	90.34	96.99	97.09	96.51	97.61	97.12	97.24	98.07	98.65
MOC	7.99	6.78	78.11	78.49	73.73	76.05	82.96	83.24	80.46	81.74	99.92	99.92	99.64	100.00	99.92	99.92	99.66	100.00
SVA	1.15	0.00	71.78	71.96	77.01	92.35	72.62	72.80	75.67	93.69	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	21.96	26.67	76.45	76.71	73.66	73.66	85.21	85.35	83.38	83.38	93.41	93.53	91.54	92.54	96.26	96.32	95.65	96.11
COR	0.00	0.00	0.00	0.00	43.32	45.66	0.00	0.00	45.58	46.88	100.00	100.00	99.13	99.13	100.00	100.00	99.56	99.56

DEM	1.15	0.00	99.84	99.86	75.99	75.99	99.84	99.86	75.99	75.99	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	3.50	3.78	97.31	97.43	99.96	99.96	97.37	97.47	99.96	99.96	99.93	99.93	100.00	100.00	99.93	99.93	100.00	100.00
PTU	3.07	1.47	95.81	95.93	99.54	99.62	95.81	95.93	99.54	99.62	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	6.80	9.44	75.06	75.28	70.71	71.55	83.80	83.92	79.66	80.50	92.97	93.07	90.22	92.36	96.33	96.33	96.39	97.53

Unimpacted baseline – RBS method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	34.12	47.52	96.83	98.35	96.93	98.43	97.33	98.59	97.57	98.74	97.74	98.72	98.31	99.10	98.21	98.92	98.59	99.19
GDU	1.55	5.69	98.49	98.90	98.03	98.96	99.05	99.45	98.42	99.16	99.62	99.67	98.79	99.30	99.85	99.94	99.10	99.44
MOC	7.99	6.78	96.25	97.97	96.75	98.26	97.20	98.61	97.58	98.80	99.99	100.00	99.95	99.98	99.99	99.99	99.93	99.96
SVA	1.15	0.00	96.14	97.66	98.43	99.31	96.79	98.17	98.25	99.22	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	21.96	26.67	98.02	99.09	97.58	98.86	98.24	99.16	97.83	98.94	98.48	99.20	98.07	98.96	98.77	99.27	98.63	99.19
COR	0.00	0.00	5.70	48.54	53.79	75.59	0.88	40.01	52.11	72.18	100.00	100.00	99.78	99.82	100.00	100.00	99.95	99.98
DEM	1.15	0.00	99.85	99.90	99.01	99.18	99.85	99.89	99.01	99.05	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	3.50	3.78	99.95	99.97	100.00	100.00	99.95	99.97	100.00	100.00	99.97	99.99	100.00	100.00	99.96	99.98	100.00	100.00
PTU	3.07	1.47	99.99	100.00	100.00	100.00	99.99	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	6.80	9.44	97.43	98.78	96.11	98.08	97.75	98.90	96.41	98.14	98.11	99.00	97.29	98.48	98.58	99.18	98.98	99.47

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	34.12	47.52	77.61	77.61	76.08	76.72	86.99	87.07	87.14	87.42	94.25	94.31	94.15	94.19	96.54	96.64	96.56	96.62
GDU	1.55	5.69	76.90	77.16	84.11	86.33	90.26	90.30	90.24	91.36	97.08	97.20	97.03	97.95	97.08	100.00	98.33	98.85
MOC	7.99	6.78	79.63	79.99	68.74	84.18	83.87	84.13	73.00	91.08	99.92	99.92	99.66	100.00	99.75	99.91	99.66	100.00
SVA	1.15	0.00	73.58	73.76	85.09	85.09	73.70	73.88	85.09	85.09	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	21.96	26.67	77.24	77.48	73.50	75.74	85.89	86.01	83.62	84.82	93.90	94.02	92.21	93.13	95.86	96.54	95.98	96.42
COR	0.00	0.00	0.00	0.00	59.09	59.09	0.00	0.00	60.61	60.61	100.00	100.00	99.07	99.07	98.86	100.00	99.43	99.43
DEM	1.15	0.00	99.95	99.95	95.95	95.95	99.95	99.95	95.95	95.95	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

