Marine Stewardship Council

MSC Fisheries Standard

This version of the Standard is designed to highlight material changes between v2.01 and v3.0. It does not show every change, and some changes may not be accurately represented due to the way Word tracks changes. This version is **not** to be used as the final version. The final version is MSC Fisheries Standard v3.0.

Version ~~2.01, 31 August 2018~~ 3.0, 26 October, 2022

Copyright notice

The official language of this standard is English. The definitive version is maintained on the MSC website (msc.org). Any discrepancy between copies, versions, or translations shall be resolved by reference to the definitive English version.

The MSC prohibits any modification of part or all of the contents in any form.

Marine Stewardship Council

Marine House

1 Snow Hill

London EC1A 2DH

United Kingdom

Phone: + 44 (0) 20 7246 8900

Fax: + 44 (0) 20 7246 8901

Email: standards@msc.org

Responsibility for these requirements

The Marine Stewardship Council (MSC) is responsible for these requirements.

Readers should verify that they are using the latest copy of this and other documents. Updated documents, together with a master list of all available MSC documents, can be found on the MSC website ~~.~~ (msc.org).

Versions published

Version no.	Date	Description of amendment
~~Consultation Draft~~	~~17 January 2011~~	~~First publication of consolidated MSC scheme requirements, released for consultation.~~
~~0.0~~	~~7 March 2011~~	~~First draft of revisions following MSC and CAB consultations.~~
~~0.8~~	~~19 May 2011~~	~~Draft issued to the MSC Technical Advisory Board for final review and sign-off.~~
1.0	15 August 2011	First version issued for application by Conformity Assessment Bodies~~.~~ (CABs).
1.1	24 October 2011	Version issued incorporating revised Group ~~CoC~~Chain of Custody requirements and correcting typos, page numbering, wrong and missing referencing, and unreadable flowcharts.
1.2	10 January 2012	Version issued incorporating ~~TAB~~Technical Advisory Board 20 agreed changes regarding reassessment, objections procedure, modifications to the default assessment tree to assess bivalves, implementation timeframes, and ~~ASC~~Aquaculture Stewardship Council requirements. Minor edits, wrong and missing referencing, typos, and unreadable figures were corrected.
1.3	14 January 2013	Version issued incorporating ~~TAB~~Technical Advisory Board 21 and ~~BoT~~Board of Trustees agreed changes. Minor edits and clarifications were also incorporated.
2.0	1 October 2014	Version issued incorporating changes to the standard as a result of the Fisheries Standard review and changes to ~~CABs~~CAB procedures as a result of the speed and cost review.
2.01	31 August 2018	Version issued incorporating updated cross-references in alignment with revision to the 'MSC Fisheries Certification ~~Process~~Process'.
3.0	26 October 2022	Version issued incorporating changes to the Standard as a result of the Fisheries Standard review.

The Marine Stewardship Council

Vision

Our vision is of the world's oceans teeming with life, and seafood supplies safeguarded for this and future generations.

Mission

Our mission is to use our ecolabel and fishery certification program to contribute to the health of the world's oceans by recognising and rewarding sustainable fishing practices, influencing the choices people make when buying seafood, and working with our partners to transform the seafood market to a sustainable basis.

General introduction

Fisheries certification

With international consultation with stakeholders, the MSC has developed standards for sustainable fishing and seafood traceability. These standards ensure that MSC labelled seafood comes from, and can be traced back to, a sustainable fishery.

The MSC standards and requirements meet global best practice guidelines for certification and ecolabelling programs.

The MSC Fisheries Standard sets out requirements that a fishery must meet to enable it to claim that its fish come from a well-managed and sustainable source.

Throughout the world, fisheries are using good management practices to safeguard jobs, secure fish stocks for the future, and help protect the marine environment. The science-based MSC environmental standard for sustainable fishing offers fisheries a way to confirm sustainability, using a credible, independent, third-party assessment process. It means sustainable fisheries can be recognised and rewarded in the marketplace, and gives an assurance to consumers that their seafood comes from a well-managed and sustainable source.

The MSC Fisheries Standard applies to wild-capture fisheries that meet the scope requirements provided in Section 1.

The MSC Fisheries Standard is comprised of the following core Principles:

Principle 1: Sustainable target fish stocks

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

Principle 2: Environmental impact of fishing

Fishing operations should allow for the maintenance of the structure, productivity, function, and diversity of the ecosystem on which the fishery depends. The ecosystem includes habitat and associated dependent and ecologically related species.

Principle 3: Effective management

The fishery is subject to an effective management system that respects local, national, and international laws and standards, and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Implementation timeframes

Effective dates of the MSC Fisheries Standard v3.0

This section outlines the circumstances under which the MSC Fisheries Standard v3.0 shall be used. It is the intent of the MSC to ensure that all:

- Initial assessments are against the MSC Fisheries Standard v3.0 as soon as possible.
- Existing Units of Certification are given a period of at least 3 years to come into compliance with the revised Standard, as per Essential Component A.3.22 of the 'GSSI Global Benchmark Tool'.
- Units of Certification are assessed against the MSC Fisheries Standard v3.0 within 6 years of the publication of MSC Fisheries Standard v3.0.

Publication date: 26 October 2022.

CABs shall conduct any initial assessment that is announced on or after 1 May 2023 in conformity with the MSC Fisheries Standard v3.0.

CABs shall conduct any reassessment that is announced on or after 1 November 2025 in conformity with the MSC Fisheries Standard v3.0.

