Fisheries Standard Review

Ensuring the Risk Based Framework continues to deliver consistent assessments for data-limited fisheries

Impact Assessment Report

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The views and opinions expressed in this report do not necessarily reflect the official policy or position of the Marine Stewardship Council. This is a working paper, it represents work in progress and is part of ongoing policy development. The language used in draft scoring requirements is intended to be illustrative only, and may undergo considerable refinement in later stages.

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1 Impact Assessment Report - Overview

1.1 Impact Assessment Framework

The aim of impact assessment is to provide clear information on the impacts of the options developed to sort out the policy issues identified in the project inception. It serves as a basis for comparing options against one another and against the business-as-usual scenario, and identify a preferred option if possible. It does not replace decision-making but is used as a tool to support the decision-making process and underpin evidenced based decision-making; increasing transparency, making trade-offs visible and reducing bias.

Impact assessment should help to:

- Specify how proposed options will tackle the identified issues and meet objectives
- Identify direct and indirect impacts, and how they occur
- Assess impacts in both qualitative and quantitative terms.
- Help find perverse or unintended consequences before they occur.
- Where possible, make risks and uncertainties known.

This is achieved by following MSC's Impact Assessment Framework that outlines when and how to undertake Impact Assessment. This ensures an efficient, systematic and consistent approach to policy development to underpin a responsive, robust and credible program. In particular, the Impact Assessment Framework defines the different types of impact (see below) and a suite of methodologies best suited to assessing each type.

The impact types used in the Impact Assessment are defined as follows:

1. **Effectiveness:** The extent to which the change is deemed likely to be successful in producing the desired results and resolving the issue(s) originally identified.
2. **Acceptability:** The extent that the change is considered tolerable or allowable, such that the MSC program is perceived as credible and legitimate by stakeholders.
3. **Feasibility:** The practicality of a proposed change and the extent to which a change is likely to be successfully implemented by fisheries within a given setting and time period.
4. **Accessibility & Retention:** The extent to which the change affects the ability of fisheries (both currently certified and those potentially entering assessment in the future) to achieve and maintain certification (i.e. changes in scores, conditions and pass rates).
5. **Simplification:** The extent to which the change simplifies and does not further complicate the Standard such that it can be easily and consistently understood and applied.
6. **Auditability:** The extent to which the change can objectively be assessed by Conformity Assessment Bodies (CABs) and Accreditation Services International (ASI) to determine whether the specified requirements are fulfilled, and CABs can provide scores.

The Impact Assessment report presents the results of this process, whereby each of the options for proposed changes to the Fisheries Standard are tested to understand their potential effects across the six defined impact types.

1.2 Problem Statement

A combination of stakeholder feedback and internal MSC review of application of the Risk-Based Framework (RBF) (including review of the MSC issue log and technical oversight), alongside external

consultant reviews has highlighted that, in certain situations, the RBF is not delivering its intent of consistent, precautionary and robust assessment outcomes aligned to the MSC Default Assessment Tree. With the development of new assessment tools such as MERA (formerly known as MSC's DLM-tool) and the Habitats tool, the Fisheries Standard Review project Ensuring the Risk Based Framework continues to deliver precautionary and consistent assessments for data-limited fisheries also aims to deliver a new scheme document (Fisheries Standard Toolbox) containing instructions for using MSC assessment tools. In response to these issues, the RBF project is divided into four topics, within which, a number of specific issues are addressed:

1. Fisheries Standard Toolbox (not considered in this paper)
2. Align with intent of the default tree
    i. PSA is not appropriate for out of scope species
    ii. Precaution for Key LTL species is not built into the RBF
3. Triggering requirements and calibration
    i. Triggering criteria for use of the RBF are not auditable
4. Clarification and redundancy (7 issues)

1.3 Objectives

The overarching objective of the RBF project is to ensure that the RBF is a consistent, robust and precautionary assessment tool for use by data-limited fisheries in MSC assessments.

1.4 Impact Assessment Summary Report

A risk-benefit analysis is presented to support the comparison of options under review in each topic. Risk-benefit analyses are a means to capture the expected negative (risk) and positive (benefit) impacts of a pre-defined change. The expected impacts are presented alongside one another, across the priority impact types for each Topic, to allow for easy and systematic comparison of effects. The impacts described in the tables are summarised from a combination of sources including external consultant reports, internal analyses of certified fisheries and preassessment data as well as expert judgement from the Executive.

1.4.1 Topic 2, Issue 1 – PSA for out of scope species

Data limited out of scope species (seabirds, marine mammals, reptiles and amphibians) can be assessed using the RBF. The RBF provides a risk status for out of scope species that is translated to an MSC score from the outcome of a PSA. The PSA currently used in assessments was developed to assess teleost fish and does not include appropriate life history characteristics for out of scope species to allow their consistent or robust risk assessment. Table 1 presents the risk benefit analysis for retaining the business as usual scenario (Option 0), and the adoption of Option 1 and Option 2.

Summary of Options

Option 0 (business as usual), retains a system for assessment of data-deficient often vulnerable (high profile) species groups (e.g. Marine mammals) that is inappropriate for their life history traits and might deliver either overly precautionary or less precautionary outcomes, depending on the species and CAB interpretation of requirements. This option is neither auditable nor effective.

Option 1 proposes a tailored PSA for different taxonomic or species groups to better assess them based on life history characteristics. This could involve revising attribute descriptions only and retaining existing thresholds meaning highly precautionary outcomes for most species. Alternatively,

it could involve changing all attributes and thresholds of the PSA which means changing the perspective on risk from between different groups e.g. cetaceans relative to teleost fish, to within groups (e.g. pinnipeds relative to sirenians), which could reduce the overall precaution of the method but could be calibrated to MSC scores accordingly to mitigate that risk. These two approaches present different resourcing implications for further options development and impact assessment in 2021.

Option 2 recognises that the PSA may not be the best method to use for assessing these species groups and proposes to halt the use of PSA for out of scope species in the short term whilst longer term, enabling the use of other tools and methods through the Fisheries Standard Toolbox (Topic 1). Whilst there is currently flexibility for the use of other data-limited methods in fisheries assessments, calibration of these approaches to the MSC Standard has proved challenging and as yet has not been completed by any CAB. With this in mind, this means that until alternatives are available (potentially developed by the MSC) there would be no immediate data-deficient option for scoring out of scope species and would likely result in higher data demands on fisheries and hamper accessibility to the program for some fisheries.

Comparison of Options

Option 1 would not limit accessibility of the program for data-limited fisheries and it tailors the PSA to better suit the context of out of scope species to ensure more appropriate outcomes relative to the default assessment tree. Option 0 (business as usual) presents continued challenges for CABs to apply the existing PSA to out of scope species and the outcomes may be either overly precautionary or less precautionary depending on the species assessed and CAB interpretation of requirements, meaning CABs opt to avoid using the RBF. If triggering requirements are made more explicit and auditable as outlined in Topic 3, this will likely mean more out of scope species trigger use of the RBF. Consequently, retaining the PSA tables in their current form is not viable for the integrity of the Standard. Option 2 limits the options for scoring data-deficient out of scope species. This would mean that revisions to the default assessment tree would be required to accommodate this change, or it would mean an increase to the evidence threshold required for these species groups, thus limiting accessibility. Taking forward Option 1 may mean significant investment in consultation and calibration to ensure attributes and thresholds are correct and outcomes are appropriate relative to known status of a range of out of scope species.

Table 1: Risks and benefits of retaining Option 0 (Business as Usual) or adopting Option 1 or Option 2.

	Option 0 (Business as Usual)		**Option 1**		**Option 2**	
Impact type	Risks	Benefits	Risks	Benefits	Risks	Benefits
Effectiveness	- Was made for finfish and not out of scope species - Consultant report has found it can deliver under	- It is already in use therefore no need to change process	- PSA not most appropriate method for out of scope species assessment	- Better reflects life history of out of scope species - Retains data-	- Does not provide a precautionary assessment for data-limited fisheries in the short term	- Removes ambiguity of current triggering requirements - Removes need to apply the RBF to

	Option 0 (Business as Usual)		Option 1		Option 2	
Impact type	Risks	Benefits	Risks	Benefits	Risks	Benefits
	precautionary outcomes depending on species - CABs are concerned it is overly precautionary for some species (ie. some species can never close conditions) - CABs struggle to apply existing requirements as not tailored for out of scope species		- Needs significant external input and calibration to get right	deficient scoring option for Out of scope species - More robust than BaU - Depends on approach	- May be seen as lowering of the bar or increasing the bar depending on how it is addressed in the default tree and how CABs approach assessments - Would require further consideration of how to address this within the default tree if taken forward	species for which it was not designed - Linking with the Toolbox, other methods could be used (not PSA) that are better suited for these species groups which could be implemented outside the FSR on a separate timeline
Acceptability	- CABs would not support this option as they have asked for more guidance / revised approach - eNGOs may be concerned it is not sufficiently precautionary	- Other SHs might be ok with this approach given it does not have high stakeholder interest generally (no broad consultation has been conducted yet on this topic)	- Depends on the approach and level of precaution	- Builds on existing approach	- eNGOs may be concerned it is not sufficiently precautionary, but would depend on approach taken in the default tree	- CABs may welcome this change as they don't like using the RBF (time and effort) - Fisheries unlikely to support this if it results in a raised performance bar

	Option 0 (Business as Usual)		Option 1		Option 2	
Impact type	Risks	Benefits	Risks	Benefits	Risks	Benefits
Feasibility	No risk	No change	- Depends on approach - existing fisheries may need to address new conditions	- Should be feasible as intent is not to raise the bar - Retains data-limited scoring option	- Fisheries may take longer than 5 years to make the necessary improvements to enable them to use the default tree.	- Only three fisheries have applied the RBF for out of scope species.
Accessibility and retention	No risk	No change	- Existing fisheries could incur new conditions using revised approach - Depends on level of precaution	- Retains data-limited scoring option for existing and new fisheries - Existing fisheries should be retained	- 3 Existing fisheries may not have sufficient data to use the default tree. - May limit new fisheries (ETP information PI is problematic for roughly 47 fisheries in pre-assessment data)	- Only three fisheries have applied the RBF for out of scope species so the impact would not be widespread across the program.

1.4.2 Topic 2, Issue 2 – Precaution for Key LTL species is not built into the RBF

Data-deficient Low Trophic Level (LTL) species can trigger the RBF and the Outcome PI can be assessed using the Consequence Analysis (CA) and the Productivity Susceptibility Analysis (PSA) in Principle 1. These species are characterized by high productivity and would thus generally score low risk (i.e. high MSC scores). This means species designated as Key LTL could potentially pass the RBF without due consideration of their key role in the ecosystem as outlined in the Default Assessment Tree.

Summary of Options

Option 0, a business as usual scenario, means that CABs continue to use the existing RBF CA and PSA for assessing data-deficient Key LTL species without any additional guidance. Whilst the RBF

assessments have been found to be generally precautionary for the assessment of LTL stocks and no Key LTL stocks have yet triggered the RBF, there is a risk that assessments may not adequately account for the key ecosystem roles that these species play, resulting in less precautionary outcomes relative to MSC's intent in the default assessment tree.

Option 1 aims to clarify guidance and requirements to ensure precautionary assessments of these species are aligned with P1 intent in the default assessment tree. This would mean lifting some aspects of the existing guidance into requirements and clarifying that CABs should account for ecosystem needs. This could include small changes to productivity attributes and susceptibility attributes for species that have been identified as Key LTL using the criteria outlined in the Default Assessment Tree (eg. Box SA1). It could also include re-incorporating the 'Scale and Intensity' component into the Consequence Analysis (i.e. SICA) to improve transparency of the scale and intensity of the fishing operation under assessment for the assessment of Key LTL stocks in the RBF.

Comparison of Options

Option 1 would increase precaution applied to Key LTL species in the RBF, aligned with the intent of the default assessment tree. Further impact testing of this option would focus on accessibility and the level of precaution needed within RBF assessments relative to the default assessment tree to align with specific Key LTL requirements in PI 1.1.1a, otherwise it may risk becoming over precautionary and start to pose a barrier to accessibility. Option 0 is least favoured as it does not clarify to CABs how to score Key LTL stocks within the RBF and could result in less precautionary assessment outcomes leading to credibility concerns.

Table 2: Risks and benefits of retaining Option 0 (Business as Usual) and adapting Option 1 or Option 2.

	Option 0 (Business as Usual)		Option 1	
Impact type	Risks	Benefits	Risks	Benefits
Effectiveness	- Additional precaution not applied to Key LTL in the RBF - Could result in under precautionary outcomes for Key LTL stocks (potential credibility risk)	- Already precautionary for Key LTL and LTL fisheries currently in the program	- Could be overly precautionary depending on the attributes and changes adopted (testing needed)	- Is explicit and clear that certain species should be treated with more precaution - Aligns with intent of the default tree
Acceptability	-CABs may continue to ask how to address key LTL in RBF - Fishery clients raised the issue that RBF is less precautionary than	-Not a major stakeholder concern	- None	- Clarity for CABs - Clear for all SHs - May enhance credibility as more precautionary

	the default tree for LTL species			
Feasibility	- No risk	- Feasible for all fisheries if no change	- Could increase the bar	- Should be achievable for fisheries (technically and affordable)
Accessibility and retention	- No risk	- Accessibility maintained and retention of existing fisheries assured	- Would not affect any existing certified fisheries as no Key LTL designated fisheries have yet applied the RBF - Increases precaution for Key LTL fisheries coming into the program	- None

1.4.3 Topic 3, Issue 1 – Triggering requirements for use of the RBF are not auditable

The RBF can be triggered for data-deficient fisheries for multiple Principle Indicators (PIs) spanning Principle 1 (P1) and Principle 2 (P2). This is done through 'triggering criteria'. ASI have raised the concern that some existing triggering criteria are not auditable.

Summary of Options

Option 0, a business as usual scenario means that ambiguity and inconsistent triggering of the RBF will continue, leaving ASI in a position where they can not raise non-conformities against these criteria. This is a credibility risk for the MSC and a point of contention for CABs that have different approaches to triggering the RBF, leading to inconsistent assessments and outcomes.

Option 1 proposes to revise all the triggering criteria for the RBF to align with the Evidence Requirements project. These 'Evidence Requirements' are likely to comprise qualitative assessments by CABs on the quality of specific information to assess different PIs. As such, quality of information could form the basis of triggering criteria for the RBF, defining what equates to a data-limited fishery. However, it is likely that this method would not be sufficiently auditable for the purposes of triggering criteria for the RBF and may also lead to double scoring.

Option 2 proposes to clarify the language and align with wording in the default assessment tree information and outcome Performance Indicators in order to deliver more consistent triggering criteria for the relevant components. Not only will this reinforce the RBF's intent as a precautionary scoring tool for fisheries that do not have sufficient data to be assessed using the default assessment tree, but it will also achieve the goal of increased auditability. In turn, however, this

could result in more frequent triggering of the RBF with potentially significant time and cost implications for fisheries. This also links to Topic 2, whereby increased triggering of the RBF may mean more out of scope species are assessed using the PSA.

Conclusion – Comparison of options

Option 2 clarifies the triggering criteria sufficiently to be auditable for ASI. Option 1 will involve qualitative justification from CABs and would likely result in inconsistent approaches and outcomes. For option 2, it will be important that there are no increases to the bar for triggering the RBF and that the requirements are updated to reflect the existing intent. Clarifying these triggers could have large impacts including increased triggering of the RBF for ETP and out of scope species, meaning time and cost implications for fisheries. This links to Topic 2. Table 3 presents the risks and benefits of the different options.

Table 3: Risks and Benefits of retaining Option 0 (Business as Usual) and adopting Option1 or Option 2.

	Option 0 (Business as usual)		**Option 1**		**Option 2**	
Impact Type	Risks	Benefits	Risks	Benefits	Risks	Benefits
Effectiveness	- Ineffective - CABs not consistent	None	- Ambiguity remains with expert judgement required	- Consistent approach across triggers	- Could result in more assessments triggering RBF	- Clear intent - Consistent application
Acceptability	- Not acceptable for ASI	- Some CABs don't perceive this to be a problem	- Unlikely to be acceptable by ASI (too qualitative)	- Aligns with Evidence Requirements work package in P3 (improves efficiency)	- CABs / fisheries may worry it's too prescriptive or 'raising the bar'	- ASI likely in favour of improved clarity - Many CABs and SHs would likely approve of enhanced clarity
Feasibility	None	- No change	- Dependent on outcome of Evidence work package	- Dependent on outcome of Evidence work package	- May mean more RBF assessments with cost implications	- Should be feasible given intent is not changing

Accessibility and retention	None	- No change	- Dependent on outcome of Evidence work package	- Dependent on outcome of Evidence work package	- Some fisheries that have used the default tree may have to apply RBF	- Should be feasible given intent is not changing
Auditability	- Not auditable	None	- Unlikely to provide needed clarity given qualitative approach proposed	None	- Could be overly prescriptive	- Auditability review highlighted this as best option

1.4.4 Topic 4, Issue 1 – Clarify Table PF3 language such as 'detectable change'

It is not clear what the difference is between 'insignificant', 'possible detectable' and 'detectable' change in the Consequence Analysis (CA) method used for assessing P1 species in the RBF. An interpretation was issued in 2015 to resolve this issue, and a public consultation was held to gauge stakeholder feedback. Consultation feedback suggested additional guidance was supported however there was not much appetite for scoring examples and the alternative of percentage cut offs was also not supported by all.