HEX	3.50	3.78	97.36	97.46	99.92	100.00	97.41	97.51	99.92	100.00	99.94	99.94	100.00	100.00	99.94	100.00	100.00	100.00
PTU	3.07	1.47	95.81	95.93	99.16	100.00	95.81	95.93	99.16	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	6.80	9.44	75.87	76.07	70.43	74.25	84.50	84.60	79.15	83.19	93.47	93.55	91.00	92.92	96.58	97.58	96.60	97.56
Fishing value lost %	6.24 (current)		21.39				23.47				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	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	15.33	10.98	70.77	71.05	74.53	74.53	81.60	81.78	82.68	82.68	90.61	90.61	88.39	91.93	96.26	96.28	95.48	97.36
GDU	55.95	13.39	95.24	95.74	83.21	99.27	97.04	97.32	90.26	99.16	97.99	98.17	97.33	97.43	99.06	99.16	98.58	98.74
MOC	14.58	18.95	79.58	79.72	78.12	79.10	85.93	86.01	85.43	86.15	93.99	94.05	92.51	94.49	100.00	100.00	99.98	100.00
SVA	0.96	0.00	99.89	99.89	98.73	100.00	99.89	99.89	98.40	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	13.78	14.74	68.30	68.36	73.54	73.54	78.95	78.97	81.91	81.91	89.48	89.52	88.76	92.30	94.41	94.45	94.55	95.97
COR	0.65	0.23	99.59	99.61	96.02	100.00	99.59	99.61	96.75	100.00	99.59	99.61	99.36	100.00	99.59	99.61	99.48	100.00
DEM	10.62	3.04	99.20	99.20	99.42	100.00	99.79	99.79	99.52	100.00	99.94	99.94	100.00	100.00	100.00	100.00	100.00	100.00
HEX	6.23	0.94	88.17	88.29	88.20	88.20	92.76	92.78	90.25	90.25	96.53	96.55	93.63	99.67	97.23	97.25	93.82	99.68
PTU	7.47	10.32	96.07	96.29	93.12	100.00	98.05	98.15	91.25	100.00	99.39	99.43	99.96	100.00	99.63	99.65	99.96	100.00
SOC	4.89	4.41	91.44	91.58	92.71	92.93	92.60	92.72	93.71	93.87	96.25	96.29	95.88	96.54	98.19	98.21	96.87	98.49

Unimpacted baseline – RBS method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	15.33	10.98	89.11	94.48	89.63	94.34	90.07	94.57	90.31	94.30	93.10	95.24	92.54	94.61	96.35	96.82	96.23	96.69

GDU	55.95	13.39	98.60	99.21	96.60	98.32	98.60	99.17	96.99	98.40	98.65	99.07	97.99	98.67	99.21	99.36	98.71	98.97
MOC	14.58	18.95	92.93	96.20	93.20	96.08	93.40	96.23	93.69	96.13	96.13	97.22	96.18	97.19	99.99	100.00	99.96	99.98
SVA	0.96	0.00	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	100.00
COB	13.78	14.74	92.21	96.49	92.75	96.67	92.61	96.54	92.98	96.65	94.04	96.76	94.05	96.68	95.61	97.22	95.98	97.35
COR	0.65	0.23	99.24	99.52	99.48	99.72	99.20	99.49	99.45	99.69	99.20	99.35	99.48	99.61	99.20	99.20	99.53	99.57
DEM	10.62	3.04	99.86	99.91	99.94	99.98	99.88	99.91	99.95	99.98	99.90	99.91	99.95	99.98	99.98	99.99	99.95	99.98
HEX	6.23	0.94	97.18	98.83	96.61	98.65	97.42	98.89	96.42	98.56	98.24	99.14	98.55	99.35	97.89	98.72	98.00	98.84
PTU	7.47	10.32	99.61	99.85	99.97	99.99	99.69	99.88	99.98	99.99	99.89	99.95	99.99	100.00	99.87	99.95	99.99	100.00
SOC	4.89	4.41	96.65	98.44	96.87	98.50	96.53	98.34	96.74	98.37	97.19	98.46	97.05	98.27	98.28	98.89	97.78	98.37

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	15.33	10.98	73.76	74.08	70.68	86.90	85.29	85.49	83.12	91.50	93.57	93.59	92.21	95.61	97.71	98.21	97.23	98.69
GDU	55.95	13.39	96.13	96.57	92.37	93.13	97.90	98.10	95.82	96.34	98.74	98.86	98.22	98.30	98.76	99.50	99.07	99.19
MOC	14.58	18.95	82.24	82.34	79.95	83.43	88.77	88.81	86.95	91.03	95.88	95.92	94.38	96.66	100.00	100.00	100.00	100.00
SVA	0.96	0.00	99.92	99.92	100.00	100.00	99.92	99.92	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	13.78	14.74	69.91	70.01	72.25	78.81	80.89	80.93	81.55	86.53	91.08	91.10	90.85	93.73	95.23	97.03	95.57	96.69
COR	0.65	0.23	99.78	99.80	99.38	100.00	99.78	99.80	99.40	100.00	99.78	99.80	99.70	100.00	99.80	99.96	99.76	100.00
DEM	10.62	3.04	99.26	99.26	99.91	99.91	99.84	99.84	100.00	100.00	99.99	99.99	100.00	100.00	100.00	100.00	100.00	100.00
HEX	6.23	0.94	89.12	89.24	83.94	95.54	93.63	93.65	84.09	99.33	97.02	97.02	94.48	99.74	96.74	97.64	94.65	99.73
PTU	7.47	10.32	96.24	96.46	99.80	100.00	98.18	98.28	99.86	100.00	99.42	99.46	99.96	100.00	99.67	100.00	99.96	100.00
SOC	4.89	4.41	92.60	92.72	90.73	97.17	93.69	93.79	92.57	97.19	97.01	97.03	96.58	97.58	97.98	98.50	97.84	98.64
Fishing value lost	1.08 (current)		31.52				34.59				42.75				75.12			