CABs may elect to use the MSC Fisheries Standard v3.0 as of the publication date (26 October 2022).

For fisheries that are certified against a version of the MSC Fisheries Standard published before the MSC Fisheries Standard v3.0, CABs shall apply the MSC Fisheries Standard v3.0 by 1 November 2028 as per the MSC Fisheries Certification Process v3.0 7.32.

Review

The MSC welcomes comments on the MSC Fisheries Standard. Comments will be considered as part of the next review process. The next review will start within 5 years of the publication of this document. Please submit comments for this review to standards@msc.org.

More information about the MSC policy-development process and the MSC Standard Setting Procedure can be found on the MSC website (msc.org).

Introduction to this document

The MSC Fisheries Standard is composed of 3 core Principles and has ~~three~~4 associated modifications for use in different types of fishery: SB, SC, SD, and SE.

Guidance

Guidance is provided in the MSC Guidance to the Fisheries Standard to help CABs interpret the MSC Fisheries Standard. The MSC Guidance to the Fisheries Standard is maintained as a separate document.

The headings and numbering in the MSC Guidance to the Fisheries Standard, when included, match those in the MSC Fisheries Standard exactly, with numbers prefaced with the letter "G" to indicate guidance.

The MSC recommends that CABs read the MSC Fisheries Standard in conjunction with the MSC Guidance to the Fisheries Standard. Text in the MSC Fisheries Standard is not repeated in the MSC Guidance to the Fisheries Standard.

Where general guidance is provided that relates to the subject of a major heading, or relates to the content of a specific clause, this icon ◙ appears at the end of the title or clause in the MSC Fisheries Standard. These icons provide hyperlinks to the related guidance section in the MSC Guidance to the Fisheries Standard.

In the MSC Guidance to the Fisheries Standard, this icon ▲ provides a hyperlink to the corresponding section or clause in the MSC Fisheries Standard.

Auditability of guidance

The guidance in the MSC Guidance to the Fisheries Standard is not directly auditable.

Derogations

Derogations are temporary normative measures that allow for an MSC requirement to be applied differently or disregarded. Derogations are provided:

- In response to editorial errors.
- In response to force majeure, where intent is no longer fit for purpose and threatens MSC credibility.
- As a provision to test a policy change or modify the implementation timeframe when publishing a revised version of the normative document.

Derogations are posted on a public log. The MSC requires CABs to follow relevant derogations.

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1 Scope

1.1 Scope requirements of the MSC Fisheries Standard ◙

1.1.1 The Unit of Assessment (UoA) shall not target species of the following taxa under Principle 1:

a. Amphibians.

b. Reptiles.

c. Birds.

d. Mammals.

1.1.2 The UoA shall not use poisons or explosives.

Enhanced fisheries

1.1.3 If a fishery is enhanced, the UoA shall conform to all the criteria in Table 1. ◙

Table 1: Scope criteria for eligible enhanced fisheries

A	**Linkages to and maintenance of a wild stock**
i	At some point in the production process, the system relies upon the capture of fish and shellfish from the **wild environment**. Such fish and shellfish may be taken at any stage of the life cycle, including eggs, larvae, juveniles, or adults. The "wild environment" in this context includes marine, freshwater, and any other aquatic ecosystems.
ii	The **species are native** to the geographic region of the fishery and the natural production areas from which the fishery's catch originates.
iii	There are **natural reproductive components** of the stock from which the fishery's catch originates that maintain themselves without having to be restocked every year.
iv	Where fish stocking is used in hatch-and-catch (HAC) systems, such stocking does not form a major part of a current rebuilding plan for depleted stocks.
v	The UoA shall incorporate some element of harvest of a wild population.
vi	The UoA shall be managed so that the natural productivity and genetic biodiversity of the wild population is not undermined with respect to any impacts on long-term sustainability.
B	**Feeding and husbandry**
i	The production system operates without **substantial augmentation of food supply**. In HAC systems, any feeding is used only to grow the animals to a small size prior to release (not more than 10% of the average adult maximum weight), such that most of the total growth (not less than 90%) is achieved during the wild phase. In catch-and-grow (CAG) systems, feeding during the captive phase is only by natural means (e.g. filter feeding in mussels), or at a level and duration that provide only for the maintenance of condition (e.g. crustaceans in holding tanks) rather than to achieve growth.
ii	In CAG systems, production during the captive phase does not routinely require disease prevention involving chemicals or compounds with medicinal prophylactic properties.

C	Habitat and ecosystem impacts
i	Any modifications to the habitat of the stock are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure and function. Modified habitats include fish aggregating devices (FADs). Note: Habitat modifications that are not reversible, are already in place, and are not created specifically for the fishery shall be in scope. This includes: • Large-scale artificial reefs. • Structures associated with enhancement activities that do not cause irreversible harm to the natural ecosystem inhabited by the stock, such as salmon fry farms next to river systems.

Introduced Species Based Fisheries

1.1.4 If the target species under Principle 1 is an introduced species, the UoA shall conform to all the criteria in Table 2.

a. If the fishery targets an introduced species, the Conformity Assessment Body (CAB) shall apply Section SD.