Two options have been considered to resolve this issue:

0.) Business as usual
1.) Amend requirements and / or guidance to provide further examples for interpreting the Consequence Analysis Table. N.B. there are significant linkages with Topic 4, Issue 2, and also with Topic 2 Issue 2 regarding potential revisions to the Consequence Analysis table.

Summary of options

Option 0, a business as usual approach would mean that CABs continue to use the Consequence Analysis (CA) table with limited guidance of how to interpret these terms. Only 1 assessment so far has received technical oversight comments regarding their interpretation of the requirements, indicating that CABs are able to interpret the requirements effectively most of the time.

Option 1 aims to incorporate the existing interpretation into requirements which was drafted in 2015 if appropriate, aligning with the resolution of other linked issues in this FSR. In developing this option, consideration will be given to clarifying and simplifying language and providing scoring guidance for the use of proxy data. Importantly, this issue resolution depends on the resolution of a linked issue (Topic 4, Issue 2 – Impact of fishing activity), and is potentially also linked to the outcomes of Topic 2, Issue 2 regarding the treatment of Key LTL species in the RBF.

Comparison of options

Option 1 provides clearer guidance to CABs on MSC's expectation for scoring and would minimize any inconsistency and reinforce alignment of the RBF with P1 intent. Updates would also align with any other changes made to the CA as part of linked issues under Topic 2 and Topic 4.

Table 4: Comparison of options to resolve Topic 4, Issue 1.

	Option 0 (Business as usual)		**Option 1**	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	- limited guidance provided at present - BaU may not align with other potential changes from this review regarding CA language	- Only one TO comment has been raised on this issue so far	- Could inadvertently raise the bar	- Revisions can ensure alignment with any updates made to CA language eg. 'fishing activity issue' (Topic 4 Issue 2)
Acceptability	- None	- Not of significant SH concern it seems	- None perceived but will depend on level of changes	- Linked to other issues, so overall changes currently unknown
Feasibility	- None	No change	Will depend on level of changes	- Unlikely to render CA unfeasible as clarifying existing intent
Accessibility and retention	- None	No change	If bar is raised this will affect fisheries	- Not intended to raise the bar therefore should not pose barrier
Auditability	- Broad language is less easy to audit	- This has not been raised by ASI as a persistent issue	If only guidance, this is not normative	- Clearer requirements and guidance is more auditable - Even guidance supports auditability and

				clarification of MSC's intent

1.4.5 Topic 4, Issue 2 – Remove the term 'Fishing Activity'

In the Consequence Analysis (CA), the emphasis for scoring is placed on the impact of the 'fishing activity' rather than the health of the stock as a whole. This does not fully align with the intent of Principle 1 where any change in stock status should be considered, regardless of whether it is directly due to fishing activity or other environmental factors.

PF 3.3.1 states that scoring 'shall be undertaken only for the subcomponent (population size, reproductive capacity, age/size/sex structure or geographic range) on which the team decides that the **fishing activity** is having the most impact.'

Public consultation on this issue in 2016 concluded that the term 'fishing activity' should be removed. Draft language was not consulted on following that. TAB confirmed that any change in stock status should be considered regardless of whether it is directly related to fishing activity or other environmental factors (e.g. climate change) to be consistent with the Default Assessment Tree. Draft language was presented to a TAB working group in June 2016, however no record could be found of the feedback. The draft language presented was: '*scoring shall be undertaken for the subcomponent (population size, reproductive capacity, age/size/sex structure or geographic range) on which the team decides is the most vulnerable to a range of factors*.'

Two options are considered to resolve this issue in the FSR:

0.) Business as usual
1.) Revise requirements to remove the term 'fishing activity'

Summary of options

In a business as usual scenario (Option 0), 6 fisheries (8 scoring elements) have used the CA to score PI 1.1.1 in v.2.0 of the Fisheries Standard. Rationales were reviewed for teams choosing subcomponents to score and in 3 scoring elements (2 fisheries), other factors aside from fishing activity were considered when determining which subcomponent to score.

Option 1 aims to align with P1 requirements and guidance ((G)SA2.2.7), and adjust the language such that the intent of the default tree is better reflected. Human induced impacts such as pollution or habitat degradation are explicitly mentioned in P1 requirements and guidance as reasons for reducing scores in PI 1.1.1, and could therefore also be considered explicitly in the RBF.

In addition to this change in language, updates to the scoring template could be made to improve transparency of rationales for choosing a specific subcomponent.

Changes to this clause, will have implications for the rest of the CA wording and would need further impact testing and generation of options to determine impacts. A consultant would be needed to investigate this further prior to full consultation on options in 2021. Importantly, moving forward on this issue, Topic 2 – Issue 2, and Topic 4 – issue 1 would both be considered in combination with this issue to ensure consistency in proposals for consultation.

An analysis of fisheries that have scored the CA for PI 1.1.1, indicate that 5 scoring elements (4 fisheries) did not consider impacts wider than 'fishing activity' when determining which subcomponent to score. A change in the requirements could have implications for those fisheries, however, it is unclear to what extent it would impact them at this stage.

Comparison of options

Option 1 would clarify the intent of the requirements to ensure that impacts to the stock as a whole are accounted for rather than purely the fishing impacts. This would ensure precaution and alignment with the intent of the default assessment tree. A change was already approved by TAB and a consultation conducted in 2016 showed most stakeholders were in favour of clarifying the wording. This could marginally increase the evidence bar for fisheries entering the program but is a clarification of the existing intent.

Table 5: Comparison of options to resolve Topic 4, Issue 2.

	Option 0 (Business as usual)		**Option 1**	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	- Other impacts undermining a P1 stock may not be considered if the focus is purely on the 'fishing impact' - Not aligned with intent of the default tree	- Some assessments are considering impacts wider than 'fishing activity' anyway	- Knock on implications for rest of the CA language - May increase the bar in terms of information needs for fisheries	- Intent is clear and aligns with that of the default tree. - Precaution is ensured
Acceptability	- Could be credibility risk	- Not of significant SH concern at present	- None perceived but will depend on level of changes	- Linked to other issues, so overall changes currently unknown
Feasibility	- None	- No change	- Will depend on level of changes	- Unlikely to render CA unfeasible as clarifying existing intent
Accessibility and retention	- None	- No change	- If bar is raised this will potentially affect four fisheries	- Not intended to raise the bar - Some fisheries already explicitly considering wider impacts

Auditability	- None	- No change	- None anticipated	- No change expected

1.4.6 Topic 4, Issue 3 – Remove RBF trigger for Primary Species

Currently primary species may trigger the RBF as per Table 3 triggering requirements. The criteria of the triggering requirements suggest that Primary Species could, in some cases, not have reference points. This is paradoxical as it directly contradicts the definition of Primary species in Annex SA, which are by definition managed to reference points and would thus never trigger the RBF, making this option redundant and confusing.

From a review of TAB papers, the minutes of TAB 23 in April 2014, captured this issue agreeing that the definition of Primary species excluded the use of the RBF for this PI.

Two options are considered to resolve this issue:

0.) Business as usual
1.) Revise trigger criteria such that RBF cannot be triggered for Primary species.

Summary of options

Option 0, a business as usual scenario would leave the contradiction in place. This doesn't cause any particular damage; however it means that confusion / bemusement would persist amongst CABs as to why this exists and it's highly likely to remain useless unless the definition of primary species changes as part of the efficiency project. Ultimately, at present, it is a redundant clause that has never been used in any fishery assessment.

Option 1 proposes to remove the option to trigger the RBF for primary species, thus removing any contradiction in the requirements, making it clear that all primary species are, by definition, managed to reference points.

Comparison of options

Depending on outcomes of the Efficiency Project, Option 1 would promote clarity of the MSC requirements and intent. No negative impact is predicted as a result of this change given that no fishery has ever triggered the RBF for primary species. Whilst retaining a trigger for primary species (Option 0) does not do any actual damage and does not pose a substantial risk, it does present a contradiction between the requirements in Annex SA on designating primary species, and the triggering criteria (leading CABs to question whether a primary species can ever be without reference points or Biologically Based Limits). SA3.1.3.3 in Annex SA shows that they cannot, therefore this clause is redundant and causes confusion.

Table 6: Comparison of options to resolve Topic 4, Issue 3.

	O Option 0 (Business as usual)		**Option 1**	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	-Does not align with default tree	- No change and covers	- May depend on outcomes of the Efficiency project	- Aligns with definition of

	definition of Primary species -Potential impacts of efficiency work is changing P2 species designation	unforeseen circumstance**s**		Primary species in the default tree - Change will need to align with Efficiency project outcomes - No fishery has ever triggered RBF for Primary species
Acceptability	- None	- Not of significant SH concern	- None perceived	- Clearer more consistent requirements generally acceptable
Feasibility	- None	- No change	- None	- No change
Accessibility and retention	- None	- No change	- None – no fisheries have triggered RBF for primary species	- None – removes the option to score Primary species using the RBF
Auditability	- None	- No change	- None	- No change expected

1.4.7 Topic 4, Issue 4 – Information requirements in Annex SA do not exist for all RBF related PIs

Information requirement specific language is used in the default tree SGs to assist CABs when scoring information in the situation where the RBF has been used to score an outcome. These do not exist for all RBF related PIs (Stock Status and Ecosystems do not have RBF specific information scoring requirements).

Two options are considered to resolve this issue:

0.) Business as usual

1.) Revise RBF information requirements to streamline and align with evidence requirements work package in Principle 3

Summary of options

A business as usual scenario (Option 1) leaves RBF related text within Annex SA scoring guideposts for information PIs and would not provide RBF bespoke language for all PIs consistently. This does not

align with the recent approach to streamline evidence requirements and also does not account for the need to account for the shift of the RBF into the Fisheries Standard Toolbox (Topic 1).

Option 1 proposes a change to the RBF information requirements. Not only is this dependent on the evidence requirements project and how that evolves, but it is also linked to the creation of a Fisheries Standard Toolbox where other assessment methods/Tools (e.g. MERA and Habitats Tool) may be used in future to derive status scores for various PIs. This option proposes to replace the specific RBF language for the information PIs, with requirements stating that where another method / Tool (e.g. the RBF) has been used, information to inform the outputs of that tool must be assessed against the evidence requirements framework. There are also dependencies identified with the efficiency project here in terms of the structure of the Standard regarding defining primary and secondary species etc.

Comparison of options

Option 1 enables a more consistent format for RBF information scoring. It also provides project streamlining with the evidence requirements project, and future proofing for the introduction of other assessment tools into the program via the Toolbox (Topic 1). This does not signify a change in the bar but merely an opportunity to clarify and streamline. Additionally, Option 0, would not be aligned with the wider updates being made through the evidence requirements and Toolbox projects and, as such, efficiencies would be missed.

Table 7: Comparison of options to resolve Topic 4, Issue 4.

	Option 0 (Business as usual)		**Option 1**	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	-Does not align with proposed updates to evidence requirements - Does not account for the shift to the Toolbox and use of potential new assessment methods and tools in the Toolbox e.g. MERA tool for data limited assessments/ Habitats tool	- No change	-Could be too generic and thus not helpful	- Could streamline requirements and cover all RBF methods consistently - Would align with changes proposed in FSR under Evidence Requirements work package in P3. - Would align with Efficiency project outcomes - Would account for shifting the RBF and other methods into the Toolbox

Acceptability	- None	- Not of significant SH concern	- None perceived	- Likely to be acceptable as requirements are quite general at present
Feasibility	- None	No change	- Could slightly raise the bar dependent on outcome of evidence requirements work package	- Likely to be feasible – dependent on outcome of evidence requirements work package
Accessibility and retention	- None	No change	None	- None
Auditability	- None	No change	- Dependencies with evidence requirements	No change expected

1.4.8 Topic 4, Issue 5 – Scoring selectivity in the CSA (adding more gears to the lookup table)

The Consequence Spatial Analysis (CSA) requires gear specific scores when scoring the gear-habitat interaction attributes. A number of gear types are included in the provided look-up tables (FCP v2.1 Table PF14 and Table PF15 and Table PF16). The assessment team must score the attributes using the most similar gear type when the UoA's gear type is not provided and teams must provide a rationale for the selection (FCP v2.1 PF7.4.7.1). Since the introduction of the CSA, fisheries with new gear types to the MSC program entered assessment and therefore it's important to check whether the new gears that were assessed need to be included into the attribute tables in the CSA. So far, only 7 fisheries (24 scoring elements, 6 different gear types) applied the CSA in their assessment, of which 3 fisheries (11 scoring elements, 3 different gear types) used a proxy for the assessed gear type when scoring the attributes. When a proxy was used, scoring seemed adequate.

Two options are considered to resolve this issue:

0.) Business as usual
1.) Revise the lookup tables to include new gears

Summary of options

In the business as usual scenario (Option 0) the existing gear lookup table will continue to be used in the CSA assessments. Where CABs are assessing a gear that is not already listed, they must assign their own risk score based upon the closest similar gear type in the lookup table.

Option 1 proposes the introduction of new gear types and associated risk scores into the matrix, increasing resolution. Whilst this could add clarity to the requirements, it would never be comprehensive such that proxies would not be needed, therefore it is not proposed to add these gear types.

Comparison of options

In the case of Option 0, only three fisheries applied a proxy for the gear type based on the risk table provided and the scores remained appropriate. Thus, it's not considered necessary to update the scoring table at this time, however, an improvement to the reporting template is proposed in order to improve transparency for reporting when a proxy for gear type has been used with a supporting rationale. There is no risk perceived with this option. Option 1 would provide a wider list of options for scoring, however, would still fail to cover all possible gear types and therefore it is likely that CABs would still have to apply a proxy approach in some scenarios limiting any value of intervention here.

Table 8: Comparison of options to resolve Topic 4, Issue 5.

	Option 0 (Business as usual)		Option 1	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	- Inconsistent scoring could occur if similar gears assessed using a proxy but assigned different scores	- No change - Currently being applied infrequently - No current issue with consistency	- Will likely never be comprehensive and proxies continue to be used	- Clearer lookup table for CABs
Acceptability	- None	- Not of significant SH concern	- None perceived	- Likely to be acceptable as improved clarity
Feasibility	- None	No change	None perceived	No change
Accessibility and retention	- None	No change	None	- None
Auditability	- None	No change	- None	Improved auditability

1.4.9 Topic 4, Issue 6 – Protest scores

There is no direct requirement that explicitly states that a CAB is responsible for assigning final scores and that a CAB may disregard scores that are not founded on reliable information i.e. Protest scores given by stakeholders that oppose the fishery out of principle.

Two options are considered to resolve this issue:

0.) Business as usual

1.) Revise requirements to ensure it is explicit that CABs are responsible for the overall scoring of the RBF and ensures that scores put forward by stakeholders are evidence based.

Summary of options

In the business as usual scenario (Option 0), there is potential for protest scores to feature in an RBF assessment, however, there is no evidence of this ever having occurred in an assessment. In the existing requirements, it is clear that 'the team' is responsible for scoring. The RBF is intended as a precautionary tool for scoring of data-limited fisheries and therefore it is considered that is the guidance which states that 'where stakeholder consensus cannot be reached, the more precautionary score should be awarded' is appropriate. There is no evidence of this ever having been a problem in assessments so far.

Option 1 would ensure that requirements are clarified to state explicitly that the CAB is responsible for the scoring of the RBF, the risk of protest scores causing problems in RBF assessments should be removed.

Comparison of options

Option 0 is deemed to be appropriate given that no evidence has been found to suggest that this has ever been an issue in RBF assessments to date. Existing requirements ensure that stakeholder comments are accounted for and that the CAB should be precautionary in scoring where there are disagreements between stakeholders, however it is clear that the CAB is responsible for overall scoring. This is aligned with the intent of the RBF being a precautionary assessment tool.

Table 9: Comparison of options to resolve Topic 4, Issue 6.

	Option 0 (Business as usual)		**Option 1**	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	- Protest scores could cause difficulties for CABs in assessments	- No change - Currently being applied without incident - Requirements are precautionary in line with RBF intent	- Could be perceived as increased conflict of interest for the CAB conducting the RBF	- Would remove potential for protest scores to occur
Acceptability	- None	- Not of significant SH concern (raised internally)	- As above – SHs contributing to RBF assessments may feel contribution is diminished by CAB	- Likely to be acceptable as improved clarity
Feasibility	- None	No change	None perceived	No change
Accessibility and retention	- None	No change	None	- None
Auditability	- None	No change	- None	No change

1.4.10 Topic 4, Issue 7 – Auditor Competency

RBF applies only to Principle 1 and Principle 2. At present, only one member of the assessment team needs to have passed the MSC training in the RBF, leading to a situation where P3 auditors can conduct RBF assessments on P1 and P2 and that the P1 and P2 assessors for that assessment may not have any background in the RBF and thus could lack understanding of how it affects scoring. It is not known exactly how many (if any) RBF assessments have been completed by P3 assessors, however, at least one P1 RBF assessment has been completed when the P1 assessor has not completed the RBF training but the P2 assessor has, indicating that assessment teams are sharing responsibilities for RBF scoring in certain situations.