Westpac Bank

Unimpacted baseline – Post Accounting method

	% in FMA	70%	80%	90%	95%

			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	4.67	3.96	87.51	87.51	87.05	87.05	89.29	89.29	89.30	89.30	94.73	94.73	94.58	94.64	96.52	96.58	96.52	97.32
GDU	0.38	1.25	84.88	85.60	90.98	91.36	87.13	87.69	93.36	94.00	93.14	93.38	95.83	98.73	94.70	94.90	97.02	99.06
MOC	3.43	4.45	86.37	86.45	84.06	92.48	91.34	91.46	88.08	94.88	96.91	96.91	95.86	99.44	98.41	98.43	97.95	99.43
SVA	2.35	0.02	75.38	75.78	69.32	78.10	85.52	85.68	88.23	91.65	95.37	95.41	99.99	99.99	96.40	96.44	100.00	100.00
COB	3.11	2.99	83.02	83.50	79.20	79.20	86.75	87.15	83.23	83.23	93.59	93.79	89.37	93.51	95.34	95.48	92.08	95.18
COR	0.01	0.00	85.38	86.50	80.63	89.59	85.38	86.50	87.85	95.57	85.38	86.50	94.74	94.74	85.38	86.50	95.16	95.16
DEM	0.88	0.24	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
HEX	0.61	0.03	99.82	99.82	99.97	99.97	100.00	100.00	99.99	99.99	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
PTU	0.89	0.88	99.11	99.17	100.00	100.00	99.70	99.72	100.00	100.00	99.98	99.98	100.00	100.00	99.98	99.98	100.00	100.00
SOC	1.95	2.00	87.17	87.67	73.44	73.44	91.22	91.54	81.91	81.91	95.98	96.14	85.23	96.05	97.07	97.19	88.29	97.17

Unimpacted baseline – RBS method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	4.67	3.96	98.36	99.28	98.70	99.44	98.37	99.28	98.71	99.45	98.63	99.36	98.84	99.48	98.80	99.41	99.04	99.55
GDU	0.38	1.25	99.15	99.68	98.69	99.34	99.15	99.68	98.70	99.34	99.71	99.89	98.84	99.37	99.71	99.89	98.93	99.39
MOC	3.43	4.45	98.95	99.53	99.15	99.64	98.97	99.54	99.17	99.65	99.05	99.55	99.22	99.66	99.19	99.59	99.31	99.68
SVA	2.35	0.02	97.38	98.68	99.91	99.96	97.42	98.69	99.95	99.98	97.71	98.75	100.00	100.00	97.85	98.77	100.00	100.00
COB	3.11	2.99	98.26	99.22	97.54	98.89	98.27	99.22	97.54	98.89	98.37	99.22	97.69	98.89	98.44	99.22	97.77	98.89
COR	0.01	0.00	89.90	96.06	94.96	98.00	89.84	96.03	94.94	97.99	88.57	95.54	94.52	97.81	87.74	95.22	94.23	97.69
DEM	0.88	0.24	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
HEX	0.61	0.03	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
PTU	0.89	0.88	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	1.95	2.00	98.75	99.41	96.60	98.25	98.76	99.41	96.62	98.25	98.83	99.41	96.66	98.15	98.88	99.41	96.70	98.10

Impacted baseline – Post Accounting method

	% in FMA	70%		80%		90%		95%	
		ROC	Power	ROC	Power	ROC	Power	ROC	Power

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	88.47	87.42	88.10	90.23	90.27	89.86	90.18	95.57	95.61	95.09	95.43	97.34	97.66	97.25	97.75
GDU	0.38	1.25	85.79	86.49	87.80	95.74	88.05	88.59	91.16	97.44	93.81	94.03	96.64	99.04	95.32	100.00	97.77	99.35
MOC	3.43	4.45	86.66	86.74	84.33	92.73	91.64	91.76	90.25	93.27	97.19	97.19	96.28	99.54	98.65	99.19	98.30	99.54
SVA	2.35	0.02	76.49	76.89	73.73	73.73	86.75	86.93	89.95	89.95	96.58	96.60	99.99	99.99	97.57	100.00	100.00	100.00
COB	3.11	2.99	83.78	84.24	76.04	84.58	87.54	87.92	80.76	88.02	94.35	94.53	90.76	94.38	93.36	96.06	93.41	96.01
COR	0.01	0.00	88.68	89.58	86.12	86.12	88.68	89.58	92.80	92.80	88.68	89.58	95.81	95.81	88.68	100.00	96.21	96.21
DEM	0.88	0.24	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
HEX	0.61	0.03	99.82	99.82	99.97	99.97	100.00	100.00	99.99	99.99	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
PTU	0.89	0.88	99.11	99.17	100.00	100.00	99.70	99.72	100.00	100.00	99.98	99.98	100.00	100.00	99.98	100.00	100.00	100.00
SOC	1.95	2.00	87.64	88.12	60.50	88.74	91.71	92.01	74.43	92.03	96.45	96.59	87.47	96.57	90.69	97.51	90.55	97.65
Fishing value lost	1.28 (Current)		1.28				2.44				8.45				13.24			