Table 2: Scope criteria for Introduced Species Based Fisheries

A	Irreversibility of the introduction in the new location
i	The introduced species has a large population size that is comparable to or larger than the population sizes of other native species occupying similar ecological niches in the new location.
ii	The species has spread to a range beyond that of its initial introduction in the new location.
iii	There is evidence to demonstrate that the species cannot be eradicated from the location by known mechanisms without serious ecological, economic, and/or social consequences.
B	**History of the introduction**
i	The species was introduced to the new location prior to 1993; this being the year that the Convention on Biological Diversity (CBD), which includes provisions on introduced species, was ratified.
ii	If the introduction occurred after the CBD was ratified, such fisheries shall only potentially be in scope if the introduction was non-deliberate and occurred at least 20 years prior to the date the application is made for assessment against the MSC Fisheries Standard.
C	**No further introductions**
i	There is no continuing introduction of the introduced species being considered for certification to the location.

Conviction for a serious crime

1.1.5 The client or client group shall not include any vessel that has been implicated in the conviction of a "serious crime" for an offence listed in Table 3Table whilst undertaking fishing operations in the last 2 years. ◙

a. The term "serious crime" means conduct constituting an offence punishable by a deprivation of liberty for at least 4 years.

1.1.5.1 If a vessel has been implicated in the conviction of a "serious crime" listed in Table 3 whilst undertaking fishing operations, the client or client group shall exclude the vessel from the UoA, UoC, and fishery certificate for 2 years. ◙

a. The client or client group shall inform their CAB immediately if a vessel has been excluded.

b. The client or client group shall provide all relevant information to their CAB to demonstrate that the vessel has been excluded. ◙

Table 3: List of offences

Category	Offence	Recognition
Illegal fishing	• Non-compliance with regulations specific to governing sustainable fishing practices	Relevant legal and/or customary framework frameworks
Transnational organised crime	• Participation in an organised criminal group • Laundering of proceeds of crime • Corruption • Obstruction of justice • Smuggling of migrants	United Nations (UN) Convention against Transnational Organized Crime Protocol against the Smuggling of Migrants by Land, Sea and Air
Trafficking of people	• Human trafficking • Prostitution and sex trafficking	Forced Labour Convention Maritime Labour Convention UN Convention against Transnational Organized Crime
Trafficking of unauthorised goods	• Drug trafficking • Trafficking of protected species or their parts	UN Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988 Convention on International Trade in Endangered Species of Wild Fauna and Flora
Piracy	• Engagement in piracy • Supporting piracy to occur	UN Convention on the Law of the Sea Customary international law

Conviction for shark finning

1.1.6 The client or client group shall not include any vessel that has been implicated in a conviction for a shark-finning violation in the last 2 years. ◙

1.1.6.1 If a vessel is implicated in a conviction for a shark-finning violation, the client or client group shall exclude the vessel from the UoA, Unit of Certification (UoC), and the certificate for 2 years. ◙

a. If a vessel has been excluded, the client or client group shall inform their CAB immediately.

a. The client or client group shall provide all relevant information to their CAB to demonstrate that the vessel has been excluded. ◙~~, to certain~~

Conviction for forced or child labour

1.1.7 The CAB shall determine the eligibility of fishery applicants ~~or~~and certificate holders with respect to the MSC's labour policy using the relevant sections within the MSC Labour Eligibility Requirements~~.~~.

Normative documents

The documents listed below contain provisions that, through reference in this text, become part of the MSC Fisheries Standard.

For documents listed, the latest published edition of the document applies.

The documents are:

a. MSC Guidance to the Fisheries Standard.

b. MSC Fisheries Certification Process.

c. MSC Guidance to the Fisheries Certification Process.

d. 'MSC-MSCI Vocabulary'.

e. MSC Fisheries Standard Toolbox.

Terms and definitions

All definitions are in the 'MSC-MSCI Vocabulary'.

Concepts, terms, or phrases used in the MSC Fisheries Standard that have more than 1 definition are defined within the text where such terms or phrases appear.

SA: The default assessment tree – normative

Scope

To be eligible for certification against the MSC Fisheries Standard, a fishery shall meet the scope criteria in Section 1.

SA1 General

SA1.1 General requirements ◙

SA1.1.1 CABs shall focus all assessments of fisheries against the MSC Fisheries Standard on:

a. The outcomes of the fisheries management process.

b. The management strategies implemented that aim to achieve those outcomes.

SA1.1.2 When using the Risk-Based Framework (RBF), CABs shall apply requirements set out in Tool A of the 'MSC Fisheries Standard Toolbox'.

SA1.1.3 CABs shall follow subsequent standard sections for species that require the use of a modified default assessment tree.