Three options are considered to resolve this issue:

0.) Business as usual
1.) Allow only P1 and P2 assessors to conduct RBF assessments for their respective principles
2.) Require either all assessors, or at a minimum all team leaders do RBF training and are responsible for oversight of the whole process and scoring.

Summary of options

The business as usual scenario (Option 0) entails a persisting credibility risk to the MSC, whereby the Principle leads for P1 and P2 are not required to have an understanding of the RBF and how it affects the scoring of their respective principles. This could lead to inappropriate outcomes and reduced credibility of MSC assessments.

Option 1 proposes that only P1 and P2 assessors may carry out the RBF in a full assessment and thus must have passed the training prior to using the RBF in an assessment. This reduces credibility risks, ensuring the relative Principle lead is responsible for the related RBF assessment with implication for scoring on that Principle. This increases the burden on the assessment teams, and reduced flexibility does not align with the existing process whereby scoring is conducted by the team as a whole.

Option 2 proposes that all assessors, or at least all team leaders must complete the RBF training, but the actual load of conducting the RBF scoring in an assessment could be shared by the auditors depending on the assessment. This would mean that all auditors are aware of how it works and how it affects scoring overall for their principle, or conversely at least the team leaders with oversight of scoring would have completed the training and understand how it works. In both scenarios here, credibility risks persist, as there would still be potential for a P3 auditor to undertake an RBF assessment on stock status.

Comparison of options

Option 2 would ensure that, at a minimum, Team leaders that have oversight of scoring are trained in the RBF and how it affects scoring. This ensures that the burden on the CAB/assessors and the P2 leads in particular who often get the most work to do in an assessment can be shared between the team but understanding of the process will be assured amongst team members. This option does not undermine any existing RBF assessments that have been conducted.

Table 10: Comparison of options to resolve Topic 4, Issue 7.

	Option 0 (Business as usual)		Option 1		Option 2	
Impact Types	Risks	Benefits	Risks	Benefits	Risks	Benefits
Effectiveness	- P3 auditors or the non-relevant Principle auditor can conduct the RBF which is a credibility risk	No change (not clear how many, if any RBF assessments have been done by a P3 team member) - One member of the team is trained at a minimum and scoring is done as a team	- None	- Would ensure competency of team is aligned with Principle for RBF - Improved credibility	-Team leader may not be relevant Principle expert for the RBF - Potential credibility risk remains	- Means less strain on the CAB and Team leader has oversight on the scoring process - Scoring is done as a team
Acceptability	- None – has not been raised as big SH concern	- Enabling P3 auditors to do the RBF may be good for accessibility in certain areas for CABs (experts that speak the local language may be the P3 team members)	- Puts CABs under more pressure to find relevant experts to run the RBF - P2 auditors have biggest job overall so this would add to the burden	- Likely to be acceptable for most SHs	- Similar issues to BaU option unresolved - more training requirements for CABs is a burden	- Team leader is required at a minimum to have RBF training to oversee scoring
Feasibility	- None	No change	None perceived	No change	No change	No change

Accessibility and retention	- None	No change	- Could increase cost of CABs to fishery clients depending on strain on resources	- None	- Could increase cost of CABs to fishery clients depending on strain on resources	- Does not put excess pressure on P2 auditors or specific Principle auditors
Auditability	- None	No change	- None	No change	None	No change

Summary of impacts
A summary comparison of the different options for each issue addressed under each respective topic is presented above.

Overall, the main impacts to consider are effectiveness, feasibility, accessibility and retention as well as auditability for fisheries in the program and those aiming to enter assessment in the near future. Some of the changes outlined above may have consequences for fisheries in the program and future assessments through the addition of precaution to the RBF methods both for out of scope species assessments and for Key LTL species. This risk needs to be managed through extensive calibrations of any proposed changes in further impact assessment in 2021. As outlined above, clarifying the triggering criteria for the RBF will likely achieve the aim to improve clarity and auditability, but as a consequence may result in increased triggering of the RBF in fisheries assessments in the future, both for out of scope species but also generally for secondary species, habitats and ecosystems. This means that particularly under Topic 2, the outcome of that work must assure consistent, robust and precautionary assessment methods for out of scope species.

2 Conclusion & Next Steps

Options discussed in this paper will be taken forward for further development and impact assessment in 2021, including public consultation.

Appendix 1: Detailed impacts

The impact assessment for this project has been conducted in a phased approach, whereby a broad range of options were considered at the initial phase, and have since, been dismissed or combined to form the options presented in this paper. The following table (Table A1), illustrates all options considered under each topic at the initial phase, and how these options have been reformulated into 'combined options' for further impact assessment in 2021. Impacts analysed for the 'combined options' are presented in detail below.

Table A1: Progression of options considered through phased impact assessment, showing initial options considered, final combined options for further analysis.

Topic	Issue	Initial Options	Combined Options
2	1 - Out of scope species PSA	1. BaU 2. Update attribute description only 3. Update attributes & thresholds 4. Halt use of PSA for out of scope species	0. BaU 1. Revise PSA tables 2. Halt use of PSA for out of scope species
2	2 – Key LTL species CA & PSA	1. Bau 2. Clarify requirements and guidance 3. Adapt equation for converting to MSC scores to be more precautionary 4. Add guidance only	0. BaU 1. Clarify requirements and guidance
3	1 – Trigger criteria not auditable	1. BaU 2. Update triggers for all PIs to align with Evidence Requirements work package 3. Align triggers for ETP, Habitats and Ecosystems with evidence requirements and update P2 and P1 species to clarify existing terms 4. Clarify existing triggers to reflect specifics of the default tree for each PI	0. BaU 1. Update triggers for all PIs to align with Evidence Requirements work package. 2. Clarify existing triggers to reflect specifics of the default tree for each PI
4	1 – Clarify Table PF3 in the CA	1. BaU 2. Amend wording of requirements 3. Add guidance and examples	0. BaU 1. Clarify requirements and guidance
4	2 – Remove CA 'Fishing Activity' wording	1. BaU 2. Amend CA language to cover other impacts to whole stock, not just fishing activity	0. BaU 1. Amend CA language to cover other impacts to whole stock, not just fishing activity
4	3 – Remove trigger for	1. BaU 2. Remove option to trigger RBF for primary species	0. BaU 1. Remove option to trigger RBF for Primary Species

Topic	Issue	Initial Options	Combined Options
	Primary species		
4	4 – RBF information requirements	1. BaU 2. Include more specific RBF information requirements under P1 and Ecosystem PIs 3. Remove the specific RBF language 4. Include overarching RBF information requirements linked to the methods used	0. BaU 1. Include overarching information requirements for the RBF methods
4	5 – CSA selectivity gear matrix	1. BaU 2. Introduce new gear types into the scoring matrix	0. BaU 1. Introduce new gear types into the scoring matrix
4	6 – Protest scores	1. BaU 2. Revise requirements to clarify CABs do final scoring 3. Add guidance on CAB's role in scoring	0. BaU 1. Revise requirements to clarify CABs do final scoring
4	7 – Auditor competency	1. BaU 2. Revise such that only P1 and P2 auditors can completed the RBF for their respective Principle 3. Revise requirements such that all assessors must be trained in RBF, but anyone can lead on it during an assessment 4. Revise requirements such that all Team Leaders must be trained in RBF and oversee process if another assessor doing RBF scoring	0. BaU 1. Revise such that only P1 and P2 auditors can complete the RBF for their respective Principle 2. All assessors, or at least Team leaders must complete RBF training, but any assessor can conduct an RBF assessment in an audit.

Following initial impact assessment, options were either dismissed or combined to form the final 'combined' options presented in this paper which are proposed to be taken forward into 2021 impact assessment and consultation. The options dismissed for each Issue addressed, and the associated rationale for dismissing these options is provided in Table A2.

Table A2: Overview of options dismissed following initial impact assessment with justification for why they were dismissed.

Topic	Issue	Options dismissed	Rationale for dismissing options
2	2 – Key LTL	Option 3 - Adapt the equation used to convert PSA scores to MSC scores to add precaution for Key LTL species	This would likely be too precautionary and inflexible causing potential accessibility and retention concerns Not transparent for stakeholders, likely unacceptable
3	2 – Trigger criteria	Option 3 – align triggers for ETP, Habitats and Ecosystems with evidence requirements and update P2 and P1 species to clarify existing terms	This is not a streamlined or consistent approach Evidence requirements for triggers unlikely to be sufficiently auditable
4	4 – RBF information requirements	Option 2- Include more specific RBF information requirements under P1 and Ecosystem PIs	Not efficient to scatter RBF clauses in the default assessment tree Would not account for movement of the RBF into the Fisheries Standard Toolbox
		Option 3 - Remove the specific RBF language	Would be ineffective at clarifying MSC intent on information requirements for the RBF
4	6 – Protest scores	Option 3 - Add guidance on CAB's role in scoring	Guidance is not normative therefore this is ineffective at resolving the issue

A1.1 Topic 2, Issue 1 – PSA for out of scope species

A1.1.1 Background

Out of scope species cover reptiles, marine mammals, birds and amphibians.

The focus will be on birds, marine mammals, and reptiles (amphibians are not common bycatch but could potentially be considered within the reptile scoring options).

In order to determine potential impacts of the different options being proposed, it was first necessary to determine what these new PSA tables could look like. This was done using results from a consultancy report carried out in 2019 (Good, 2019), and an in-house literature review to determine whether other adapted PSA methods and attributes might be suitable for use in assessment of these species groups. It is worth noting that PSAs for other species groups have been developed and could apply but their application is slightly different to that of the MSC, therefore any attributes and thresholds used for these species would need significant calibration with existing MSC fisheries to ensure the translated MSC scores are appropriate and precautionary relative to outcomes of default tree assessments. This would be undertaken in 2021 if Option 1 is taken forward.

Options being proposed to resolve the issue are as follows:

0. Business as Usual – existing MSC PSA attribute tables continue to be applied to out of scope species
1. Revise PSA tables to better suit out of scope species – this can be done in two ways:
    a. Edit attribute description to enable more consistent and accurate scoring for specific species in line with MSC's intent, but retain existing PSA risk scoring thresholds
    b. Revise both the attributes and thresholds of the existing PSA tables to better reflect life history strategies of different species groups enabling more appropriate assessments
2. Remove the option to the use the PSA for out of scope species (meaning scoring would need to be undertaken using the default assessment tree)

The draft PSA table options outlined above, are presented below by species group, demonstrating the different (example) proposed attribute tables for each option. Original attributes are described in black text. Additions to the existing attributes are described using green text, and where proposals include removing attributes or thresholds, these are described using strikethrough text.

Potential impacts were analysed using a qualitative framework comparing the draft options against 6 different impact types (Effectiveness, Acceptability, Feasibility, Accessibility and retention, Simplification, and Auditability). Following an initial impact assessment, the impact types that were considered further were, Effectiveness, Acceptability, Feasibility, Accessibility and retention for issues under Topic 2. The impact types 'Simplification' and 'Auditability' were not investigated further for this Topic as these were not considered the most important impact types at present, given that the PSA already exists and is auditable, and whilst these options potentially create more requirements, they are aiming to simplify interpretation of the RBF for out of scope species and this will be considered further in future impact assessment in 2021 dependent on which options are taken forward.

The overall results of the potential impacts of all the different options are described in the final section under this topic (see Section A1.5).

A1.2 Seabirds – detailed options

A1.2.1 Option 0 - Seabirds

Option 0 proposes no change to the existing MSC PSA attribute table.

Table A3: Option 0 –business as usual PSA attribute table

Productivity Attributes (Seabirds Option 0)			
Productivity Attribute	**High productivity Low risk (1)**	**Medium productivity Medium Risk (2)**	**Low productivity High Risk (3)**
Average Age at maturity	‹5 years	5-15 years	›15 years
Average Max age	‹10 years	10 – 25 years	›25 years
Fecundity	›20,000 eggs per year	100-20,000 eggs per year	‹100 eggs per year
Average max size (not scored for inverts)	‹100 cm	100-300 cm	›300 cm
Average size at maturity (not scored for inverts)	‹40 cm	40-200 cm	›200 cm
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer
Trophic level	‹2.75	2.75-3.25	›3.25
Density Dependence (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely.	No depensatory or compensatory dynamics demonstrated or likely.	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.
Susceptibility Attributes (Seabirds Option 0)			
Susceptibility Attribute	**Low susceptibility (low risk, score = 1)**	**Medium susceptibility (medium risk, score = 2)**	**High susceptibility (High risk, score = 3)**
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	‹10% overlap	10-30% overlap	›30% overlap
Encounterability: The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability). Default score for target species (Principle 1).

Selectivity of gear type: Potential of the gear to retain species	a.) Individuals < size at maturity are rarely caught.	a.) Individuals < size at maturity are regularly caught.	a.) Individuals < size at maturity are frequently caught.
	b.) Individuals < size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity are retained by gear.
Post-capture mortality (PCM): The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released. Default score for retained species (Principle 1 or Principle 2).

A1.2.2 Option 1 - Seabirds

Option 1 proposes to revise PSA tables to better suit out of scope species – this can be done in two ways presented below:

a. Edit attribute description to enable more consistent and accurate scoring for specific species in line with MSC's intent, but retain existing PSA risk scoring thresholds
b. Revise both the attributes and thresholds of the existing PSA tables to better reflect life history strategies of different species groups enabling more appropriate assessments

Example PSA options were drafted based on a consultant report commissioned in 2019 (Good 2019), and a review of related literature including Fulton et al. (2019)[1], Waugh et al. (2012)[2], and Jimenez *et al*. (2012)[3].

Table A4: Option 1a. – Example draft Productivity and Susceptibility attribute table with revised attribute descriptions to support more consistent scoring for seabirds. NB thresholds remain the same. (Potential revisions are added in green text).

Productivity Attributes (Seabirds Option 1a)			
Productivity Attribute	**High productivity Low risk (1)**	**Medium productivity**	**Low productivity High Risk (3)**

[1] Fulton, E.A., Bulman, C., Thomas, L., Sporcic, M., and Hartog, J. (2019). Ecological Risk Assessment Global Review. Report for the Fisheries Research & Development Corporation. CSIRO, Australia.

[2] Waugh, S.M., Filippi, D.P., Kirby, D.S., Abraham, E., and Walker, N., (2012). Ecological Risk Assessment for seabirds interactions in Western and Central Pacific longline fisheries. Marine Policy 36: 933-946.

[3] Jimenez, S., Domingo, A., Abreu, M., Brazeiro A., (2012). Risk assessment and relative impact of Uruguayan pelagic longliners on seabirds. Aquatic Living Resources 25: 281-295.

		Medium Risk (2)	
Average Age at maturity Seabirds: median age at first breeding	‹5 years	5-15 years	›15 years
Average Max age	‹10 years	10 – 25 years	›25 years
Fecundity Seabirds: scoring should consider number of eggs per nest and number of nests per year (frequency of breeding)	›20,000 eggs per year	100-20,000 eggs per year	‹100 eggs per year
Average max size (not scored for inverts) Seabirds: scoring should consider the largest dimension (either wingspan or length)	‹100 cm	100-300 cm	›300 cm
Average size at maturity (not scored for inverts) Seabirds: scoring should consider the largest dimension (either wingspan or length)	‹40 cm	40-200 cm	›200 cm
Reproductive strategy Seabirds: considered live bearers	Broadcast spawner	Demersal egg layer	Live bearer
Trophic level	‹2.75	2.75-3.25	›3.25
Density Dependence (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely.	No depensatory or compensatory dynamics demonstrated or likely.	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.
Susceptibility Attributes (Seabirds Option 1a)			
Susceptibility Attribute	**Low susceptibility (low risk, score = 1)**	**Medium susceptibility (medium risk, score = 2)**	**High susceptibility (High risk, score = 3)**
Areal overlap (availability):	‹10% overlap	10-30% overlap	›30% overlap

Overlap of the fishing effort with a species concentration of the stock Seabirds: This should consider seasonality in bird distribution (scoring should take a precautionary approach and score based on the highest potential overlap with fishing effort)			
Encounterability: The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear All air breathing species should be considered default high risk unless mitigation measures are in place and a lower risk score can be justified	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability). Default score for target species (Principle 1).
Selectivity of gear type: Potential of the gear to retain species Seabirds: Scoring shall consider how regularly individuals are caught by the gear regardless of their size	a.) Individuals < size at maturity are rarely caught.	a.) Individuals < size at maturity are regularly caught.	a.) Individuals < size at maturity are frequently caught.
	b.) Individuals < size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity are retained by gear.
Post-capture mortality (PCM): The chance that, if captured, a species would be released and that it would be in a	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released. Default score for retained species (Principle 1 or Principle 2).

condition permitting subsequent survival Seabirds: scoring shall consider potential for lethal encounter which could result in injury or death.			