West Norfolk

Unimpacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	3.16	1.87	80.56	81.04	73.60	73.60	88.96	89.06	86.25	86.25	94.81	94.81	89.99	97.47	98.41	98.49	98.82	99.94
GDU	1.26	2.99	79.88	80.46	77.12	100.00	84.33	84.79	86.55	100.00	91.88	92.26	94.94	97.32	94.97	95.27	98.70	99.50
MOC	5.62	6.03	93.74	93.90	90.72	97.04	96.67	96.67	94.75	99.37	98.30	98.30	97.02	100.00	99.60	99.60	99.34	100.00
SVA	2.39	0.00	87.64	87.94	95.84	100.00	88.45	88.73	95.96	100.00	92.45	92.63	99.28	99.28	98.44	98.50	100.00	100.00
COB	7.87	7.45	91.98	92.42	90.45	90.45	93.71	94.09	92.68	92.68	96.30	96.50	94.84	96.84	98.79	98.87	98.08	98.94
COR	13.79	35.20	98.79	98.81	97.51	100.00	99.36	99.38	98.05	100.00	99.69	99.69	99.90	100.00	99.97	99.97	99.98	100.00
DEM	9.76	38.27	99.57	99.57	99.78	100.00	99.61	99.61	99.91	100.00	99.62	99.62	99.99	99.99	99.94	99.94	100.00	100.00
HEX	2.62	1.70	94.87	94.93	99.46	99.46	95.33	95.37	99.49	99.49	96.86	96.88	99.22	100.00	99.53	99.53	99.90	100.00
PTU	1.54	0.02	94.06	94.34	95.45	96.53	94.76	95.00	95.72	96.74	96.57	96.75	96.62	96.62	99.57	99.57	99.97	99.97
SOC	4.88	5.75	94.11	94.29	89.61	89.61	95.64	95.80	91.86	91.86	97.41	97.51	92.63	97.13	99.12	99.16	96.37	99.01

Unimpacted baseline – RBS method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	3.16	1.87	98.41	99.37	98.16	99.29	98.78	99.49	99.01	99.61	98.99	99.48	99.22	99.64	99.17	99.42	99.56	99.72
GDU	1.26	2.99	95.13	98.08	99.48	99.79	94.63	97.78	99.50	99.79	95.30	97.53	99.51	99.76	95.63	96.87	99.62	99.75
MOC	5.62	6.03	99.54	99.83	99.49	99.80	99.72	99.89	99.77	99.91	99.72	99.88	99.77	99.90	99.80	99.89	99.83	99.91
SVA	2.39	0.00	99.45	99.78	99.97	99.99	99.39	99.75	99.97	99.99	99.26	99.64	99.96	99.99	99.81	99.93	100.00	100.00
COB	7.87	7.45	99.59	99.84	99.47	99.79	99.56	99.83	99.42	99.77	99.49	99.80	99.32	99.73	99.55	99.78	99.39	99.70
COR	13.79	35.20	99.96	99.98	99.97	99.99	99.95	99.98	99.97	99.99	99.96	99.99	99.97	99.99	99.97	99.99	99.97	99.99
DEM	9.76	38.27	99.96	99.98	99.73	99.89	99.96	99.98	99.73	99.89	99.96	99.98	99.73	99.89	99.96	99.98	99.73	99.89
HEX	2.62	1.70	99.96	99.98	99.99	100.00	99.95	99.98	99.99	100.00	99.94	99.98	99.99	100.00	99.98	99.99	100.00	100.00
PTU	1.54	0.02	99.99	100.00	99.99	100.00	99.99	100.00	99.99	100.00	99.99	100.00	99.99	100.00	100.00	100.00	100.00	100.00
SOC	4.88	5.75	99.67	99.87	99.02	99.63	99.66	99.87	98.91	99.59	99.60	99.84	98.70	99.48	99.67	99.83	98.79	99.33