SA2 Principle 1

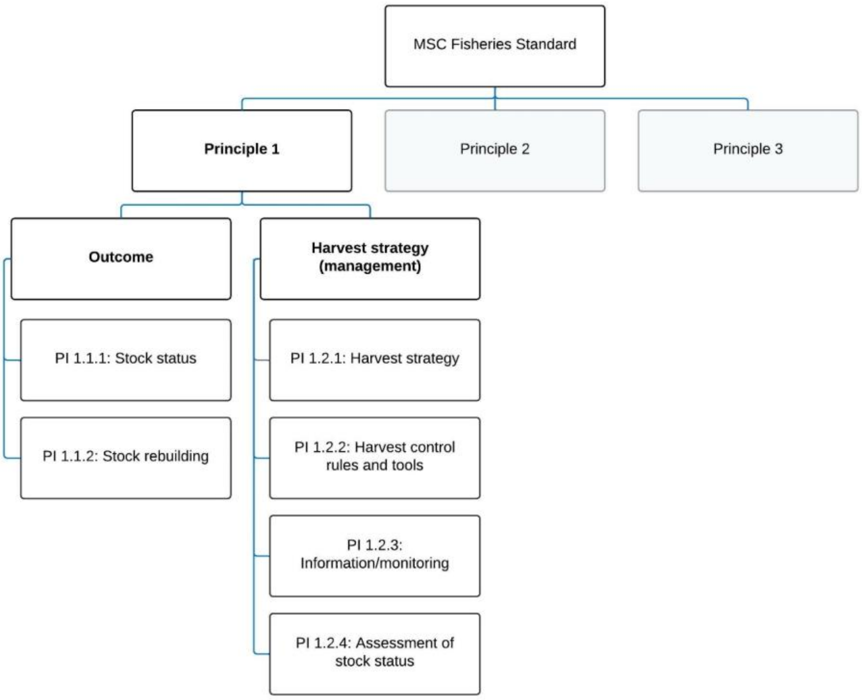

Figure SA1: Principle 1 default assessment tree

SA2.1 General requirements for Principle 1 ◙

SA2.1.1 In Principle 1 (P1), the team shall score the whole of the target stock(s) selected for inclusion in the UoA.

SA2.1.1.1 The team shall apply the decision tree in Figure SA3 and the supporting requirements (SA3.1.4) to determine the Principle 1 stock. ◙

SA2.1.2 In P1, the terms "likely", "highly likely", and "high degree of certainty" are used to allow for either qualitative or quantitative evaluation.

SA2.1.2.1 In a probabilistic context and in relation to scoring issue (a):

a. "Likely" means greater than or equal to the 70th percentile of a distribution (i.e. there shall be at least a 70% probability that the true status of the stock is higher than the point at which there is an appreciable risk of recruitment being impaired).

b. "Highly likely" means greater than or equal to the 80th percentile.

c. "High degree of certainty" means greater than or equal to the 95th percentile.

SA2.1.3 When considering the effectiveness of a management strategy and its ability to meet P1 outcomes, the CAB shall take into account any impacts of fishing overcapacity and other issues resulting from subsidies. ◙

SA2.1.3.1 If overcapacity exists as a result of subsidies, the management system should be robust enough to deal with this issue and still deliver a sustainable fishery as per Principle 1.

SA2.2 Stock status Performance Indicator (PI 1.1.1) ◙

Table SA1: PI 1.1.1 stock status Performance Indicator Scoring Guideposts

Component	PI	Scoring issues	SG60	SG80	SG100
Outcome	Stock status **1.1.1** The stock is at a level ~~which~~that maintains high productivity and has a low probability of recruitment overfishing.	(a) Stock status relative to recruitment impairment.	It is **likely** that the stock is above the point ~~where~~of recruitment ~~would be impaired~~impairment (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.
		(b) Stock status in relation to achievement of maximum sustainable yield (MSY).		The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

Scoring stock status

SA2.2.1 All management systems shall have reference points, as confirmed in Performance Indicator (PI) 1.2.4 scoring issue (b).

SA2.2.1.1 Where these are not stated explicitly, they should be implicit within the decision rules or management procedures (MPs). ◙

SA2.2.2 When scoring PI 1.1.1 scoring issue (b), the team shall consider: ◙

a. The biology of the species and stock status in recent years.

b. The scale and intensity of both the UoA and management system.

c. Other relevant issues in determining time periods over which to judge fluctuations.

SA2.2.2.1 The team shall provide a clear rationale as to why the Scoring Guidepost (SG) 80 or 100 levels are met.

SA2.2.2.2 The rationale shall include details of the time period over which this is assessed.

SA2.2.3 If information is not available on the stock status relative to the PRI or MSY levels, the team shall use proxy indicators and reference points to score Performance Indicator (PI) 1.1.1. ◙

SA2.2.3.1 If the team uses proxy indicators and reference points to score PI 1.1.1, the team shall justify their use as proxies of stock biomass for the PRI and/or MSY.

SA2.2.3.2 If the team uses proxy reference points to score the stock biomass status, the team shall assign higher scores where greater confidence is provided by the proxy information. ◙

SA2.2.4 If the team uses recent trends in fishing mortality to score stock status, the team shall demonstrate that the fishing mortality rate (F) has been low enough for long enough to ensure that the required biomass levels are now "likely" to be met. ◙

Stock complexes ◙

SA2.2.5 If several species or stocks are fished as stock complexes, the team shall treat them as either:

a. Separate UoAs, or

b. Separate scoring elements within a single UoA, as in the case of multiple in-scope species considered under PI 2.1.1.

SA2.2.5.1 In either case, the team shall seek evidence for each SG that, as an outcome, the levels of "likelihood" meet the levels of "likelihood" specified in SA2.1.2 for each separate stock.

SA2.2.6 For species or stocks fished as stock complexes, the overall target reference points (TRPs) shall:

a. Be consistent with the intent of the PI and

b. Maintain the high productivity of the stock complex.

Consideration of environmental variability ◙

SA2.2.7 ~~As ecosystem productivity may change from time to time as marine environments change naturally, for instance under conditions of regime shift,~~ The team shall verify that reference points are consistent with ecosystem productivity.

SA2.2.7.1 If changes in fishery productivity are due to natural environmental fluctuations, the team shall accept adjustments to the reference points in scoring PI 1.1.1.