In Option 1b, presented below, there could be potential to develop a matrix of default scores for specific species and gears under the susceptibility attributes which could be applied as default scores. These default scores could be reduced if appropriate justification were provided to demonstrate that mitigation measures are in place for example. One example of specific scoring options for long lines is also provided in Option 1b for scoring selectivity.

Table A5: Seabirds (Option 1b) Potential example productivity and susceptibility attributes for seabirds, showing original attributes (black text) and proposed revisions (green text and strikethrough text).

Productivity Attributes (Seabirds Option 1b)			
Productivity Attribute	**High productivity Low risk (1)**	**Medium productivity Medium Risk (2)**	**Low productivity High Risk (3)**
~~Average Age at maturity~~	~~‹5 years~~	~~5-15 years~~	~~›15 years~~
Median age at first breeding (Waugh *et al*. 2012)	‹5 years	5-7.5 years	›7.5 years
Average Max age	‹10 years	10 – 25 years	›25 years
~~Fecundity~~	~~›20,000 eggs per year~~	~~100-20,000 eggs per year~~	~~‹100 eggs per year~~
Fecundity Factors Index (FFI) (Waugh *et al*.2012)	Annual breeding, multiple egg clutches	Annual breeding, single egg clutches	Biennial breeding, single egg clutches
~~Average max size (not scored for inverts)~~	~~‹100 cm~~	~~100-300 cm~~	~~›300 cm~~
~~Average size at maturity (not scored for inverts)~~	~~‹40 cm~~	~~40-200 cm~~	~~›200 cm~~
~~Reproductive strategy~~	~~Broadcast spawner~~	~~Demersal egg layer~~	~~Live bearer~~
~~Trophic level~~	~~‹2.75~~	~~2.75-3.25~~	~~›3.25~~
~~Density Dependence (to be used when scoring invertebrate species only)~~	~~Compensatory dynamics at low population size demonstrated or likely.~~	~~No depensatory or compensatory dynamics demonstrated or likely.~~	~~Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.~~
Susceptibility Attributes (Seabirds Option 1b.)			

Susceptibility Attribute	Low susceptibility (Low risk, score = 1)	Medium susceptibility (Medium risk, score = 2)	High susceptibility (High risk, score = 3)
~~Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock~~	~~‹10% overlap~~	~~10-30% overlap~~	~~›30% overlap~~
Availability based on relative frequency (FO) of occurrence (%) from observations near fishing vessels			
Population Size › 100,000 breeding pairs	FO ‹ 25%	FO 25-50%	FO › 50%
10,000 – 100,000 breeding pairs	FO ‹ 10%	FO 10 -25%	FO › 25%
‹ 10,000 breeding pairs	FO ‹ 5%	FO 5 – 10%	FO › 10%
Encounterability: The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear All air breathers should be considered default high risk unless mitigation measures are in place and can be justified.	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability). Default score for target species (Principle 1)
Selectivity of gear type: Potential of the gear to retain species	a.) Individuals ~~‹ size at maturity~~ are rarely caught.	a.) Individuals ~~‹ size at maturity~~ are regularly caught.	a.) Individuals ~~‹ size at maturity~~ are frequently caught.

	~~b.) Individuals < size at maturity can escape or avoid gear.~~	~~b.) Individuals < half the size at maturity can escape or avoid gear.~~	~~b.) Individuals < half the size at maturity are retained by gear.~~
Selectivity (hooks) (culmen is bill length, FL is front length of the hook and TL is total length of the hook. (example attributes for longline assessment as per Jimenez et al. 2012)	Culmen < FL	FL <= Culmen >= TL	Culmen > TL
Post-capture mortality (PCM): The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released. Default score for retained species (Principle 1 or Principle 2).

A1.3 Marine Mammals – detailed options

A1.3.1 Option 0 – Marine mammals

Option 0 proposes no change from the existing MSC PSA attribute tables.

Table A6: Marine Mammals (Option 0) - potential example productivity and susceptibility attributes for marine mammals

Productivity Attributes (Marine Mammals Option 0)			
Productivity Attribute	**High productivity Low risk (1)**	**Medium productivity Medium Risk (2)**	**Low productivity High Risk (3)**
Average Age at maturity	<5 years	5-15 years	>15 years
Average Max age	<10 years	10 – 25 years	>25 years
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year
Average max size (not scored for inverts)	<100 cm	100-300 cm	>300 cm
Average size at maturity (not scored for inverts)	<40 cm	40-200 cm	>200 cm

Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer
Trophic level	‹2.75	2.75-3.25	›3.25
Density Dependence (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely.	No depensatory or compensatory dynamics demonstrated or likely.	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.
Susceptibility Attributes (Marine Mammals Option 0)			
Susceptibility Attribute	**Low susceptibility (low risk, score = 1)**	**Medium susceptibility (medium risk, score = 2)**	**High susceptibility (High risk, score = 3)**
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	‹10% overlap	10-30% overlap	›30% overlap
Encounterability: The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability). Default score for target species (Principle 1).
Selectivity of gear type: Potential of the gear to retain species	a.) Individuals ‹ size at maturity are rarely caught.	a.) Individuals ‹ size at maturity are regularly caught.	a.) Individuals ‹ size at maturity are frequently caught.
	b.) Individuals ‹ size at maturity can escape or avoid gear.	b.) Individuals ‹ half the size at maturity can escape or avoid gear.	b.) Individuals ‹ half the size at maturity are retained by gear.
Post-capture mortality (PCM): The chance that, if captured, a species	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released.

would be released and that it would be in a condition permitting subsequent survival			Default score for retained species (Principle 1 or Principle 2).

A1.3.2 Option 1 – Marine Mammals

Option 1 proposes to revise PSA tables to better suit out of scope species – this can be done in two ways presented below:

a. Edit attribute description to enable more consistent and accurate scoring for specific species in line with MSC's intent, but retain existing PSA risk scoring thresholds.
b. Revise both the attributes and thresholds of the existing PSA tables to better reflect life history strategies of different species groups enabling more appropriate assessments.

Brown *et al*. (2013)[4], developed a PSA for cetaceans which is adopted as an example for Option 1b. It is not clear that these exact attributes and thresholds would be entirely appropriate for pinnipeds or sirenians, therefore, if taken further, significant testing and calibration would be required.

Table A7: Marine mammals (Option 1a) – Example PSA table with attribute descriptions edited to enable more consistent scoring of marine mammals. Original thresholds remain unchanged. Potential revisions to attribute descriptions are provided in green text.

Productivity Attributes (Marine Mammals Option 1a.)			
Productivity Attribute	**High productivity Low risk (1)**	**Medium productivity Medium Risk (2)**	**Low productivity High Risk (3)**
Average Age at maturity Marine Mammals: Age at first reproduction (female sexual maturity)	‹5 years	5-15 years	›15 years
Average Max age Marine Mammals: Oldest reproducing female	‹10 years	10 – 25 years	›25 years
Fecundity	›20,000 eggs per year	100-20,000 eggs per year	‹100 eggs per year
Average max size (not scored for inverts)	‹100 cm	100-300 cm	›300 cm
Average size at maturity (not scored for inverts)	‹40 cm	40-200 cm	›200 cm

[4] Brown, S.L., Reid, D., and Rogan, E., 2013: A risk-based approach to rapidly screen vulnerability of cetaceans to impacts from fisheries bycatch. Biological Conservation 168 (2013) 78-87.

Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer
Trophic level	‹2.75	2.75-3.25	›3.25
Density Dependence (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely.	No depensatory or compensatory dynamics demonstrated or likely.	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.
Susceptibility Attributes (Marine Mammals Option 1a.)			
Susceptibility Attribute	**Low susceptibility (low risk, score = 1)**	**Medium susceptibility (medium risk, score = 2)**	**High susceptibility (High risk, score = 3)**
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock Marine Mammals: This should consider seasonality in distribution (scoring should take a precautionary approach and score based on the highest potential overlap with fishing effort)	‹10% overlap	10-30% overlap	›30% overlap
Encounterability: The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear All air breathing species should be considered default high risk unless mitigation measures are in place and a	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability). Default score for target species (Principle 1).

lower risk score can be justified			
Selectivity of gear type: Potential of the gear to retain species Scoring shall consider how regularly individuals are caught by the gear regardless of their size	a.) Individuals < size at maturity are rarely caught.	a.) Individuals < size at maturity are regularly caught.	a.) Individuals < size at maturity are frequently caught.
	b.) Individuals < size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity are retained by gear.
Post-capture mortality (PCM): The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival Marine mammals: consider possibility for lethal encounter (ie. Likelihood of encounter leading to escape and survival or leading to injury and or death.)	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released. Default score for retained species (Principle 1 or Principle 2).

For option 1b: Attributes have been adopted from Brown *et al.* (2013)[4], which includes the use of a selectivity matrix for cetaceans detailed in Table A8.

Susceptibility attributes for cetaceans have been derived by Brown *et al.* (2013)[4] and are derived through a weighted geometric mean using the following equation: $S = (a \times e^2 \times s^2 \times PLE)^{1/6}$, where S: Susceptibility, a: Availability, e: Encounterability and PLE: Potential for Lethal Encounter.

Table A8: Marine Mammals (Option 1b) – Example revised attributes and thresholds are provided in green and original removed attributes are described in black strikethrough text. This table covers marine mammals as a group and would be expected to cover pinnipeds and sirenians as well as cetaceans.

Productivity Attributes (Marine Mammals Option 1b.)			
Productivity Attribute	**High productivity Low risk (1)**	**Medium productivity Medium Risk (2)**	**Low productivity High Risk (3)**
~~Average Age at maturity~~	~~<5 years~~	~~5-15 years~~	~~>15 years~~

Mean age at first reproduction (female sexual maturity)	‹=5 years	6-10 years	›=11 years
~~Average Max age~~	~~‹10 years~~	~~10 – 25 years~~	~~›25 years~~
Oldest reproducing female	‹=44 years	45-60 years	›=61 years
~~Fecundity~~	~~›20,000 eggs per year~~	~~100-20,000 eggs per year~~	~~‹100 eggs per year~~
Calf survival (proportion)	›=0.90	0.77 – 0.89	‹=0.76
Inter-calving period	‹=2.5 years	2.6-3.5 years	›3.5 years
~~Average max size (not scored for inverts)~~	~~‹100 cm~~	~~100-300 cm~~	~~›300 cm~~
~~Average size at maturity (not scored for inverts)~~	~~‹40 cm~~	~~40-200 cm~~	~~›200 cm~~
~~Reproductive strategy~~	~~Broadcast spawner~~	~~Demersal egg layer~~	~~Live bearer~~
~~Trophic level~~	~~‹2.75~~	~~2.75-3.25~~	~~›3.25~~
~~Density Dependence (to be used when scoring invertebrate species only)~~	~~Compensatory dynamics at low population size demonstrated or likely.~~	~~No depensatory or compensatory dynamics demonstrated or likely.~~	~~Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.~~
Susceptibility Attributes (Marine Mammals Option 1b.)			
Attribute	**Low risk Score = 1**	**Medium Risk Score = 2**	**High Risk Score = 3**
Availability	Globally (or multi-ocean basin) distributed	Restricted to same hemisphere / ocean basin as fishery / presence of sub-populations / sub-species	Restricted to same region / country as fishery / presence of sub-populations / sub-species
Encounterability	Spatial and temporal overlap but more than half of habitat range unaffected	Spatial and temporal overlap and less than half of habitat range unaffected	Total spatial or temporal overlap
Selectivity (using gear / species matrix provided below)	Low potential for capture	Moderate potential for capture	High potential for capture
Potential for lethal encounter	Interaction with gear unlikely to result in injury or death	Interaction with gear likely to result in injury or death	Interaction with gear likely to result in death
~~Areal overlap (availability):~~	~~‹10% overlap~~	~~10-30% overlap~~	~~›30% overlap~~

~~Overlap of the fishing effort with a species concentration of the stock~~			
~~Encounterability: The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear~~	~~Low overlap with fishing gear (low encounterability).~~	~~Medium overlap with fishing gear.~~	~~High overlap with fishing gear (high encounterability). Default score for target species (Principle 1)~~
~~Selectivity of gear type: Potential of the gear to retain species~~	~~a.) Individuals < size at maturity are rarely caught.~~	~~a.) Individuals < size at maturity are regularly caught.~~	~~a.) Individuals < size at maturity are frequently caught.~~
	~~b.) Individuals < size at maturity can escape or avoid gear.~~	~~b.) Individuals < half the size at maturity can escape or avoid gear.~~	~~b.) Individuals < half the size at maturity are retained by gear.~~
~~Post-capture mortality (PCM): The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival~~	~~Evidence of majority released post-capture and survival.~~	~~Evidence of some released post-capture and survival.~~	~~Retained species or majority dead when released. Default score for retained species (Principle 1 or Principle 2).~~

The gear selectivity matrix used for assessing cetaceans by Brown *et al.* (2013)[4] is defined in Table A9 and could be used in conjunction with Option 1b PSA tables described above as an example.

Table A9: Marine Mammals (Option 1b) - Gear/species selectivity matrix defined by Brown *et al.* 2013. Specific default risk scores are assigned on a scale of 1-3 (low to high risk respectively) and these default values are then used to complete the PSA and populate values for the 'selectivity' attribute.

Species	Gillnets (demersal sp.)	Long lines (demersal sp.)	Pots (crustaceans)	Pelagic trawl (small pelagic sp.)	Bottom Otter trawl (demersal sp.)	Seines (demersal sp.)
Atlantic white-sided dolphin	3	1	1	2	1	1
Bottlenose dolphin	3	1	1	2	1	1
Common Dolphin	3	1	1	2	1	1
Fin Whale	3	3	3	1	1	1
Harbour Porpoise	3	1	1	1	1	1
Humpback whale	3	3	3	1	1	1
Killer whale	2	1	1	1	1	1
Long-finned pilot whale	2	1	1	1	1	1
Minke whale	3	3	3	1	1	1
Northern bottlenose whale	2	1	1	1	1	1
Risso's dolphin	3	1	1	1	1	1
Sperm whale	2	1	1	1	1	1
Striped dolphin	3	1	1	2	1	1
White-beaked dolphin	3	1	1	1	1	1

A1.4 Reptiles – detailed options

A1.4.1 Option 0 – Reptiles

Table A10: Option 0 – business as usual PSA table for reptiles with attributes and thresholds as published in MSC FCP v2.2.

Productivity Attributes (Reptiles Option 0)			
Productivity Attribute	**High productivity Low risk (1)**	**Medium productivity Medium Risk (2)**	**Low productivity High Risk (3)**
Average Age at maturity	‹5 years	5-15 years	›15 years
Average Max age	‹10 years	10 – 25 years	›25 years
Fecundity	›20,000 eggs per year	100-20,000 eggs per year	‹100 eggs per year
Average max size (not scored for inverts)	‹100 cm	100-300 cm	›300 cm
Average size at maturity (not scored for inverts)	‹40 cm	40-200 cm	›200 cm
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer
Trophic level	‹2.75	2.75-3.25	›3.25
Density Dependence (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely.	No depensatory or compensatory dynamics demonstrated or likely.	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.
Susceptibility Attributes (Reptiles Option 0)			
Susceptibility Attribute	**Low susceptibility (low risk, score = 1)**	**Medium susceptibility (medium risk, score = 2)**	**High susceptibility (High risk, score = 3)**
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	‹10% overlap	10-30% overlap	›30% overlap
Encounterability: The position of the stock/species within the water column relative to the fishing	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability).

gear, and the position of the stock/species within the habitat relative to the position of the gear			Default score for target species (Principle 1).
Selectivity of gear type: Potential of the gear to retain species	a.) Individuals < size at maturity are rarely caught.	a.) Individuals < size at maturity are regularly caught.	a.) Individuals < size at maturity are frequently caught.
	b.) Individuals < size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity are retained by gear.
Post-capture mortality (PCM): The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released. Default score for retained species (Principle 1 or Principle 2).

A1.4.2 Option 1– Reptiles

Option 1 proposes to revise PSA tables to better suit out of scope species – this can be done in two ways presented below:

a. Edit attribute description to enable more consistent and accurate scoring for specific species in line with MSC's intent, but retain existing PSA risk scoring thresholds
b. Revise both the attributes and thresholds of the existing PSA tables to better reflect life history strategies of different species groups enabling more appropriate assessments

Table A11: Reptiles (Option 1a) – Example PSA attribute table for reptiles, with attribute descriptions edited to ensure more consistent scoring. Thresholds remain unchanged. Potential revisions are provided in green text with original text in black text or strikethrough.