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	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	59.61	88.61	89.33	89.45	79.39	93.67	95.12	95.14	90.05	97.77	98.76	100.00	99.02	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	93.17	95.16	97.38	96.01	100.00	98.86	99.52
MOC	5.62	6.03	93.90	94.04	91.12	97.00	96.73	96.73	94.26	100.00	98.37	98.37	97.12	100.00	99.64	99.78	99.42	100.00
SVA	2.39	0.00	87.85	88.15	98.88	98.88	88.66	88.94	98.90	98.90	92.66	92.84	99.28	99.28	98.52	100.00	100.00	100.00
COB	7.87	7.45	92.10	92.54	88.42	92.82	93.84	94.20	91.03	94.67	96.40	96.60	95.01	96.93	98.33	98.85	98.19	98.99
COR	13.79	35.20	98.80	98.82	99.55	99.97	99.37	99.39	99.84	100.00	99.69	99.69	99.90	100.00	99.97	100.00	99.98	100.00
DEM	9.76	38.27	99.57	99.57	99.99	99.99	99.61	99.61	99.99	99.99	99.62	99.62	99.99	99.99	99.94	100.00	100.00	100.00
HEX	2.62	1.70	94.88	94.94	98.92	100.00	95.34	95.38	99.00	100.00	96.87	96.89	99.22	100.00	99.53	100.00	99.90	100.00
PTU	1.54	0.02	94.06	94.34	96.00	96.00	94.76	95.00	96.23	96.23	96.57	96.75	96.63	96.63	99.57	100.00	99.97	99.97

SOC	4.88	5.75	94.20	94.38	85.95	93.85	95.72	95.88	88.76	95.54	97.48	97.58	93.02	97.26	96.56	99.16	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	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	12.72	15.93	77.73	78.25	70.10	70.10	82.35	82.53	80.66	80.66	94.31	94.49	90.39	92.69	96.01	96.07	95.34	95.54
GDU	0.06	6.60	100.00	100.00	93.95	99.81	100.00	100.00	97.24	97.50	100.00	100.00	99.18	99.34	100.00	100.00	99.38	99.48
MOC	13.03	10.40	97.74	97.84	95.16	97.36	98.06	98.16	95.66	97.52	100.00	100.00	99.78	100.00	100.00	100.00	99.86	100.00
SVA	21.32	0.66	95.45	95.47	80.29	100.00	95.75	95.77	79.96	100.00	98.15	98.17	100.00	100.00	98.40	98.40	100.00	100.00
COB	1.16	2.33	86.66	86.82	91.38	91.38	87.70	87.88	92.25	92.25	97.55	97.61	97.66	98.12	97.61	97.67	98.34	98.40
COR	16.63	5.68	94.69	94.69	90.35	97.53	95.43	95.45	91.32	98.08	97.48	97.50	95.77	97.75	97.85	97.87	95.78	98.38
DEM	0.36	0.01	100.00	100.00	98.16	100.00	100.00	100.00	98.92	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.10	0.00	99.83	99.83	99.72	99.72	100.00	100.00	99.81	99.81	100.00	100.00	99.96	99.96	100.00	100.00	99.96	99.96
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	97.46	96.77	96.77	97.61	97.61	96.85	96.85	99.21	99.21	98.99	99.19	99.31	99.31	99.00	99.28

Unimpacted baseline – RBS method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	12.72	15.93	98.70	99.35	98.64	99.38	98.74	99.36	98.76	99.42	99.24	99.53	99.29	99.61	99.28	99.54	99.42	99.66
GDU	0.06	6.60	100.00	100.00	99.81	99.91	100.00	100.00	99.81	99.91	100.00	100.00	99.91	99.94	100.00	100.00	99.91	99.95
MOC	13.03	10.40	99.99	99.99	99.96	99.98	99.99	100.00	99.96	99.98	100.00	100.00	99.98	99.99	100.00	100.00	99.98	99.99
SVA	21.32	0.66	99.49	99.73	99.99	100.00	99.48	99.72	99.99	99.99	99.67	99.78	100.00	100.00	99.68	99.78	100.00	100.00
COB	1.16	2.33	98.22	99.20	99.37	99.72	98.19	99.18	99.36	99.72	98.89	99.22	99.59	99.74	98.88	99.21	99.60	99.74
COR	16.63	5.68	99.76	99.90	99.64	99.85	99.76	99.90	99.63	99.84	99.73	99.85	99.52	99.75	99.73	99.85	99.51	99.75

DEM	0.36	0.01	99.97	99.99	100.00	100.00	99.97	99.99	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.10	0.00	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	100.00
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	99.89	99.95	99.78	99.89	99.89	99.95	99.78	99.88	99.91	99.95	99.79	99.85	99.91	99.95	99.79	99.84

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	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	67.96	74.00	83.27	83.45	81.38	81.80	94.79	94.97	90.70	93.16	95.16	96.48	95.64	96.00
GDU	0.06	6.60	100.00	100.00	96.07	98.09	100.00	100.00	96.72	98.40	100.00	100.00	99.24	99.42	99.00	100.00	99.44	99.56
MOC	13.03	10.40	97.75	97.85	76.63	100.00	98.07	98.17	76.64	100.00	100.00	100.00	99.80	100.00	99.90	100.00	99.90	100.00
SVA	21.32	0.66	95.89	95.91	99.96	99.96	96.19	96.21	99.96	99.96	98.39	98.39	100.00	100.00	98.63	100.00	100.00	100.00
COB	1.16	2.33	88.19	88.31	88.79	94.93	89.24	89.40	89.88	95.58	98.60	98.62	97.75	98.51	98.56	98.68	98.43	98.81
COR	16.63	5.68	94.92	94.92	91.99	96.73	95.66	95.68	93.52	96.74	97.68	97.70	96.74	97.62	96.92	98.06	96.74	98.24
DEM	0.36	0.01	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
HEX	0.10	0.00	99.83	99.83	99.73	99.73	100.00	100.00	99.82	99.82	100.00	100.00	99.97	99.97	99.94	100.00	99.97	99.97
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	96.46	97.44	97.71	97.71	96.46	97.58	99.27	99.27	99.22	99.26	99.21	99.37	99.24	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	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0.00	0.01	0.00	0.00	78.97	78.97	0.00	0.00	80.15	80.15	100.00	100.00	98.31	98.31	0.00	0.00	84.75	84.75
GDU	1.59	1.68	70.35	70.47	77.86	77.86	82.08	84.34	84.27	84.27	99.87	99.87	94.06	96.26	96.87	97.35	96.30	97.76