~~SA2.2.7.2 If fishery productivity is being affected through human-induced impacts (either directly from the UoA or from other sources such as pollution or habitat degradation), no changes to reference points are justified.~~

~~a. The impacts should be resolved.~~

~~b. The UoA should receive a reduced score in PI 1.1.1 until the stock is above the unadjusted reference points.~~

Treatment of key low trophic level 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 The team shall treat a stock under assessment against Principle 1 as a key low trophic level (LTL) stock if either a or b below are met: ◙

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 2 of the following sub-criteria:

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. it is a “wasp-waisted” ecosystem. ◙

b. It is not one of the species types listed in Box SA1, but in its adult life-cycle phase it meets at least 2 of the sub criteria in SA2.2.9a.i–iii, and the species:

i. Feeds predominantly on plankton,

ii. Is characterised by small body size, early maturity, high fecundity, and short life span: default values: < 30cm long as adults, mean age at maturity <= 2, > 10,000 eggs/spawning, maximum age < 10 years, respectively, and

iii. Forms dense schools.

SA2.2.10 The team shall provide evidence specifically addressing each of the sub-criteria in SA2.2.9 to justify any decision not to define the stock as a key LTL species in the ecosystem under assessment.

SA2.2.10.1 If information is unavailable on a sub-criterion in SA2.2.9, the team shall assume that the stock meets that sub-criterion.

SA2.2.10.2 When formulating rationales against the key LTL sub-criteria (SA2.2.9a.i–iii), the team shall:

a. Document the choice of spatial scale.

b. Provide reasonable justification for the choice.

SA2.2.11 The team shall determine whether a species is to be considered a key LTL species based on its status at the time of assessment. ~~The determination shall be reviewed at each surveillance audit.~~

Box SA1: Species types defined by default as key LTL stocks for the purposes of an MSC assessment

See ‘ASFIS List of Species for Fishery Statistics Purposes’ for species included in different families and orders (FAO, 2022)[1].

- Family Ammodytidae (sandeels, sandlances)
- Family Clupeidae (herrings, menhaden, pilchards, sardines, sardinellas, sprats)
- Family Engraulidae (anchovies)
- Family Euphausiidae (krill)
- Genus Calanus (copepods)
- Family Myctophidae (lanternfish)
- Family Osmeridae (smelts, capelin)
- Genus Scomber (mackerels)
- Order Atheriniformes (silversides, sand smelts)
- Species *Trisopterus esmarkii* (Norway pout)

[1] FAO 2022. ASFIS List of Species for Fishery Statistics Purposes. Fisheries and Aquaculture Division. Rome. https://www.fao.org/fishery/en/collection/asfis/en [accessed on 12 August 2022].

Scoring of key LTL stocks

Table SA2: PI 1.1.1A stock status PISGs applicable to key LTL stocks

Component	PI	Scoring issues	SG60	SG80	SG100
Outcome	Stock status **1.1.1A** The stock is at a level that has a low probability of serious ecosystem impacts.	(a) Stock status relative to ecosystem impairment.	It is **likely** that the stock is above the point where serious ecosystem impacts could occur.	It is **highly likely** that the stock is above the point where serious ecosystem impacts could occur.	There is a **high degree of certainty** that the stock is above the point where serious ecosystem impacts could occur.
		(b) Stock status in relation to ecosystem needs.		The stock is at or fluctuating around a level consistent with ecosystem needs.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with ecosystem needs or has been above this level over recent years.

SA2.2.12 The team shall score stocks identified as key LTL stocks against PI 1.1.1A instead of PI 1.1.1. ◙

a. The team shall use Table SA2 and associated requirements SA2.2.13 to SA2.2.17 below.

SA2.2.13 When scoring PI 1.1.1A scoring issue (a), the team shall interpret 'the point where serious ecosystem impacts could occur' as being substantially higher than the PRI. ◙

a. Such a reference point shall not be less than 20% of the total biomass (B_0) or the spawning stock level (SSB_0) that would be expected in the absence of fishing.

SA2.2.14 The team shall expect the following of key LTL species when scoring PI 1.1.1A scoring issue (b): ◙

a. The default biomass target level consistent with ecosystem needs shall be 75% of the B_0 or SSB_0 that would be expected in the absence of fishing.

b. However, a higher or lower target level, down to a minimum 40% of the B_0 or SSB_0 that would be expected in the absence of fishing, may still achieve an 80-level score if it can be demonstrated, using a credible ecosystem model or robust empirical data for the UoA/ecosystem being assessed, that the level adopted:

i. Does not impact the abundance levels of more than 15% of the other species and trophic groups by more than 40% compared to their state in the absence of fishing on the target LTL species.

ii. Does not reduce the abundance level of any single ecosystem group (species or trophic group) by more than 70% (compared to its biomass level in the absence of fishing on the target LTL species).

SA2.2.15 At SG100 in scoring issue (b), the team shall require a higher degree of certainty when considering the ecological impact of the UoA on the stock.

SA2.2.15.1 For key LTL species to score 100, the team shall demonstrate that biomass levels are fluctuating "above" the 'level consistent with ecosystem needs' at SG80.

SA2.2.16 If the team uses proxy indicators and reference points to score key LTL species at PI 1.1.1A, the team shall justify their use as reasonable proxies of stock biomass for the points where serious ecosystem impacts could occur and the level consistent with ecosystem needs. ◙

SA2.2.16.1 Where the team uses fishing mortality rate to score stock status, the default fishing mortality required to maintain a stock fluctuating around the level consistent with ecosystem needs shall take the value of:

a. 0.5M, where M is the natural mortality of the species, or

b. $0.5F_{MSY}$, where the maximum rate of fishing mortality (F_{MSY}) has been determined in a single-species context.

SA2.2.16.2 Proxy fishing mortalities required to maintain the stock above the point where serious ecosystem impacts could occur shall be lower than assumed to be able to keep the population above the point where recruitment would be impaired.