Productivity Attributes (Reptiles Option 1a.)			
Productivity Attribute	**High productivity Low risk (1)**	**Medium productivity Medium Risk (2)**	**Low productivity High Risk (3)**
Average Age at maturity	‹5 years	5-15 years	›15 years
Average Max age	‹10 years	10 – 25 years	›25 years
Fecundity Turtles: should be calculated as: (number of eggs per nest* number of nests per season) / remigration interval	›20,000 eggs per year	100-20,000 eggs per year	‹100 eggs per year
Average max size (not scored for inverts)	‹100 cm	100-300 cm	›300 cm
Average size at maturity (not scored for inverts)	‹40 cm	40-200 cm	›200 cm
Reproductive strategy Turtles: considered live bearers	Broadcast spawner	Demersal egg layer	Live bearer
Trophic level	‹2.75	2.75-3.25	›3.25
Density Dependence (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely.	No depensatory or compensatory dynamics demonstrated or likely.	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.
Susceptibility Attributes (Reptiles Option 1a.)			
Susceptibility Attribute	**Low susceptibility (low risk, score = 1)**	**Medium susceptibility (medium risk, score = 2)**	**High susceptibility (High risk, score = 3)**
Areal overlap (availability): Overlap of the fishing effort with the relevant spatial management unit (eg. RMU for turtles or habitat area) ~~a species~~	‹10% overlap	10-30% overlap	›30% overlap

~~concentration of the stock~~			
Encounterability: The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear All air breathing species should be considered default high risk unless mitigation measures are in place and a lower risk score can be justified	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability). Default score for target species (Principle 1).
Selectivity of gear type: Potential of the gear to retain species Turtles: Consider potential of the gear to retain species regardless of size at maturity.	a.) Individuals < size at maturity are rarely caught.	a.) Individuals < size at maturity are regularly caught.	a.) Individuals < size at maturity are frequently caught.
	b.) Individuals < size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity are retained by gear.
Post-capture mortality (PCM): The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released. Default score for retained species (Principle 1 or Principle 2).

Option 1b for reptiles adopts a method developed specifically for turtles (Nel *et al*. 2013[5]) with slightly adapted language to account for other reptiles such as sea snakes where possible. It is

[5] Nel, R., Wanless, R.M., Angel, A., Mellet, B., Harris, L., (2013). Ecological Risk Assessment and Productivity – Susceptibility Analysis of sea turtles overlapping with fisheries in the IOTC region. Unpublished Report to IOTC and IOSEA Marine Turtle MoU.

noted, however, that this method was only developed for turtles and thus may need added calibration and edits to be fully appropriate for other reptile assessment.

When calculating the productivity attributes, the method applied by Nel *et al.* (2013[5]) used a weighted average applying the weightings detailed in Table A12. NB. 'Natural survivorship' was measured twice with a weighting of 5% for both, whereas here, this has been grouped into one attribute in the proposal below, weighted at 10%. Susceptibility calculations, however have not been adapted as the susceptibility attributes used in this method where generally covered by the existing attributes in the MSC PSA, therefore minimal changes have been proposed.

Table A12: Reptiles (Option 1b) – Example PSA attribute table detailing example potential changes to attributes and thresholds for reptiles adapted from Nel *et al.* (2013)[5] – potential revisions are indicated in green text and original attributes are illustrated using black text, with those to be removed illustrated in strikethrough black text.

Productivity Attributes (Reptiles Option 1b.)				
Productivity Attribute	**Weighting**	**High productivity Low risk (1)**	**Medium productivity Medium Risk (2)**	**Low productivity High Risk (3)**
~~Average Age at maturity~~		~~<5 years~~	~~5-15 years~~	~~>15 years~~
Recent (5-10 year) population trend	20%	Increasing	Stable	Uncertain OR Declining
Turtles: RMU (Regional Management Unit) population size (number of reproducing females) Other: Number of reproducing females	30%	>5,000 annual reproducing females Large	1,000 – 5,000 Annual reproducing females Medium	<1,000 Annual reproducing females Small
Average age at maturity	10%	<16 years	16 – 30 years	>30 years
~~Average Max age~~		~~<10 years~~	~~10 – 25 years~~	~~>25 years~~
~~Fecundity~~		~~>20,000 eggs per year~~	~~100-20,000 eggs per year~~	~~<100 eggs per year~~
Natural survivorship (nest / young success)	10%	>75%	50-75%	<50%
Average number of eggs / young per female (average clutch size)	10%	>120 eggs / young	90-120 eggs / young	<90 eggs / young
Number of clutches per individual per season	10%	< 4 clutches	4-6 clutches	>6 clutches
Remigration / breeding interval	10%	<2.6 years	2.6 – 4 years	> 4 years
~~Average max size (not scored for inverts)~~		~~<100 cm~~	~~100-300 cm~~	~~>300 cm~~

~~Average size at maturity (not scored for inverts)~~		~~<40 cm~~	~~40-200 cm~~	~~>200 cm~~
~~Reproductive strategy~~		~~Broadcast spawner~~	~~Demersal egg layer~~	~~Live bearer~~
~~Trophic level~~		~~<2.75~~	~~2.75-3.25~~	~~>3.25~~
~~Density Dependence (to be used when scoring invertebrate species only)~~		~~Compensatory dynamics at low population size demonstrated or likely.~~	~~No depensatory or compensatory dynamics demonstrated or likely.~~	~~Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.~~
Susceptibility Attributes (Reptiles Option 1b)				
Susceptibility Attribute	Weighting	**Low risk (1)**	**Medium risk (2)**	**High risk (3)**
Areal overlap (availability): ~~Overlap of the fishing effort with a species concentration of the stock~~ of RMU / relevant habitat /species distribution area and fishery region (possible fished area)	N/A	<10% overlap	10-30% overlap	>30% overlap
Encounterability: The position of the stock/species within the water column relative to the fishing gear, and the position of the stock / species within the habitat relative to the position of the gear	N/A	Low overlap with fishing gear	Medium overlap with fishing gear	High overlap with fishing gear Default score for target species and air breathing species
Selectivity (based on gear risk matrix TBC)	N/A	Individuals are rarely caught / can escape or avoid capture	Individuals are regularly caught and when caught are unlikely to escape gear	Individuals frequently caught by gear and are retained by the gear.
Post-capture mortality (PCM): The chance that, if captured, a species would be released and that it would be in a	N/A	Evidence of majority released post-capture and survival	Evidence of some released post-capture and survival	Retained species of majority dead when released.

condition permitting survival				Default score for retained species (Principle 1 or Principle 2).
~~Selectivity of gear type: Potential of the gear to retain species~~		~~a.) Individuals < size at maturity are rarely caught.~~	~~a.) Individuals < size at maturity are regularly caught.~~	~~a.) Individuals < size at maturity are frequently caught.~~
		~~b.) Individuals < size at maturity can escape or avoid gear.~~	~~b.) Individuals < half the size at maturity can escape or avoid gear.~~	~~b.) Individuals < half the size at maturity are retained by gear.~~

A risk matrix could be developed to align with Option 1b such as the example presented below in Table A13, developed for illustrative purposes only in the context of options development for default scoring of gear type. This could be developed based on outcomes from studies such as Nel *et al*. (2013)[5] based on reported incidences of bycatch per gear type.

Table A13: Example draft gear matrix (for illustrative purposes only) for assigning default risk scores per gear type for the selectivity attribute based on level of recorded bycatch of turtles for different gear types.

Gear type	Default risk score
Gillnets	3
Trammel nets	3
Beach Seines	3
Long line	2
Handline	1
Traps	1

A1.5 Comparison of options Topic 2, Issue 1

To determine the feasibility and accessibility and retention risks to the fisheries in the program or potentially entering assessment, fisheries that have already used the RBF to assess out of scope species were considered using Options 0, 1a, and 1b to generate potential risk scores and determine the potential impact to those UoAs. The results of those PSA analyses are presented below. These were conducted using the spreadsheet for RBF scoring and the proposed PSA tables for each option outlined in sections A1.1-A1.4 above. Where necessary, the RBF spreadsheet calculations were adjusted to account for the new methods applied.

Table A14 illustrates that the marine mammals had more precautionary outcomes using the existing PSA compared with Option 1b (revising both the attributes and thresholds). Option 1a yielded the most precautionary outcomes of the three options presented due to the increase in susceptibility scores.

Table A14: Accessibility and retention analysis for Topic 2, Issue 1 showing the Productivity, susceptibility and final MSC scores for options 0, 1a and 1b, using data from a certified fishery. Yellow highlight indicates a condition would apply to the fishery, whereas green highlight indicates an unconditional pass.

	PI 2.3.1								
	BuA Option 0			Option 1a			Option 1b		
	Productivity	Susceptibility	MSC Score	Productivity	Susceptibility	MSC Score	Productivity	Susceptibility	MSC Score
Short-beaked common dolph	2.57	1.58	67	2.57	1.88	60	2.25	2.14	63
Dusky dolphin	2.29	1.58	76	2.29	1.88	69	2.00	1.70	81
South american fur seal	2.29	1.13	83	2.29	1.43	78	1.50	1.51	93
South american sea lion	2.57	1.08	75	2.57	1.28	72	1.50	1.51	93

An overview of the change to productivity scores when applying the different options is presented below. This demonstrates that the risk ranking for productivity is reduced when applying Option 1b. As shown below in Table A15, no difference is observed between Option 0 (business as usual) and Option 1a (changing only the attribute description to aid more consistent scoring). Option 1b, however, results in consistently lower risk scores, consistent with the approach taken, which changes the relative perception of risk to within the marine mammal group.

Table A15: Productivity scores for a range of marine mammal species when applying the different proposed options for PSA attributes and thresholds. Orange highlight indicates less precautionary scores that Option 0.

Productivity scores			
	PI 2.3.1		
Species	Option 0	Option 1a.	Option 1b.
Maui's dolphin	2.43	2.43	2.25
Short-beaked common dolphin	2.57	2.57	2.25
Dusky dolphin	2.29	2.29	2.00
Blue Whale	2.86	2.86	2.75
Baird's beaked whale	2.86	2.86	2.75
Vaquita	2.43	2.43	1.50
Humpback whale	2.86	2.86	2.50
South american fur seal	2.29	2.29	1.50
South american sea lion	2.57	2.57	1.50
Harbour porpoise	2.43	2.43	1.75
Dugong	2.57	2.57	2.25
Manatee	2.43	2.43	1.75
Bottlenose dolphin (north sea)	2.71	2.71	2.00

An overview of seabird productivity scores (Table A16) indicates wider variability in scores dependent on the option applied. When compared with Option 0, Option 1a (editing the attribute descriptions to aid more consistent scoring) provided either the same scores or more precautionary scores. Option 1b yielded more variable results with 3 species achieving higher risk scores than Option 0, but the rest being less precautionary scores than Option 0. This again seems consistent with this change in approach, whereby risk is measured between seabirds and not across species groups. Further testing and analysis would be needed to determine whether the attributes used are appropriate and full calibration to the MSC standard would also be required.

Table A16: Productivity scores for a range of seabird species when applying the different proposed options for PSA attributes and thresholds. Green highlight indicates more precautionary scores than Option 0, and orange highlight indicates less precautionary scores than Option 0.

Productivity Scores			
	PI 2.3.1		
Species	Option 0	Option 1a	Option 1b
Atlantic puffin	2.29	2.29	2.33
Black guillemot	2.00	2.14	1.33
Brown noddy	2.29	2.29	2.00
Common loon	2.29	2.43	1.67
Greater shearwater	2.43	2.43	2.00
Lesser frigatebird	2.43	2.57	3.00
Long-tailed duck	2.14	2.14	1.33
Western Grebe	2.14	2.14	1.33
Black-browed albatross	2.43	2.71	2.67
White-chinned petrel	2.57	2.57	2.33
Kelp Gull	2.14	2.14	1.00
Marbled murrelet	2.00	2.00	1.67

Further to these initial analyses, a consultant was also commissioned to run a small initial calibration, comparing scores between fisheries certified on the default tree and scores generated by the consultant using the proposed PSA tables as described in Options 0, 1a, and 1b. The consultant was also asked to verify how appropriate the revised attributes were and what further changes might be needed.

Overall, the same pattern was found by the consultant, with Option 1b yielding less precautionary scores than the data rich fisheries scored using the default tree. Option 1a was generally more consistently precautionary aligning with the default tree outcomes. The findings highlighted that both PSA table options would need further investment in external review to ensure the outcomes are appropriate, including a wider calibration with existing certified fisheries. On balance, investing in Option 1a may be more effective given the time constraints of the FSR. There is no clear best practice for an existing PSA approach that covers all these species groups, thus Option 1b would need to comprise an MSC bespoke PSA tailored for each species group which will require significant investment in expert time to get right.

Risks and benefits of the different options are described in the following tables. Broadly speaking, the main risk of changing the PSA tables using Option 1a. are that they could produce overly precautionary results. The benefit, however, is that they would be more consistently precautionary for these species in assessments going forward, thus reducing credibility risks. If using Option 1b., the main risk is that this downgrades the risk rating, as it changes the perspective on risk from between species groups, e.g. Finfish vs seabirds, to looking within groups, e.g. Gannet vs Albatross. Whilst this reduces the overall risk score in the current system, the equation set up to convert PSA scores to MSC scores, is based on the existing PSA attributes and thresholds. Therefore, it is clear, that recalibrating would be needed to reflect the new attributes and thresholds for those species to adequately provide precaution consistent with that of the MSC assessments in the default tree.

Table A17: Risks and benefits of adopting Option 0 to resolve Topic 2, Issue 1.

Impact type	Risks	Benefits
Effectiveness	- Was made for finfish and not out of scope species - Consultant report has found it can deliver under precautionary outcomes depending on species - CABs are concerned it is overly precautionary for some species (ie. some species can never close conditions)	- It is already in use therefore no need to change process
Acceptability	- CABs may not support this option as they have asked for more guidance / revised approach - eNGOs may be concerned it is not sufficiently precautionary	- Other SHs might be ok with this approach given it does not have high stakeholder interest generally (no broad consultation has been conducted yet on this topic)
Feasibility	No risk	Feasible for all fisheries
Accessibility and retention	No risk	Feasible for all fisheries

Table A18: Risks and benefits of adopting Options 1a (revise attribute descriptions) and 1b (revise attributes and thresholds) to resolve Topic 2, Issue 1.

Impact type	Option 1a		Option 1b	
	Risks	Benefits	Risks	Benefits
Effectiveness	- Does not account for all key life history traits for all species groups	- Generally more precautionary outcomes so far – needs further testing - Similar approach to existing tables so not new process for CABs	- Less precautionary scores so far & will need significant testing and calibration - Changes perception of risk from between species groups to within species groups	- Better reflects life history traits of out of scope species so may be more appropriate once sufficient testing and calibration completed

Acceptability	- Fisheries / CABs may perceive the bar to be too high - CABs may still feel the attributes are inappropriate for out of scope species	- eNGOs would generally agree with more precautionary scores	- eNGOs would not approve if it lowers the bar and reduces precaution	- May be more widely accepted by CABs and fisheries as more appropriate approach
Feasibility	- May incur more conditions - Some species may be unable to pass without conditions	- Should be generally feasible for fisheries given not much change to current process	- Some information may not be available	- Should be achievable by most fisheries - Some information may be more easily accessible
Accessibility and retention	- May incur more conditions for existing and entering fisheries	- Promotes improvements and likely will not fail any existing fisheries	- Could be considered as lowering the bar	- May increase accessibility and retention

Table A19: Risks and benefits of adopting Option 2 (halt the use of PSA for out of scope species) to resolve Topic 2, Issue 1.

Impact type	Risks	Benefits
Effectiveness	- Does not provide a precautionary assessment for data-limited fisheries in the short term - May be seen as lowering of the bar or increasing the bar depending on how it is addressed in the default tree and how CABs approach assessments - Would require further consideration of how to address this within the default tree if taken forward	- Removes ambiguity of current triggering requirements - Removes need to apply the RBF to species for which it was not designed - Linking with the Toolbox, other methods could be used (not PSA) that are better suited for these species groups which could be implemented outside the FSR on a separate timeline
Acceptability	- eNGOs may be concerned it is not sufficiently precautionary but would depend on approach taken in the default tree	- CABs may welcome this change as they don't like using the RBF (time and effort) - Fisheries unlikely to support this if it results in a raised performance bar

Feasibility	- Fisheries may take longer than 5 years to make the necessary improvement to enable them to use the default tree.	- Only three fisheries have applied the RBF for out of scope species.
Accessibility and retention	- Three existing fisheries may not have sufficient data to use the default tree. Would require mitigation plans in the default tree - Reduces accessibility for data-limited fisheries incoming to the program- (ETP information PI is problematic for roughly 47 fisheries in pre-assessment data)	- Only three fisheries have applied the RBF for out of scope species so the impact would not be widespread across the program.

A1.6 Topic 2, Issue 2 – Precaution for Key LTL species is not built into the RBF

Background
The RBF can be used to assess target stocks under Principle 1 for data-deficient fisheries through the use of the Consequence Analysis (CA) and the PSA combined.

Specific guidance is not provided for data limited fisheries where the target species is a Key low trophic level species. This does not align with the intent of the default tree where Key LTL species are considered with specific criteria and increased precaution relative to stocks that do not meet the Key LTL criteria. Given that the RBF is intended to act as a precautionary assessment tool relative to the default assessment tree, it is important that the RBF reflects the increased precaution afforded for Key LTL stocks in Principle 1 of the default tree through the Consequence Analysis and the PSA.