MOC	0.66	0.49	60.07	60.49	68.40	69.60	70.17	70.57	77.89	79.89	100.00	100.00	98.94	98.94	100.00	100.00	99.30	99.30
SVA	8.48	45.60	74.16	74.32	77.85	77.85	81.14	81.14	78.77	78.77	90.98	91.32	79.58	79.92	96.97	97.01	98.34	99.88
COB	4.42	2.94	81.65	81.85	74.73	78.59	86.66	86.80	82.59	84.65	97.69	97.75	96.18	98.98	97.27	97.29	97.58	97.98
COR	5.44	3.04	75.84	75.92	74.90	82.78	81.60	81.66	82.28	85.92	95.83	95.89	95.68	96.74	99.62	99.64	99.76	100.00
DEM	0.93	0.34	77.46	77.56	39.96	62.30	81.70	81.74	50.78	65.58	91.02	91.10	70.34	70.34	99.91	99.91	100.00	100.00
HEX	1.63	1.73	80.21	80.25	83.57	83.57	85.01	85.11	89.03	89.03	93.43	93.53	94.28	99.08	98.87	98.91	99.35	99.99
PTU	0.38	0.03	80.29	80.33	84.31	91.45	85.78	86.00	87.04	95.14	95.88	96.10	99.76	99.76	99.78	99.78	100.00	100.00
SOC	2.52	2.52	79.62	79.68	83.66	83.66	85.04	85.24	88.99	88.99	94.23	94.31	94.15	95.59	97.14	97.18	97.15	98.65

Unimpacted baseline – RBS method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0.00	0.01	NaN	NaN	98.49	99.42	NaN	NaN	97.36	98.97	NaN	NaN	99.61	99.81	NaN	NaN	93.07	95.92
GDU	1.59	1.68	97.47	98.83	98.25	99.20	96.83	98.43	97.90	98.88	99.85	99.94	99.17	99.49	97.52	98.21	99.28	99.49
MOC	0.66	0.49	99.68	99.88	99.43	99.77	99.55	99.83	99.53	99.79	100.00	100.00	99.98	99.99	100.00	100.00	99.94	99.97
SVA	8.48	45.60	97.00	98.63	96.25	98.29	96.41	98.03	94.89	97.09	97.61	98.45	91.48	93.76	99.40	99.61	99.91	99.96
COB	4.42	2.94	98.38	99.33	98.36	99.32	97.78	98.96	97.68	98.93	99.68	99.80	99.61	99.76	99.25	99.47	99.35	99.53
COR	5.44	3.04	98.36	99.36	98.11	99.26	97.58	98.99	97.08	98.77	99.30	99.56	99.21	99.42	99.97	99.99	99.99	99.99
DEM	0.93	0.34	98.46	99.40	92.96	97.24	97.91	99.07	88.84	95.03	98.06	98.82	85.31	91.85	99.92	99.97	100.00	100.00
HEX	1.63	1.73	99.56	99.83	99.90	99.96	99.53	99.80	99.92	99.97	99.77	99.88	99.97	99.99	99.98	99.99	100.00	100.00
PTU	0.38	0.03	99.78	99.92	99.99	100.00	99.64	99.87	99.99	100.00	99.29	99.64	99.99	100.00	99.95	99.96	100.00	100.00
SOC	2.52	2.52	99.20	99.67	99.37	99.74	99.11	99.59	99.32	99.69	99.64	99.83	99.66	99.84	99.48	99.68	99.65	99.77

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0.00	0.01	0.00	0.00	79.03	79.03	0.00	0.00	80.23	80.23	100.00	100.00	98.30	98.30	0.00	0.00	84.80	84.80