SA2.2.16.3 Departures from these default levels may be justified if the team can demonstrate that SA2.2.14.b is met.

SA2.2.17 The team shall judge performance against these reference points in the context of recruitment variability typical for the given species in its ecosystem. ◙

~~Consideration of uncertain information~~

~~SA2.2.17 The consideration of the status of the stock in P1 shall include mortality that is observed and mortality that is unobserved.~~

SA2.3 Stock rebuilding PI (PI 1.1.2) ◙

Table SA3: PI 1.1.2 stock rebuilding PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Outcome	Stock rebuilding 1.1.2 Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe.	(a) Rebuilding timeframes	A rebuilding timeframe is specified for the stock that is the **shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years. ◙		The shortest practicable rebuilding timeframe is specified that does not exceed **one generation time** for the stock.

Component	PI	Scoring issues	SG60	SG80	SG100
		(b) Rebuilding evaluation	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is **evidence** that the rebuilding strategies are rebuilding stocks, or it is **likely** based on simulation modelling, exploitation rates, or previous performance that they will be able to rebuild the stock within the **specified timeframe**.	There is **strong evidence** that the rebuilding strategies are rebuilding stocks, or it is **highly likely** based on simulation modelling, exploitation rates, or previous performance that they will be able to rebuild the stock within the **specified timeframe**.

SA2.3.1 If PI 1.1.1/PI 1.1.1.A score less than SG80, the team shall score PI 1.1.2.

SA2.3.2 If the score for PI 1.1.1/PI 1.1.1A changes during a certification cycle, the team shall update PI 1.1.2 as follows:

a. If the score is increased from below SG80 to SG80 or above, the team shall remove PI 1.1.2 from the scoring of P1 and consider the condition to be closed.

b. If the score is reduced to less than SG80, the team shall score PI 1.1.2 within 12 months of becoming aware of the reduced status.

SA2.3.3 The team shall require that where a score of between SG60 and SG80 is awarded, the subsequent conditions are fulfilled within 1 certification period. ◙

SA2.3.4 In scoring issue (b), unless there is clear evidence that the stocks are rebuilding, where fishing mortality rate is available for the UoA: ◙

a. Current F shall be “likely” to be less than FMSY to justify an SG80 score.

b. Current F shall be “highly likely” to be less than F_{MSY} to justify an SG100 score.

SA2.3.5 In UoAs that use assessments and reference points that are regarded as proxies of F_{MSY} and/or biomass at MSY (B_{MSY}), the team shall, in their scoring, take account of any differences between the proxy reference levels and MSY levels.

SA2.4 Harvest strategy PI (PI 1.2.1) ◙

Table SA4: PI 1.2.1 harvest strategy PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Harvest strategy (management)	Harvest strategy **1.2.1**	(a) Harvest strategy design ◙	The harvest strategy is **expected** to achieve stock	The harvest strategy is **responsive** to the state of	The harvest strategy is **responsive** to the state of

Component	PI	Scoring issues	SG60	SG80	SG100
	There is a robust and precautionary harvest strategy in place.		management objectives reflected in PI 1.1.1/ PI 1.1.1A SG80.	the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1/ PI 1.1.1A SG80.	the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1/ PI 1.1.1A SG80.
		(b) Harvest strategy evaluation	The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy ~~may not have~~has been ~~fully~~ **tested** ~~but~~and is expected to meet the objectives reflected in PI 1.1.1/ PI 1.1.1A SG80 or there is evidence ~~exists~~ that ~~it~~the harvest strategy is achieving its objectives~~.~~ reflected in PI 1.1.1/ PI 1.1.1A SG80.	The performance of the harvest strategy has been ~~**fully**~~ **evaluated** and evidence exists to show that it is achieving ~~its~~the objectives reflected in PI 1.1.1/ PI 1.1.1A SG80, including being clearly able to maintain stocks at target levels.
		(c) Harvest strategy monitoring	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
		(d) Harvest strategy review			The harvest strategy is periodically reviewed and improved as necessary.

Component	PI	Scoring issues	SG60	SG80	SG100
		(e) Shark finning	~~It~~There is ~~**likely**~~a **high degree of certainty** that shark finning is not taking place.	~~It is **highly likely** that shark finning is not taking place.~~	
		(f) Review of **alternative measures**	There has been a review of **alternative measures** to minimise UoA-related mortality of **unwanted catch** of the target stock.	There is a **review** every 5 years of **alternative measures** to minimise UoA-related mortality of **unwanted catch** of the target stock and they are implemented as appropriate.	There is a **review** that happens every 2 years of **alternative measures** to minimise UoA-related mortality of **unwanted catch** of the target stock, and they are implemented, as appropriate.

SA2.4.1 The team shall interpret: ◙

a. "Responsive" at SG80 and SG100 scoring issue (a) to mean that the harvest strategy allows management to be adaptive to the development and implementation of the differing elements of the harvest strategy and action has been taken by management, when required.

b. "Designed" at SG100 scoring issue (a) to mean a harvest strategy that includes a management procedure (MP) that has been developed through management strategy evaluation (MSE).

c. "Tested" at SG80 scoring issue (b) to mean the involvement of some sort of structured logical argument and analysis that supports the choice of strategy.

d. "Evaluated" at SG100 scoring issue (b) to mean "tested for robustness to uncertainty, appropriate to the scale and intensity of the UoA".

SA2.4.2 When setting conditions, if new harvest control rules (HCRs) or assessment methods require different or additional information, the team shall ensure that: ◙

a. The information is already available, or

b. The information is made part of the condition.