In scoping out this issue, a consultant was commissioned to conduct a calibration exercise, comparing scores between existing fisheries certified on the default tree and consultant generated CA and PSA scores for a range of LTL and Key LTL species. Overall the conclusion was that the existing RBF CA and PSA were precautionary relative to the default tree. There were some suggested alterations however that the consultant proposed to improve clarity and ensure overall precaution is applied to these species. The proposal below builds on that of the consultant.

<u>Options considered to resolve this issue are:</u>

0. Business as usual

1. Include more specific guidance and requirements on how to consider Key LTL species in the RBF aligning with the intent of the default tree.

Option 1 would enhance clarity and overall consistency and precaution of results when using the default tree to assess Key LTL species.

Draft requirements and PSA tables are provided below for both options as examples of the changes that could be implemented.

A1.6.1 Option 0

Option 0 proposes no change to the existing CA and PSA used by the MSC.

Table A20: Option 0 – business as usual PSA for Key LTL species

Productivity Attributes			
Productivity Attribute	**High productivity Low risk (1)**	**Medium productivity Medium Risk (2)**	**Low productivity High Risk (3)**
Average Age at maturity	‹5 years	5-15 years	›15 years
Average Max age	‹10 years	10 – 25 years	›25 years
Fecundity	›20,000 eggs per year	100-20,000 eggs per year	‹100 eggs per year
Average max size (not scored for inverts)	‹100 cm	100-300 cm	›300 cm
Average size at maturity (not scored for inverts)	‹40 cm	40-200 cm	›200 cm
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer
Trophic level	‹2.75	2.75-3.25	›3.25
Density Dependence (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely.	No depensatory or compensatory dynamics demonstrated or likely.	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.
Susceptibility Attributes			
Susceptibility Attribute	**Low susceptibility (low risk, score = 1)**	**Medium susceptibility (medium risk, score = 2)**	**High susceptibility (High risk, score = 3)**
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	‹10% overlap	10-30% overlap	›30% overlap
Encounterability: The position of the stock/species within the water column relative to the fishing	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability).

gear, and the position of the stock/species within the habitat relative to the position of the gear			Default score for target species (Principle 1).
Selectivity of gear type: Potential of the gear to retain species	a.) Individuals < size at maturity are rarely caught.	a.) Individuals < size at maturity are regularly caught.	a.) Individuals < size at maturity are frequently caught.
	b.) Individuals < size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity are retained by gear.
Post-capture mortality (PCM): The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released. Default score for retained species (Principle 1 or Principle 2).

A1.6.2 Option 1

Suggested changes from the consultant included:

- Revision of productivity thresholds 'average age at maturity' and 'trophic level' to be more precautionary, consistent with Patrick *et al*. 2009[6].
- Adapt susceptibility attributes to include those of Patrick *et al*. 2009[6], which cover geographic concentration and schooling aggregation / behaviour components.
- Consider decreasing the cut off value for areal overlap to be consistent with PI 1.1.1.A (accounting for ecosystem needs)
- Use a more precautionary equation to calculate susceptibility applying a geometric mean rather than using a multiplicative approach.
- Consider defining terms used in the CA such as 'full exploitation rate' and 'maximum sustainable levels' to align with intent of the Key LTL requirements under Principle 1.

[6] Patrick, W.S., Spencer, P., Ormseth, O., Cope, J., Field, J., Kobayashi, D., Gedamke, T., Cortes, E., Bigelow, K., Overholtz, W., Link, J., and Lawson, P., (2009). Use of productivity and susceptibility indices to determine the vulnerability of a stock: with example applications to six U.S. fisheries.

- Consider re-adopting the Scale Intensity Consequence Analysis for species defined as Key LTL in order to provide more transparency on the scale and intensity of the fishing operation under assessment.

In Option 1, the PSA table outlined in Table A21 would be applied in combination with a Consequence Analysis for the assessment of Principle 1. This PSA table could be applied only for species that are described under the taxa identified in Box SA1 and/or that meet the requirements for Key LTL stocks as described in Figure A1 and Figure A2 below for example.

Treatment of key Low Trophic Level (LTL) stocks

SA2.2.8 The team shall consider the trophic position of target stocks to ensure precaution in relation to their ecological role, in particular for species low in the food chain.

SA2.2.9 Teams shall treat a stock under assessment against Principle 1 as a key LTL stock if:

a. It is one of the species types listed in Box SA1 and in its adult life cycle phase the stock holds a key role in the ecosystem, such that it meets at least two of the following sub-criteria i, ii and iii.

i. A large proportion of the trophic connections in the ecosystem involve this stock, leading to significant predator dependency;

ii. A large volume of energy passing between lower and higher trophic levels passes through this stock;

iii. There are few other species at this trophic level through which energy can be transmitted from lower to higher trophic levels, such that a high proportion of the total energy passing between lower and higher trophic levels passes through this stock (i.e., the ecosystem is 'wasp-waisted').

Figure A1: Criteria used in the Fisheries Standard v2.0 for defining Key LTL stocks in the Default Assessment Tree (Annex SA).

Box SA1: Species types that are defined by default as "key LTL stocks" for the purposes of an MSC assessment. See ASFIS List of Species for species included in different families and orders (http://www.fao.org/fishery/collection/asfis/en)

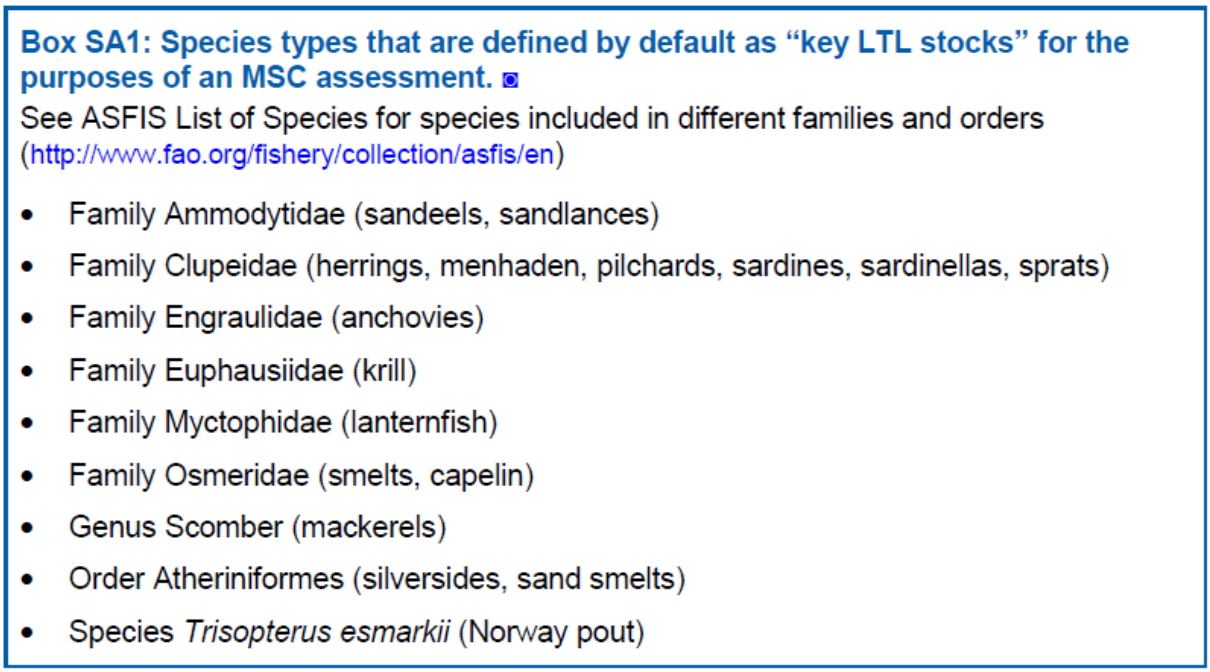

Figure A2: Box SA1 from the Fisheries Standard v2.0 which is used to identify Key LTL species for the purposes of an MSC fisheries assessment.

The following PSA table is adapted to incorporate attributes to enhance overall precaution of outputs for LTL species as used in Patrick *et al.* (2009)[6]. N.B. The threshold used by Patrick *et al.* (2009)[6] concerning trophic level was not proposed following review as it would have been less precautionary than the business as usual threshold.

Table A21: Option 1a. draft example proposed amendments to PSA table for (Key) LTL species adopting attributes from Patrick *et al.* (2009)[6] outlined in green text. N.B. The threshold for trophic level from Patrick et al. 2009[6] was not proposed as it would have been less precautionary than the existing thresholds.

Productivity Attributes			
Productivity Attribute	**High productivity Low risk (1)**	**Medium productivity Medium Risk (2)**	**Low productivity High Risk (3)**
Average Age at maturity	~~‹5 years~~ ‹2 years	~~5-15 years~~ 2-4 years	~~›15 years~~ ›4 years
Average Max age	‹10 years	10 – 25 years	›25 years
Fecundity	›20,000 eggs per year	100-20,000 eggs per year	‹100 eggs per year
Average max size (not scored for inverts)	‹100 cm	100-300 cm	›300 cm
Average size at maturity (not scored for inverts)	‹40 cm	40-200 cm	›200 cm

Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer
Trophic level	‹2.75	2.75-3.25	›3.25
Density Dependence (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely.	No depensatory or compensatory dynamics demonstrated or likely.	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.
Susceptibility Attributes			
Susceptibility Attribute	**Low susceptibility (low risk, score = 1)**	**Medium susceptibility (medium risk, score = 2)**	**High susceptibility (High risk, score = 3)**
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	‹10% overlap	10-30% overlap	›30% overlap
Encounterability: The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability). Default score for target species (Principle 1).
Selectivity of gear type: Potential of the gear to retain species	a.) Individuals ‹ size at maturity are rarely caught.	a.) Individuals ‹ size at maturity are regularly caught.	a.) Individuals ‹ size at maturity are frequently caught.
	b.) Individuals ‹ size at maturity can escape or avoid gear.	b.) Individuals ‹ half the size at maturity can escape or avoid gear.	b.) Individuals ‹ half the size at maturity are retained by gear.
Post-capture mortality (PCM): The chance that, if captured, a species	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released.

would be released and that it would be in a condition permitting subsequent survival			Default score for retained species (Principle 1 or Principle 2).
Geographic concentration	Stock is distributed in › 50% of its total range	Stock is distributed in 25% to 50% of its total range	Stock is distributed in ‹25% of its total range
Schooling / Aggregation and other behavioural responses	Behavioural responses decrease the catchability of the gear	Behavioural responses do not substantially affect the catchability of the gear	Behavioural responses increase the catchability of the gear (i.e. hyperstability of CPUE with schooling behaviour)

At present the existing MSC PSA considers the need to account for schooling behaviour and relative catchability in the adjustment of scores for areal overlap under the susceptibility attributes. PF 4.4.6.d considers this aspect with associated guidance, however, it is not always clear how areal overlap has been calculated and often rationales lack extensive justification in fisheries assessments, therefore it may be pertinent to consider this as a standalone scoring attribute within the PSA. This may however mean adjusting the areal overlap requirements such that double scoring does not take place.

Other approaches that could be used to increase precaution and align with intent of the default tree include the following:

In addition to adapting the PSA attributes, further clarity could also be provided in the CA table (Table A22), whereby the terms 'full exploitation rate' and 'maximum sustainable levels' used in Table PF3 could be defined specifically for scoring of Key LTL species aligned with the default tree. This should account for ecosystem needs. At present, under the subcomponent 'population size' in the CA, high risk is defined by default for fisheries operating at 'full exploitation rate', however, a definition is not provided except to indicate that this relates to so called 'large-scale' fisheries. For the purposes of the calibration conducted by the consultant, 'full exploitation' rate was considered equivalent to operating at Fmsy. Where this was the case and where SSB and recruitment trends indicated no concerns for the reproductive capacity of the stock, the fishery scored SG60 in the CA.

In relation to the default tree under Principle 1, when assessing Key LTL species, PI 1.1.1.A reflects that in order to score SG60: 'It is highly likely that the stock is above the point where serious ecosystem impacts could occur'. This is to be interpreted as being substantially higher than the PRI and 'shall not be less than 20% of the of the spawning stock level that would be expected in the absence of fishing'.

When scoring at SG80 SI.b states the 'stock is at or fluctuating around a level consistent with ecosystem needs'. This is further interpreted as 'the default biomass target level consistent with ecosystem needs shall be 75% of the spawning stock level that would be expected in the absence of fishing.'

These requirements could be reflected by applying a more precautionary threshold to the attribute areal overlap under the susceptibility attributes as outlined in Option 1b below (Table A23). Reducing the high risk attribute to 25% instead of 30% would increase the precaution consistent with requirements in the default tree to account for ecosystem needs.

As a purely illustrative example, requirements for scoring of the CA could also be formulated to be more explicit as follows:

PF XXXX: Where Key LTL species are under assessment, CABs shall verify that exploitation rates account for ecosystem needs through use of precautionary indicators to ensure the stock remains above levels where serious ecosystem impacts could occur.

To enhance clarity and transparency of the assessment of Key LTL stocks in the RBF, the SICA could be reintroduced, which would highlight the scale and intensity of the fishery under assessment.

Table A22: Existing consequence analysis wording for the subcomponent population size.

	Consequence category			
Subcomponent	**Fail**	**60**	**80**	**100**
Population size	Consequence is higher risk than 60 level.	Full exploitation rate but long-term recruitment dynamics not adversely damaged.	Possible detectable change in size/growth rate (r) but minimal impact on population size and none on dynamics.	Insignificant change to population size/ growth rate (r). Change is unlikely to be detectable against natural variability for this population.

Option 1b. presents an alternative approach whereby the 'age at maturity' productivity attribute threshold is reduced to provide more precaution aligned with Patrick *et al.* (2009)[6]. In addition, the susceptibility attribute areal overlap is also reduced to add precaution aligned with accounting for ecosystem needs. In this scenario, the additional attributes from Patrick *et al.* 2009[6] are accounted for in the calculation of areal overlap as is currently the case in the RBF which reduces potential for double scoring. Further testing in 2021 would consider these options and scoring of the RBF relative to data rich Key LTL fisheries.

Table A23: Option 1b. Draft example PSA tables for addressing Topic 2, Issue 2.

Productivity Attributes			
Productivity Attribute	**High productivity Low risk (1)**	**Medium productivity Medium Risk (2)**	**Low productivity High Risk (3)**
Average Age at maturity	~~‹5 years~~ ‹2 years	~~5-15 years~~ 2-4 years	~~›15 years~~ ›4 years

Average Max age	‹10 years	10 – 25 years	›25 years
Fecundity	›20,000 eggs per year	100-20,000 eggs per year	‹100 eggs per year
Average max size (not scored for inverts)	‹100 cm	100-300 cm	›300 cm
Average size at maturity (not scored for inverts)	‹40 cm	40-200 cm	›200 cm
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer
Trophic level	‹2.75	2.75-3.25	›3.25
Density Dependence (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely.	No depensatory or compensatory dynamics demonstrated or likely.	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely.
Susceptibility Attributes			
Susceptibility Attribute	**Low susceptibility (low risk, score = 1)**	**Medium susceptibility (medium risk, score = 2)**	**High susceptibility (High risk, score = 3)**
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	‹10% overlap	~~10-30% overlap~~ 10-25% overlap	~~›30% overlap~~ ›25% overlap
Encounterability: The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability). Default score for target species (Principle 1).
Selectivity of gear type: Potential of the gear to retain species	a.) Individuals ‹ size at maturity are rarely caught.	a.) Individuals ‹ size at maturity are regularly caught.	a.) Individuals ‹ size at maturity are frequently caught.

	b.) Individuals < size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity can escape or avoid gear.	b.) Individuals < half the size at maturity are retained by gear.
Post-capture mortality (PCM): The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released. Default score for retained species (Principle 1 or Principle 2).

A1.6.3 Comparison of options

To verify the potential accessibility and retention risks of these options for fisheries within the program, existing certified fisheries that had used the RBF to score Principle 1 were explored. None of the existing P1 RBF assessments were designated as Key Low Trophic Level species using the criteria in the default tree. Three assessments were undertaken on v1.3, and scored highly (low risk) in the SICA meaning they did not have to undertake a PSA analysis, therefore results could not be simulated and compared. One fishery that was a potential key low trophic level stock, used the CA and the PSA in v2.0. Using outputs of that assessment and simulating results with the revised PSA tables, an initial understanding of the potential impacts can be derived.

The certified fishery used the CA and the PSA analysis to certify the target stocks of small pelagics. The CAB justified that the stocks under assessment were not Key LTL as per the MSC criteria under Principle 1 in the default assessment tree, however the results can be used as an illustrative example for the option's impacts. The results of using a revised PSA (Option 1 a) are presented below in Table A24.

Table A24: Comparison of Options 0 and 1a under Topic 2, Issue 2. Accessibility and retention PSA impact analysis for a certified small pelagics fishery. Scores in Option 1a have been derived using a geometric mean for calculating susceptibility where P denotes the Productivity score and S denotes the Susceptibility score.