GDU	1.59	1.68	71.08	71.48	77.82	79.04	83.23	85.13	83.82	85.82	99.88	99.88	94.10	96.28	97.38	97.76	96.49	97.85
MOC	0.66	0.49	60.23	60.67	69.24	69.24	70.18	70.56	79.01	79.01	100.00	100.00	98.93	98.93	100.00	100.00	99.30	99.30
SVA	8.48	45.60	74.94	75.14	76.77	81.29	81.97	81.99	78.63	81.31	91.11	91.45	80.53	81.43	96.98	97.02	98.27	99.87
COB	4.42	2.94	82.14	82.34	73.31	81.05	87.16	87.30	82.51	85.85	97.69	97.75	96.19	98.99	97.40	97.42	97.67	98.15
COR	5.44	3.04	76.15	76.23	67.95	90.37	81.92	81.98	77.08	91.88	95.83	95.89	95.76	96.68	99.61	99.63	99.76	100.00
DEM	0.93	0.34	77.56	77.64	48.36	48.36	81.83	81.85	56.46	56.46	91.04	91.14	67.91	67.91	99.91	99.91	100.00	100.00
HEX	1.63	1.73	80.34	80.38	80.02	87.14	85.09	85.19	85.00	93.08	93.42	93.52	94.28	99.08	98.86	98.90	99.35	99.99
PTU	0.38	0.03	80.35	80.39	87.87	87.87	85.86	86.08	91.08	91.08	95.95	96.17	99.76	99.76	99.78	99.78	100.00	100.00
SOC	2.52	2.52	79.73	79.77	79.95	87.47	85.12	85.30	85.42	92.62	94.19	94.27	94.12	95.56	97.19	97.23	97.20	98.66
Fishing value lost	41.70 (Current)		41.7				45.44				87.37				93.82			

Central Louisville

Unimpacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0.00	0.00	0.00	0.00	40.31	40.31	100.00	100.00	99.88	99.88	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
GDU	5.22	1.46	58.35	60.19	73.80	73.80	90.21	90.39	91.19	91.19	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MOC	0.29	0.25	84.69	84.73	75.76	85.18	100.00	100.00	96.69	98.45	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SVA	7.14	21.66	80.39	80.55	71.26	71.26	92.58	92.92	96.15	96.15	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	1.86	1.64	76.40	76.64	77.15	78.37	83.04	83.26	80.89	88.59	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COR	1.85	1.30	96.14	96.16	95.85	99.83	100.00	100.00	95.88	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
DEM	0.05	0.01	81.80	83.02	92.55	96.69	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.52	0.24	93.00	93.04	93.78	93.78	99.56	99.58	99.95	99.95	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
PTU	0.04	0.00	98.86	98.86	99.39	99.61	100.00	100.00	99.95	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SOC	1.10	0.69	85.95	86.31	87.89	87.89	91.57	91.97	92.33	92.33	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Unimpacted baseline – RBS method

	% in FMA	70%	80%	90%	95%

			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0.00	0.00	97.80	99.16	98.20	99.27	100.00	100.00	99.95	99.97	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
GDU	5.22	1.46	89.55	94.21	94.71	97.09	97.29	98.41	98.53	99.16	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MOC	0.29	0.25	99.45	99.79	99.20	99.67	100.00	100.00	99.97	99.99	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SVA	7.14	21.66	96.59	98.14	92.37	95.31	99.02	99.44	99.57	99.79	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COB	1.86	1.64	97.29	98.86	97.49	98.95	98.25	99.20	98.05	99.11	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COR	1.85	1.30	99.96	99.98	99.98	99.99	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	99.85	99.94	99.86	99.95	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.52	0.24	99.91	99.96	99.92	99.97	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
PTU	0.04	0.00	99.99	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	1.10	0.69	99.04	99.62	98.68	99.47	98.86	99.46	98.34	99.20	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	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0.00	0.00	0.00	0.00	39.48	39.48	100.00	100.00	99.90	99.90	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
GDU	5.22	1.46	60.08	61.60	70.93	79.87	90.15	90.29	90.19	92.13	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MOC	0.29	0.25	84.84	84.88	80.75	80.75	100.00	100.00	97.56	97.56	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
SVA	7.14	21.66	81.42	81.56	69.48	76.22	92.48	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	76.70	76.92	75.75	80.19	82.80	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	1.30	95.98	96.00	95.58	99.92	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	80.69	81.85	94.63	94.63	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HEX	0.52	0.24	93.00	93.04	93.71	93.91	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	0.00	98.85	98.85	99.50	99.50	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	1.10	0.69	86.08	86.44	85.75	90.67	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)		59.52				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	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0.00	0.00	NA	NA	72.35	72.35	NA	NA	72.48	72.48	NA	NA	87.47	87.47	NA	NA	90.20	90.20
GDU	12.08	2.36	81.37	83.29	75.82	82.40	85.65	85.97	82.92	82.92	93.57	93.89	89.58	91.12	96.42	96.66	95.19	95.67
MOC	0.38	0.43	98.78	99.00	85.42	91.52	98.88	98.90	89.33	90.61	98.88	98.90	93.73	93.73	98.88	98.90	95.42	95.42
SVA	5.49	8.18	80.57	80.57	87.76	94.22	87.33	87.45	99.88	99.88	91.31	91.53	99.76	100.00	96.26	96.42	99.94	100.00
COB	3.22	2.49	71.98	72.12	73.21	73.21	79.25	79.31	81.04	81.28	89.87	90.03	88.36	92.26	95.01	95.15	94.72	97.14
COR	0.39	0.19	98.84	100.00	96.84	100.00	99.71	99.71	97.89	99.69	99.71	99.71	98.04	100.00	100.00	100.00	98.70	100.00
DEM	0.00	0.00	99.99	100.00	99.78	99.78	100.00	100.00	98.57	100.00	100.00	100.00	99.82	99.82	100.00	100.00	99.84	99.84
HEX	0.20	0.02	89.18	89.28	96.78	96.78	90.44	90.90	97.41	97.41	90.78	91.20	97.52	97.52	96.51	96.65	98.94	98.94
PTU	0.01	0.00	76.65	76.85	90.78	91.10	75.99	77.51	90.95	90.95	77.37	78.87	91.08	91.08	98.59	98.61	98.94	98.94
SOC	0.99	0.59	85.06	85.32	88.86	89.14	89.03	89.15	91.75	91.75	92.91	92.99	89.87	99.39	93.67	93.71	91.99	99.39