Shark finning ◙

SA2.4.3 If the target species is a shark, the team shall score scoring issue (e).

SA2.4.3.1 The team shall interpret the term "shark" to refer to any species within the taxonomic groups Selachimorpha and Rhinopristiformes.

a. If the UoA is part of a management agency whose definition of "shark" includes additional species, the management agency's definition shall apply.

SA2.4.4 At scoring issue (e) at SG60, the team shall:

a. Determine that a fins naturally attached (FNA) policy is in place for all retained sharks.

b. Apply the Evidence Requirements Framework in Tool B of the MSC Fisheries Standard Toolbox to establish that the information used to determine that an FNA or non-retention policy is in place and enforced has a very high degree of accuracy.

"Unwanted catch"

SA2.4.5 If there is "unwanted catch" of the target P1 stock, the team shall score scoring issue (f).

SA2.4.5.2 When applying scoring issue (f) to target stocks in P1, the team shall include consideration of "alternative measures" directed at minimising mortality of "unwanted catch" from ghost gear.

SA2.5 Harvest control rules and tools PI (PI 1.2.2) ◙

Table SA5: PI 1.2.2 Harvest control rules and tools PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Harvest strategy	Harvest control rules and tools **1.2.2** There are well-defined and effective ~~harvest control rules~~ ~~(~~HCRs~~)~~ in place.	(a) HCRs design and application ◙	**Generally understood** HCRs are **in place** ~~**or available**~~ that are **expected to reduce the exploitation rate as the** ~~point of recruitment impairment~~ ~~(~~**PRI**~~)~~ **is approached**.	**Well-defined** HCRs are **in place** that **ensure** ~~that~~ the exploitation rate is reduced as the PRI is approached, and are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species ~~a level~~at levels consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level **most of** the time, taking into account the ecological role of the stock~~,~~ ~~**most of the** time~~.
		(b) ~~HCRs~~ The robustness of HCRs to uncertainty ◙		The HCRs are **likely** to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock,

Component	PI	Scoring issues	SG60	SG80	SG100
					and there is **evidence** that the HCRs are robust to the main uncertainties.
		(c) Evaluation of HCRs ◙	There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

SA2.5.1 The team should require additional precaution to be built into the HCR at SG100 so that the HCR keeps stocks well above limit reference points (LRPs).

SA2.5.2 The team shall interpret:

a. "Generally understood" at SG60 to mean HCRs that can be shown to have been applied in some way in the past but have not been explicitly defined or agreed.

b. "Well defined" at SG80 to mean HCRs exist in some written form that has been agreed by the management agency, ideally with stakeholders and state what actions will be taken at what specific TRP levels.

c. "In place" at SG60 and SG80 to mean the HCR has been adopted by the management agency, and/or there is evidence or documentation that management actions have been taken where required.

SA2.5.2 In scoring issue (a) at the SG60 level, teams shall accept 'available' HCRs (instead of HCRs that are 'in place') in cases where: ‼

a. Stock biomass has not previously been reduced below the MSY level or has been maintained at that level for a recent period of time that is at least longer than 2 generation times of the species, and is not predicted to be reduced below BMSY within the next 5 years; or

b. In UoAs where BMSY estimates are not available, the stock has been maintained to date by the measures in use at levels that have not declined significantly over time, nor shown any evidence of recruitment impairment.

SA2.5.3 Teams shall recognise 'available' HCRs as 'expected to reduce the exploitation rate as the point of recruitment impairment is approached' only in cases where: ‼ a. HCRs are effectively used in some other UoAs, that are under the control of the same management body and of a similar size and scale as the UoA; or b. An agreement or framework is in place that requires the management body to adopt HCRs before the stock declines below BMSY.

SA2.5.4 In scoring issue (a) at the SG100 level, where quantitative simulation testing is available, "most of the time" should be interpreted as the stock being maintained at or above MSY or some ecologically more relevant target point at least 70% of the time. ◙

SA2.5.5 In scoring issue (c) at the SG60 level, where HCRs are recognised as ‘available’, teams shall include in their rationale: ‼

a. Evidence that HCRs are being ‘effectively’ used in other named UoAs, also managed by the same management body, including the basis on which they are regarded as ‘effective’; or

b. A description of the formal agreement or legal framework that the management body has defined, and the indicators and trigger levels that will require the development of HCRs.

Evaluating the effectiveness of HCRs ◙

SA2.5.3 In scoring issue (c), for “evidence” the team shall use the current levels of exploitation in the UoA, such as measured by the fishing mortality rate or harvest rate, where available.

SA2.5.3.1 If information is not available on the exploitation rate consistent with achieving a long-term MSY, the team shall provide justification where available proxy indicators and reference points are used as reasonable proxies of the exploitation rate.

SA2.6 Information and monitoring PI (PI 1.2.3)

Table SA6: PI 1.2.3 information and monitoring PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Harvest strategy	Information ~~/~~and monitoring **1.2.3** Relevant information is collected to support the harvest strategy.	(a) Range of information	**Some** relevant information related to stock structure, stock productivity, and fleet composition is available to support the harvest strategy.	**Sufficient** relevant **information** related to stock structure, stock productivity, fleet composition and, other data are available to support the harvest strategy.	A **comprehensive range of information** (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals, and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.
		(b) Monitoring ◙	Stock abundance and UoA removals are monitored and **at least** ~~**one**~~**1 indicator** is available	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the**	**All information** required by the harvest ~~control rule~~strategy is monitored with high frequency and a **high degree of certainty**, and there is a good

Component	PI	Scoring issues	SG60	SG80	SG100
			and monitored with sufficient frequency to support the harvest ~~control rule~~strategy.	**harvest ~~control rule~~strategy**, and **~~one~~1 or more indicators** are available and monitored with sufficient frequency to support the harvest ~~control rule~~strategy.	understanding of the inherent **uncertainties** in the information ~~[~~(data~~]~~) and the robustness of assessment and management ~~to~~in dealing with this uncertainty.
		(c) Comprehensiveness of information ◙		There is good information on all other fishery removals from the stock.	