Fishery	Option 0				Option 1a			
Gear Type	P	S	PSA score	MSC score	P	S	PSA score	MSC score
Trawl	1.29	2.33	2.66	80	1.29	2.80	3.08	64
Trapnet	1.29	2.33	2.66	80	1.29	2.80	3.08	64

Table A24 highlights that scores would be decreased if applying the proposed amendments to the PSA tables described under Option 1a. This is largely due to the higher risk scores allocated for the two attributes adopted from Patrick *et al*. 2009. At present, this would not impact any existing fisheries certified on the RBF as they have not been assessed as Key LTL species. For any that do meet that criteria in the future, however, this new approach could ensure that a more precautionary assessment is conducted in line with the additional precaution mandated in the default tree Key LTL requirements under PI 1.1.1 A. Further testing and calibration of Option 1 would be needed in 2021 to ensure that any changes align with the intent of the default tree key LTL requirements.

Risks and benefits of the different options are described in Table A25.

Table A25: Risks and benefits of adopting Option 0 or Option 1 to resolve Topic 2, Issue 2.

	Option 0		Option 1	
Impact type	**Risks**	**Benefits**	**Risks**	**Benefits**
Effectiveness	- Additional precaution not applied to Key LTL in the RBF - Could result in under precautionary outcomes for Key LTL stocks (potential credibility risk)	- Already precautionary for Key LTL and LTL fisheries currently in the program based on calibration exercise completed by consultant	- Could be overly precautionary depending on the attributes and changes adopted (testing needed)	- Is explicit and clear that certain species should be treated with more precaution - Aligns with intent of the default tree
Acceptability	-CABs may continue to ask how to address key LTL in RBF - Fishery clients raised the issue that RBF is less precautionary than the default tree for LTL species	-Not a major stakeholder concern - No Key LTL stocks yet assessed using the RBF	- None	- Clarity for CABs - Clear for all SHs - May enhance credibility as more precautionary
Feasibility	- No risk	- Feasible for all fisheries if no change	- Could increase the bar	- Should be achievable for fisheries (technically and affordable)
Accessibility and retention	- No risk	- Accessibility maintained and retention of	- Increases precaution for Key LTL fisheries	- Would not affect any existing certified fisheries as no Key

		existing fisheries assured	coming into the program	LTL designated fisheries have yet applied the RBF

A1.7 Topic 3, Issue 1 – Triggering requirements are not auditable

A1.7.1 Background

Triggering criteria are not auditable. This has been highlighted by CABs and ASI during calibration workshops and MSC Technical Oversight. A number of the clauses in Table 3 of the Fisheries Certification Process could have multiple interpretations leading to inconsistent triggering of the RBF. These issues are highlighted in Table A26 below.

The RBF is intended as a precautionary assessment tool for fisheries with limited data and information. As such, the triggering requirements should be prescriptive and easily applied to ensure that those with the same level of data-deficiency must apply the appropriate risk-based method. CABs often avoid triggering the RBF where possible. This is likely predominantly a result of the stakeholder engagement requirements which can be onerous and the additional time and cost it adds to assessments. Alongside this reticence to apply the RBF for cost and time reasons, CABs are also not satisfied that the RBF is appropriate for out of scope species, so this links with outcomes of Topic 2, Issue 1.

A1.7.2 Objectives

This review aims to ensure that triggering requirements for using the RBF are clear and auditable when applied by CABs in an MSC fishery full assessment.

A1.7.3 Issues Identified

ASI have confirmed that the triggering requirements for the RBF are not auditable and the main reasoning for this is the following:

1. Triggering requirements often ask that information or an analysis is available, however it is not clear who should have completed the analysis:
    a. CABs are sometimes conducting their own analysis to arrive at conclusions in the default tree
        i. The expectation would normally be that an independent party has conducted these analyses or these outcomes are based upon peer reviewed studies which the CAB would then use to audit during a full assessment.
        ii. This issue was primarily raised in relation to P2 (primary, secondary and ETP species) triggering criteria but could also be applicable to the P1 triggering criteria as currently written, therefore this is further explored as an option below.
2. A secondary cause for lack of auditability is that these requirements are generally vague, for example:
    a. What constitutes information and is it adequate?
    b. What constitutes an analysis?

c. In the case of ETP, if the impact CAN be analytically determined, HAS it been analytically determined and if so, by whom?

A1.7.4 Options being considered in the FSR RBF project:

0.) Business as usual
1.) Update all triggering criteria to align with the 'evidence adequacy' framework (being developed through evidence requirements work package in the P3 FSR project)
2.) Update triggering requirements to reflect specifics of the default tree for each PI (e.g. the presence/absence of specific data i.e. Analytical stock assessment)

The following tables outline the draft options 0-2 as described above with draft changes demonstrated using strikethrough of the original text and green text to denote proposed revisions.

NB. Option 2 has been drafted based on a broad understanding of the shape of the evidence requirements project, however full details of what the evidence requirements will look like are not yet available. It is assumed that these requirements will have a focus on the quality of information being used to score the fishery for the different PIs, however it is likely that the framework to assess quality of information will be assessed in a qualitative manner looking at different indicators of information 'adequacy', therefore it is not clear how auditable they will be in a 'triggering requirements' capacity.

A1.7.5 Option 0

Option 0 proposes no change from the existing triggering requirements used by the MSC.

Table A26: Existing MSC RBF triggering criteria (Option 0) - Business as usual. This shows the existing Fisheries Standard RBF Triggering Requirements as detailed in Table 3 of the FCP v2.1. NB. Red text illustrates aspects which are not auditable or are vague, and which require clarification in the RBF FSR project.

Performance Indicator	Criteria	Consideration	Notes
1.1.1 Stock status	Stock status reference points are available derived either from analytical stock assessment or using empirical approaches.	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.
2.1.1 Primary species outcome and 2.2.1 Secondary species outcome	Biologically based limits are available, derived either from analytical stock assessment or using empirical approaches.	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.

2.3.1 ETP species outcome	Can the impact of the fishery on the ETP species be analytically determined?	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.
2.4.1 Habitats outcome	In line with the MSC fisheries standard habitats guidance (GSA3.13.1.1) are both of the following applicable? 1. Information on habitats encountered is available. 2. Information of impact of fishery on habitats encountered is available.	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.
2.5.1 Ecosystem outcome	Is information available to support an analysis of the impact of the fishery on the ecosystem?	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.

A1.7.6 Option 1

Option 1 proposes to change all triggering criteria to align with the P3 Evidence requirements project. This is based on a broad and hypothetical understanding of the shape of that project which is not yet finalised.

Table A27: Draft triggering criteria (Option 1) – change all triggering requirements to reflect the evidence requirements work (green text indicates proposed revisions, black text denotes original text, and black strikethrough text indicates potential deletions).

Performance Indicator	Criteria	Consideration	Notes
1.1.1 Stock status	~~Stock status reference points are available derived either from analytical stock assessment or using empirical approaches.~~ Information is 'adequate' to determine stock status as per Evidence requirements SA XXXX	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.
2.1.1 Primary species outcome and 2.2.1 Secondary species outcome	~~Biologically based limits are available, derived either from analytical stock assessment or using empirical approaches~~. Information is 'adequate' to determine biologically based limits as per Evidence requirements SA XXXX	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.
2.3.1 ETP species outcome	~~Can the impact of the fishery on the ETP species be analytically determined?~~ Information is 'adequate' to determine the impact (direct effects) of the fishery on the recovery of ETP species as per	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.

	Evidence requirements SA XXXX		
2.4.1 Habitats outcome	~~In line with the MSC fisheries standard habitats guidance (GSA3.13.1.1) are both of the following applicable?~~ ~~1. Information on habitats encountered is available.~~ ~~2. Information of impact of fishery on habitats encountered is available.~~ Information is 'adequate' to determine the impact of the fishery on the habitats as per Evidence requirements SA XXXX	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.
2.5.1 Ecosystem outcome	~~Is information available to support an analysis of the impact of the fishery on the ecosystem?~~ Information is 'adequate' to determine the impact of the fishery on the ecosystem as per Evidence requirements SA XXXX	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.

A1.7.7 Option 2

Option 2 proposes to edit the language to be more specifically aligned with the default tree requirements for outcome and information. The table below presents a number of sub-options specifically for ETP requirements. These could be considered in future as being standalone triggers or being used together either with 'and' or 'or' functions. Further suggestions were made through the

auditability review by the assessors involved and these will be integrated into further options development in 2021.

Table A28: Draft triggering criteria (Option 2) – revise all triggering criteria to be more specific to the data needed in the default tree (note multiple sub options are presented for ETP that could be considered together or in isolation going forwards).

Performance Indicator	Criteria	Consideration	Notes
1.1.1 Stock status	Stock status reference points are available derived either from analytical stock assessment or using empirical approaches from an independent source.	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.
2.1.1 Primary species outcome and 2.2.1 Secondary species outcome	Biologically based limits are available, derived either from analytical stock assessment or using empirical approaches from an independent source.	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.
2.3.1 ETP species outcome (Option 2a)	Is the species classified by the IUCN as 'data deficient'?	No	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		Yes	Use Annex PF (RBF) for this PI.
2.3.1 ETP species outcome (Option 2b)	Is population status of ETP species known?	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.

2.3.1 ETP species outcome (Option 2c)	Have the direct effects of the fishery on the ETP species been quantified.	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI
		No	Use Annex PF (RBF) for this PI.
2.3.1 ETP species outcome (Option 2d)	Have the direct effects of the fishery on the ETP species been independently quantified?	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI
		No	Use Annex PF (RBF) for this PI.
2.4.1 Habitats outcome	In line with the MSC fisheries standard habitats guidance (GSA3.13.1.1) are both of the following applicable? 1. Specific and quantitative SGB information on habitats encountered is available. 2. Gear specific, quantitative information of impact of the fishery on habitats encountered is available including knowledge of regeneration ability that is specific to the UoA and/or habitat specific research results that examine the	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.

	impact of the gear(s) on habitats in the relevant area.		
2.5.1 Ecosystem outcome	~~Is information available to support an analysis of the impact of the fishery on the ecosystem?~~ Is quantitative information available to assess the impact of the fishery on the ecosystem?	Yes	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.

A1.7.8 Comparison of options

An auditability review was conducted for this Topic and associated options. This was done by 2 separate assessors familiar with the MSC requirements and the RBF as well as ASI.

Overall conclusions from the auditability reviews were that Option 2 provided the most effective pathway to achieve the objective of consistent outcomes from auditable and clear triggering requirements. A few additional suggestions were made in the auditability reports which will be further explored in 2021. One risk highlighted by auditors in the auditability review was that, tightening up these triggering criteria could result in a large additional number of fisheries triggering the RBF, dependent on the extent of the changes. This links to issues addressed in Topic 2, ensuring that the RBF is robust and precautionary for out of scope species, if more RBF assessments are triggered. It also has potential time and cost implications for fisheries depending on how any revisions are framed. These impacts will be further considered in 2021.

The main risks and benefits of the respective options are outlined in the following Table.

Table A29: Comparison of risks and benefits of the different options for resolving Topic 3, Issue 1.

	Option 0 - BaU		**Option 1**		**Option 2**	
Impact Type	Risks	Benefits	Risks	Benefits	Risks	Benefits
Effectiveness	- Ineffective - CABs not consistent	None	- Ambiguity remains	- Consistent approach across triggers	- Could result in more assessments triggering RBF	- Clear intent - Consistent application

Acceptability	- Not acceptable for ASI	- Some CABs don't perceive this to be a problem	- Unlikely to be acceptable by ASI and or CABs (too qualitative)	- Aligns with Evidence Requirements work package in P3 (improves efficiency)	- CABs / Fisheries may worry it's too prescriptive or 'raising the bar'	- ASI likely in favour of improved clarity - Many CABs and SHs would likely approve of enhanced clarity
Feasibility	None	- No change	- Dependent on outcome of Evidence work package	- Dependent on outcome of Evidence work package	- May mean more RBF assessments with cost implications	- Should be feasible given intent is not changing
Accessibility and retention	None	- No change	- Dependent on outcome of Evidence work package	- Dependent on outcome of Evidence work package	- Some fisheries that have used the default tree may trigger the RBF	- Should be feasible given intent is not changing
Auditability	- Not auditable	None	- Unlikely to provide needed clarity given qualitative approach proposed	None	- Could be overly prescriptive	- Auditability review highlighted this as best option

A1.8 Topic 4, Issue 1 – Clarify Table PF3 language such as 'detectable change'

A1.8.1 Background

It is not clear what the difference is between 'insignificant', 'possible detectable' and 'detectable' change in the Consequence Analysis (CA) method used for assessing P1 species in the RBF. An interpretation was issued in 2015 to resolve this issue, and a public consultation was held to gauge stakeholder feedback. Consultation feedback suggested additional guidance was supported however

there was not much appetite for scoring examples and the alternative of percentage cut offs was also not supported by all.

Two options have been considered to resolve this issue:

2.) Business as usual
3.) Amend requirements and / or guidance to provide further examples for interpreting the Consequence Analysis Table. N.B. there are significant linkages with Topic 4, Issue 2, and also with Topic 2 Issue 2 regarding potential revisions to the Consequence Analysis table.

A1.8.2 Option 0

Option 0, a business as usual approach would mean that CABs continue to use the Consequence Analysis (CA) table with limited guidance of how to interpret these terms. Only 1 assessment so far has received technical oversight comments regarding their interpretation of the requirements, indicating that CABs are able to interpret the requirements effectively most of the time.

A1.8.3 Option 1

Option 1 aims to incorporate the existing interpretation into requirements which was drafted in 2015 if appropriate, aligning with the resolution of other linked issues in this FSR. In developing this option, consideration will be given to clarifying and simplifying language and providing scoring guidance for the use of proxy data. Importantly, this issue resolution depends on the resolution of a linked issue (Topic 4, Issue 2 – Impact of fishing activity), and is potentially also linked to the outcomes of Topic 2, Issue 2 regarding the treatment of Key LTL species in the RBF.

A1.8.4 Comparison of options

Option 1 provides clearer guidance to CABs on MSC's expectation for scoring and would minimize any inconsistency and reinforce alignment of the RBF with P1 intent. Updates would also align with any other changes made to the CA as part of linked issues under Topic 2 and Topic 4.

Table A30: Comparison of options to resolve Topic 4, Issue 1.

	Option 0		**Option 1**	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	- limited guidance provided at present - BaU may not align with other potential changes from this review regarding CA language	- Only one TO comments raised on this issue so far	- Could inadvertently raise the bar	- Revisions can ensure alignment with any updates made to CA language e.g. 'fishing activity issue'

Acceptability	- None	- Not of significant SH concern it seems	- None perceived but will depend on level of changes	- Linked to other issues, so overall changes currently unknown
Feasibility	- None	No change	Will depend on level of changes	- Unlikely to render CA unfeasible as clarifying existing intent
Accessibility and retention	- None	No change	If bar is raised this will affect fisheries	- Not intended to raise the bar therefore should not pose barrier
Auditability	- Broad language is less easy to audit	- This has not been raised by ASI as a persistent issue	If only guidance, this is not normative	- Clearer requirements and guidance is more auditable - Even guidance supports auditability and clarification of MSC's intent

A1.9 Topic 4, Issue 2 – remove the term 'fishing activity'

A1.9.1 Background

In the Consequence Analysis (CA), the emphasis for scoring is placed on the impact of the 'fishing activity' rather than the health of the stock as a whole. This does not fully align with the intent of Principle 1 where any change in stock status should be considered, regardless of whether it is directly due to fishing activity or other environmental factors.

PF 3.3.1 states that scoring "shall be undertaken only for the subcomponent (population size, reproductive capacity, age/size/sex structure or geographic range) on which the team decides that the **fishing activity** is having the most impact."

Public consultation on this issue in 2016 concluded that the term 'fishing activity' should be removed. Draft language was not consulted on following that. TAB confirmed that any change in stock status should be considered regardless of whether it is directly related to fishing activity of other environmental factors (e.g. climate change) to be consistent with the Default Assessment Tree. Draft language was presented to a TAB working group in June 2016, however no record could be found of the feedback. The draft language presented was: "*scoring shall be undertaken for the subcomponent (population size, reproductive capacity, age/size/sex structure or geographic range) on which the team decides is the most vulnerable to a range of factors*."

Two options are considered to resolve this issue in the FSR:

2.) Business as usual
3.) Revise requirements to remove the term 'fishing activity'

A1.9.2 Option 0

In a business as usual scenario (Option 0), 6 fisheries (8 scoring elements) have used the CA to score PI 1.1.1 in v.2.0 of the Fisheries Standard. Rationales were reviewed for teams choosing subcomponents to score and in 3 scoring elements (2 fisheries), other factors aside from fishing activity were considered when determining which subcomponent to score.

A1.9.3 Option 1

Option 1 aims to align with P1 requirements and guidance ((G)SA2.2.7), and adjust the language such that the intent of the default tree is better reflected. Human induced impacts such as pollution or habitat degradation are explicitly mentioned in P1 requirements and guidance as reasons for reducing scores in PI 1.1.1, and could therefore also be considered explicitly in the RBF.