Unimpacted baseline – RBS method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0.00	0.00	NA	NA	99.31	99.74	NA	NA	98.83	99.54	NA	NA	98.52	98.96	NA	NA	99.99	100.00
GDU	12.08	2.36	98.52	99.41	99.00	99.60	98.45	99.35	98.92	99.55	98.46	98.93	98.70	99.17	99.44	99.59	99.30	99.56
MOC	0.38	0.43	100.00	100.00	99.91	99.97	100.00	100.00	99.85	99.94	100.00	100.00	99.60	99.80	100.00	100.00	99.61	99.80
SVA	5.49	8.18	98.85	99.54	99.21	99.69	99.01	99.58	99.99	100.00	98.14	98.84	99.99	99.99	98.88	99.29	99.99	100.00
COB	3.22	2.49	99.15	99.67	99.02	99.62	99.10	99.65	99.19	99.68	98.30	99.02	98.50	99.12	99.07	99.44	99.28	99.57
COR	0.39	0.19	100.00	100.00	99.99	100.00	100.00	100.00	99.99	100.00	100.00	100.00	99.99	99.99	100.00	100.00	99.99	100.00
DEM	0.00	0.00	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	100.00
HEX	0.20	0.02	99.98	99.99	99.99	100.00	99.97	99.99	99.99	100.00	99.89	99.96	99.96	99.98	99.92	99.97	99.96	99.98
PTU	0.01	0.00	99.99	100.00	99.99	100.00	99.98	99.99	99.99	100.00	99.90	99.96	99.96	99.99	99.96	99.98	99.97	99.99
SOC	0.99	0.59	99.58	99.84	99.68	99.88	99.46	99.80	99.59	99.84	99.06	99.50	99.25	99.60	99.00	99.45	99.28	99.61

Impacted baseline – Post Accounting method

	% in FMA		70%				80%				90%				95%			
			ROC		Power		ROC		Power		ROC		Power		ROC		Power	
Taxa	ROC	PowMn	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
ERO	0.00	0.00	NA	NA	72.02	72.02	NA	NA	72.16	72.16	NA	NA	87.34	87.34	90.03	90.03	90.03	90.03
GDU	12.08	2.36	82.23	82.73	78.42	79.86	85.64	85.96	82.21	83.49	93.62	93.94	89.54	91.10	94.17	96.65	95.17	95.65
MOC	0.38	0.43	98.88	98.90	88.50	88.50	98.88	98.90	89.99	89.99	98.88	98.90	93.76	93.76	91.98	98.90	95.44	95.44
SVA	5.49	8.18	80.57	80.79	82.10	100.00	87.30	87.40	99.74	100.00	91.36	91.56	99.74	100.00	96.47	100.00	99.94	100.00
COB	3.22	2.49	71.98	72.04	71.71	74.57	79.17	79.21	80.17	81.77	89.87	90.03	88.29	92.23	95.15	96.69	94.70	97.14
COR	0.39	0.19	99.71	99.71	97.42	100.00	99.71	99.71	97.56	100.00	99.71	99.71	98.02	100.00	98.70	100.00	98.70	100.00
DEM	0.00	0.00	100.00	100.00	99.78	99.78	100.00	100.00	99.78	99.78	100.00	100.00	99.82	99.82	99.68	100.00	99.68	100.00
HEX	0.20	0.02	88.99	89.45	96.78	96.78	90.43	90.89	97.41	97.41	90.77	91.19	97.52	97.52	96.65	100.00	96.65	100.00
PTU	0.01	0.00	75.99	77.51	90.94	90.94	75.99	77.51	90.95	90.95	77.38	78.88	91.08	91.08	98.59	99.29	98.59	99.29
SOC	0.99	0.59	85.08	85.28	78.73	99.19	89.02	89.14	84.06	99.36	92.91	92.99	89.82	99.38	93.71	97.61	91.94	99.38
Fishing value lost	1.77 (Current)		61.31				72.48				83.35				98.64			