Draft example requirements:

"Scoring shall be undertaken for the subcomponent (population size, reproductive capacity, age/size/sex structure or geographic range) on which the team decides is the most vulnerable to a range of factors"

Or

"Scoring shall be undertaken for the subcomponent (population size, reproductive capacity, age/size/sex structure or geographic range) on which the team decides is the most vulnerable to a range of factors including the fishing activity, environmental variation, or other human induced impacts"

In addition to this change in language, updates to the scoring template could be made to improve transparency of rationale for choosing a specific subcomponent.

Changes to this clause, will have implications for the rest of the CA wording and would need further impact testing and generation of options to determine impacts. A consultant would be needed to investigate this further prior to full consultation on options in 2021. Importantly, moving forward on this issue, Topic 2 – Issue 2, and Topic 4 – issue 1 would both be considered in combination with this issue to ensure consistency in proposals for consultation.

An analysis of fisheries that have scored the CA for PI 1.1.1, indicate that 5 scoring elements (4 fisheries) did not consider impacts wider than 'fishing activity' when determining which subcomponent to score. A change in the requirements could have implications for those fisheries, however, it is unclear to what extent it would impact them at this stage.

A1.9.4 Comparison of options

Option 1 would clarify the intent of the requirements to ensure that impacts to the stock as a whole are accounted for rather than purely the fishing impacts. This would ensure precaution and alignment with the intent of the default assessment tree. A change was already approved by TAB and a consultation conducted in 2016 showed most stakeholders were in favour of clarifying the wording.

This could marginally increase the evidence bar for fisheries entering the program but is a clarification of the existing intent.

Table A31: Comparison of options to resolve Topic 4, Issue 2.

	Option 0		Option 1	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	- Other impacts undermining a P1 stock may not considered if the focus is purely on the 'fishing impact' - Not aligned with intent of the default tree	Some assessments are considering impact wider than 'fishing activity' anyway	- Knock on implications for rest of the CA language - May increase the bar in terms of information needs for fisheries	- Intent is clear and aligns with that of the default tree. - Precaution is ensured
Acceptability	- Could be credibility risk	- Not of significant SH concern at present	- None perceived but will depend on level of changes	- Linked to other issues, so overall changes currently unknown
Feasibility	- None	No change	Will depend on level of changes	- Unlikely to render CA unfeasible as clarifying existing intent
Accessibility and retention	- None	No change	If bar is raised this will affect fisheries	- Not intended to raise the bar therefore should not pose barrier
Auditability	- None	No change	None anticipated	No change expected

A1.10 Topic 4, Issue 3 – remove RBF trigger for Primary species

A1.10.1 Background

Currently primary species may trigger the RBF as per Table 3 triggering requirements. The criteria of the triggering requirements suggest that Primary Species could, in some cases, not have reference points. This is paradoxical as it directly contradicts the definition of Primary species in Annex SA, which are by definition managed to reference points and would thus never trigger the RBF, making this option redundant and confusing.

From a review of TAB papers, the minutes of TAB 23 in April 2014, captured this issue agreeing that the definition of Primary species excluded the use of the RBF for this PI.

Two options are considered to resolve this issue:

2.) Business as usual
3.) Revise trigger criteria such that RBF cannot be triggered for Primary species.

A1.10.2 Option 0

Option 0, a business as usual scenario would leave the contradiction in place. This doesn't cause any particular damage; however it means that confusion / bemusement would persist amongst CABs as to why this exists and it's highly likely to remain useless unless the definition of primary species changes as part of the efficiency project. Ultimately, at present, it is a redundant clause that has never been used in any fishery assessment.

A1.10.3 Option 1

Option 1 proposes to remove the option to trigger the RBF for primary species, thus removing any contradiction in the requirements, making it clear that all primary species are, by definition, managed to reference points.

A1.10.4 Comparison of options

Depending on outcomes of the Efficiency Project, Option 1 would promote clarity of the MSC requirements and intent. No negative impact is predicted as a result of this change given that no fishery has ever triggered the RBF for primary species. Whilst retaining a trigger for primary species (Option 0) does not do any actual damage and does not pose a substantial risk, it does present a contradiction between the requirements in Annex SA on designating primary species, and the triggering criteria (leading CABs to question whether a primary species can ever be without reference points or Biologically Based Limits). SA3.1.3.3 in Annex SA shows that they cannot, therefore this clause is redundant and causes confusion.

Table A32: Comparison of options to resolve Topic 4, Issue 3.

	Option 0		**Option 1**	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	-Does not align with default tree definition of Primary species -Potential impacts of efficiency work is changing P2 species designation	- No change and covers unforeseen circumstances	- Does not cover unforeseen circumstances in which CABs may opt to use RBF for Primary species (maybe reference points exist but information is poor?) - No fishery has ever triggered	- Aligns with definition of Primary species in the default tree - Change will need to align with Efficiency project

			RBF for Primary species	
Acceptability	- None	- Not of significant SH concern	- None perceived	- Clearer more consistent requirements generally acceptable
Feasibility	- None	No change	None	- No change
Accessibility and retention	- None	No change	None – no fisheries have triggered RBF for primary species	- None – removes the option to score Primary species using the RBF
Auditability	- None	No change	None	No change expected

A1.11 Topic 4, Issue 4 – Specific RBF Information requirements are scattered in Annex SA and do not exist for all RBF related PIs.

A1.11.1 Background

Information requirement specific language is used in the default tree SGs to assist CABs when scoring information in the situation where the RBF has been used to score an outcome. These do not exist for all RBF related PIs (Stock Status and Ecosystems do not have RBF specific information scoring requirements).

Two options are considered to resolve this issue:

2.) Business as usual

3.) Revise RBF information requirements to streamline and align with evidence requirements work package in Principle 3

A1.11.2 Option 0

A business as usual scenario would leave RBF related text within Annex SA scoring guideposts for information PIs and would not provide RBF bespoke language for all PIs consistently. This does not align with the recent approach to streamline evidence requirements and also does not account for the need to account for the shift of the RBF into the Fisheries Standard Toolbox (Topic 1).

A1.11.3 Option 1

This option proposes a change to the RBF information requirements. Not only is this dependent on the evidence requirements project and how that evolves, but it is also linked to the creation of a Fisheries Standard Toolbox where other assessment methods/Tools (e.g. MERA and Habitats Tool) may be used in future to derive status scores for various PIs. This option proposes to replace the

specific RBF language for the information PIs, with requirements stating that where another method / Tool (e.g. the RBF) has been used, information to inform the outputs of that tool must be assessed against the evidence requirements framework. There are also dependencies identified with the efficiency project here in terms of the structure of the Standard regarding defining primary and secondary species etc.

A1.11.4 Comparison of options

Option 1 enables a more consistent format for RBF information scoring. It also provides project streamlining with the evidence requirements project, and futureproofing for the introduction of other assessment tools into the program via the Toolbox (Topic 1). This does not signify a change in the bar but merely an opportunity to clarify and streamline. Additionally, Option 0, would not be aligned with the wider updates being made through the evidence requirements and Toolbox projects and, as such, efficiencies would be missed.

Table A33: Comparison of options to resolve Topic 4, Issue 4.

	Option 0		**Option 1**	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	-Does not align with proposed updates to evidence requirements - Does not account for the shift to the Toolbox and use of potential new assessment methods and tools in the Toolbox eg. Mera / Habitats tool	- No change	-Could be too generic and thus not helpful	- Could streamline requirements and cover all RBF methods consistently - Would align with changes proposed in FSR under Evidence Requirements work package in P3. - Would align with Efficiency project outcomes - Would account for shifting the RBF and other methods into the Toolbox
Acceptability	- None	- Not of significant SH concern	- None perceived	- Likely to be acceptable as requirements are

				quite general at present
Feasibility	- None	No change	- Could slightly raise the bar dependent on outcome of evidence requirements work package	- Likely to be feasible – dependent on outcome of evidence requirements work package
Accessibility and retention	- None	No change	None	- None
Auditability	- None	No change	- Dependencies with evidence requirements	No change expected

A1.12 Topic 4, Issue 5 – Scoring selectivity in the CSA (adding more gears to the lookup table)

A1.12.1 Background

The Consequence Spatial Analysis (CSA) requires gear specific scores when scoring the gear-habitat interaction attributes. A number of gear types are included in the provided look-up tables (FCP v2.1 Table PF14 and Table PF15 and Table PF16). The assessment team must score the attributes using the most similar gear type when the UoA's gear type is not provided and teams must provide a rationale for the selection (FCP v2.1 PF7.4.7.1). Since the introduction of the CSA, fisheries with new gear types to the MSC program entered assessment and therefore it's important to check whether the new gears that were assessed need to be included into the attribute tables in the CSA. So far, only 7 fisheries (24 scoring elements, 6 different gear types) applied the CSA in their assessment, of which 3 fisheries (11 scoring elements, 3 different gear types) used a proxy for the assessed gear type when scoring the attributes. When a proxy was used, scoring seemed adequate.

Two options are considered to resolve this issue:

2.) Business as usual
3.) Revise the lookup tables to include new gears

A1.12.2 Option 0

In the business as usual scenario (Option 0) the existing gear lookup table will continue to be used in the CSA assessments. Where CABs are assessing a gear that is not already listed, they must assign their own risk score based upon the closest similar gear type in the lookup table.

A1.12.3 Option 1

Option 1 proposes the introduction of new gear types and associated risk scores into the matrix, increasing resolution. Whilst this could add clarity to the requirements, it would never be

comprehensive such that proxies would not be needed, therefore it is not proposed to add these gear types.

A1.12.4 Comparison of options

Option 0 is deemed to be appropriate in this case, as only three fisheries applied a proxy for the gear type based on the risk table provided and the scores remained appropriate. Thus, it is not considered necessary to update the scoring table at this time, however, an improvement to the reporting template is proposed in order to improve transparency for reporting when a proxy for gear type has been used with a supporting rationale. There is no risk perceived with this option. Option 1 would provide a wider list of options for scoring, however, would still fail to cover all possible gear types and therefore it is likely that CABs would still have to apply a proxy approach in some scenarios limiting any value of intervention here.

Table A34: Comparison of options to resolve Topic 4, Issue 5

	Option 0		**Option 1**	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	- Inconsistent scoring could occur if similar gears assessed using a proxy but assign different scores	- No change - Currently being applied infrequently - No current issue with consistency	- Will likely never be comprehensive and proxies continue to be used	- Clearer lookup table for CABs
Acceptability	- None	- Not of significant SH concern	- None perceived	- Likely to be acceptable as improved clarity
Feasibility	- None	No change	None perceived	No change
Accessibility and retention	- None	No change	None	- None
Auditability	- None	No change	- None	Improved auditability

A1.13 Topic 4, Issue 6 – Protest scores

A1.13.1 Background

There is no direct requirement that explicitly states that a CAB may disregard unreasonable scores that are not founded on reliable information i.e. Protest scores given by stakeholders that oppose the fishery out of principle.

Two options are considered to resolve this issue

0.) Business as usual

1.) Revise requirements to ensure it is explicit that CABs are responsible for the overall scoring of the RBF and ensures that scores put forward by stakeholders are evidence based.

A1.13.2 Option 0

In the business as usual scenario (Option 0), there is potential for protest scores to feature in an RBF assessment, however, there is no evidence of this ever having occurred in an assessment. In the existing requirements, it is clear that 'the team' is responsible for scoring. The RBF is intended as a precautionary tool for scoring of data-limited fisheries and therefore it is considered that is the guidance which states that 'where stakeholder consensus cannot be reached, the more precautionary score should be awarded' is appropriate. There is no evidence of this ever having been a problem in assessments so far.

A1.13.3 Option 1

Option 1 would ensure that requirements are clarified to state explicitly that the CAB is responsible for the scoring of the RBF, the risk of protest scores causing problems in RBF assessments should be removed.

A1.13.4 Comparison of Options

Option 0 is deemed to be appropriate given that no evidence has been found to suggest that this has ever been an issue in RBF assessments to date. Existing requirements ensure that stakeholder comments are accounted for and that the CAB should be precautionary in scoring where there are disagreements between stakeholders, however it is clear that the CAB is responsible for overall scoring. This is aligned with the intent of the RBF being a precautionary assessment tool.

Table A35: Comparison of options to resolve Topic 4, Issue 6.

	Option 0 (Business as usual)		**Option 1**	
Impact Types	Risks	Benefits	Risks	Benefits
Effectiveness	- Protest scores could cause difficulties for CABs in assessments	- No change - Currently being applied without incident - Requirements are precautionary in line with RBF intent	- Could be perceived as increased conflict of interest for the CAB conducting the RBF	- Would remove potential for protest scores to occur
Acceptability	- None	- Not of significant SH	- As above – SHs contributing to RBF assessments	- Likely to be acceptable as improved clarity

		concern (raised internally)	may feel contribution is diminished by CAB	
Feasibility	- None	No change	None perceived	No change
Accessibility and retention	- None	No change	None	- None
Auditability	- None	No change	- None	No change

A1.14 Topic 4, Issue 7 – Auditor Competency

A1.14.1 Background

RBF applies only to Principle 1 and Principle 2. At present, only one member of the assessment team needs to have passed the MSC training in the RBF, leading to a situation where P3 auditors can conduct RBF assessments on P1 and P2 and that the P1 and P2 assessors for that assessment may not have any background in the RBF and thus could lack understanding of how it affects scoring. It is not known exactly how many (if any) RBF assessments have been completed by P3 assessors, however, at least one P1 RBF assessment has been completed when the P1 assessor has not completed the RBF training but the P2 assessor has, indicating that assessment teams are sharing responsibilities for RBF scoring in certain situations.

Three options are considered to resolve this issue:

0.) Business as usual
1.) Allow only P1 and P2 assessors to conduct RBF assessments for their respective principles
2.) Require either all assessors, or at a minimum all team leaders do RBF training and are responsible for oversight of the whole process and scoring.

A1.14.2 Option 0

The business as usual scenario (Option 0) entails a persisting credibility risk to the MSC, whereby the Principle leads for P1 and P2 are not required to have an understanding of the RBF and how it affects the scoring of their respective principles. This could lead to inappropriate outcomes and reduced credibility of MSC assessments.

A1.14.3 Option 1

Option 1 proposes that only P1 and P2 assessors may carry out the RBF in a full assessment and thus must have passed the training prior to using the RBF in an assessment. This reduces credibility risks, ensuring the relative Principle lead is responsible for the related RBF assessment with implication for scoring on that Principle. This increases the burden on the assessment teams, and reduced flexibility does not align with the existing process whereby scoring is conducted by the team as a whole.

A1.14.4 Option 2

Option 2 proposes that all assessors, or at least all team leaders must complete the RBF training, but the actual load of conducting the RBF scoring in an assessment could be shared by the auditors

depending on the assessment. This would mean that all auditors are aware of how it works and how it affects scoring overall for their principle, or conversely at least the team leaders with oversight of scoring would have completed the training and understand how it works. In both scenarios here, credibility risks persist, as there would still be potential for a P3 auditor to undertake an RBF assessment on stock status.

A1.14.5 Comparison of options

Option 2 would ensure that, at a minimum, Team leaders that have oversight of scoring are trained in the RBF and how it affects scoring. This ensures that the burden on the CAB/assessors, and the P2 leads in particular who often get the most work to do in an assessment, can be shared between the team but understanding of the process will be assured amongst team members. This option does not undermine any existing RBF assessments that have been conducted.

Table A36: Comparison of options to resolve Topic 4, Issue 7.

	Option 0 (Business as usual)		**Option 1**		**Option 2**	
Impact Types	Risks	Benefits	Risks	Benefits	Risks	Benefits
Effectiveness	- P3 auditors or the non-relevant Principle auditor can conduct the RBF which is a credibility risk	No change (not clear how many, if any RBF assessments have been done by a P3 team member) - One member of the team is trained at a minimum and scoring is done as a team	- None	- Would ensure competency of team is aligned with Principle for RBF - Improved credibility	-Team leader may not be relevant Principle expert for the RBF - Potential credibility risk remains	- Means less strain on the CAB and Team leader has oversight on the scoring process -Scoring is done as a team
Acceptability	- None – has not been raised as big SH concern	- Enabling P3 auditors to do the RBF may be good for accessibility in certain areas for CABs (experts that speak the	- Puts CABs under more pressure to find relevant experts to run the RBF - P2 auditors have biggest job overall so this	- Likely to be acceptable for most SHs	- Similar issues to BaU option unresolved - more training requirements for CABs is a burden	- Team leader is required at a minimum to have RBF training to

		local language may be the P3 team members)	would add to the burden			oversee scoring
Feasibility	- None	No change	None perceived	No change	No change	No change
Accessibility and retention	- None	No change	- Could increase cost of CABs to fishery clients depending on strain on resources	- None	- Could increase cost of CABs to fishery clients depending on strain on resources	- Does not put excess pressure on P2 auditors or specific Principle auditors
Auditability	- None	No change	- None	No change	None	No change