SA2.6.1 In considering the status of the stock in P1, the team shall consider information about mortality that is observed and mortality that is unobserved.

SA2.6.2 The team shall identify which information from the information categories in SA2.6.3 is relevant to both the design and effective operational phases of the harvest strategy. ◙

SA2.6.2.1 The team should base its evaluation on this information.

SA2.6.3 The team shall determine a combined score for this PI on the quality of data available, weighted by information category on the relevance to the harvest strategy, HCR, and management tools. Information categories include: ◙

a. Stock structure.
b. Stock productivity.
c. Fleet composition.
d. Stock abundance.
e. UoA removals.
f. Other data.

SA2.6.4 The team shall interpret “sufficient” information at the SG80 level to mean that all information required to implement the harvest strategy is available at a quality and quantity necessary to demonstrate achievement of the SG80 outcome PI 1.1.1.

SA2.6.5 The team shall interpret a “comprehensive range of information” and “all information” at the SG100 level to include information provided by a strategic research plan.

SA2.6.5.1 This information shall go beyond the immediate short-term management needs to create a strategic body of research relevant to the long-term UoA-specific management system.

SA2.6.6 The team shall assess the veracity of information.

SA2.7 Assessment of stock status PI (PI 1.2.4) ◙

Table SA7: PI 1.2.4 assessment of stock status PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Harvest strategy	Assessment of stock status **1.2.4** There is an adequate assessment of the stock status.	(a) Appropriateness of assessment to stock under consideration		The assessment is appropriate for the stock and for the harvest ~~control rule~~strategy.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
		(b) Assessment approach	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
		(c) Uncertainty in the assessment	The assessment **identifies major sources** of uncertainty.	The assessment **takes uncertainty into account**.	The assessment ~~takes into account uncertainty and is evaluating~~evaluates stock status relative to reference points in a **probabilistic** way.
		(d) Evaluation of assessment			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Component	PI	Scoring issues	SG60	SG80	SG100
		(e) Peer review of assessment		The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

SA2.7.1 For SG80, if considering an assessment that covers stock complexes (see SA2.2.5) the team shall take into account that the level of assessment required for individual stocks or species within the complex should reflect their ecological importance.

SA3 Principle 2

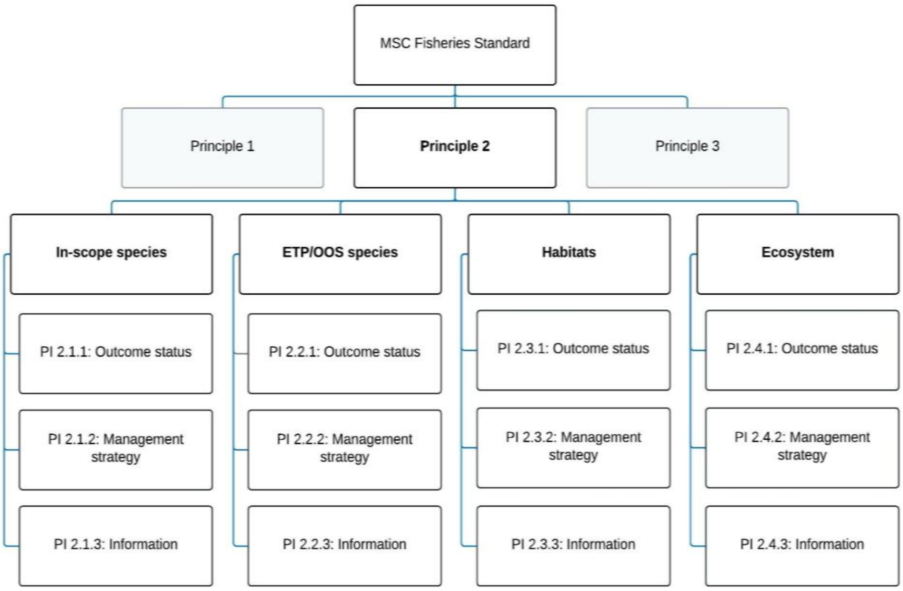

Figure SA2: Principle 2 assessment tree structure

SA3.1 General requirements for Principle 2

SA3.1.1 The team shall interpret the following terms used in Principle 2 as follows:

a. "Does not hinder recovery" means the impact of the UoA is low enough that if the status of the species can improve, the UoA will not hinder that improvement.

b. "If necessary", in the management PIs, excludes:

  i. The assessment of UoAs that do not have scoring elements at these SG levels.

  ii. Scoring elements with impacts determined to be "negligible".

c. "In place" means the measure, partial strategy, strategy, or comprehensive strategy has been fully implemented in the UoA.

d. "Minimise" means reduce to lowest achievable level.

  i. In determining the lowest achievable level, the team shall consider the requirements of each component.

e. "Negligible" means not material or significant.

  i. In determining whether an impact is "negligible", the team shall consider the relevant requirements of each component.

f. "Unwanted catch" is the part of the catch that a fisher did not intend to catch but could not avoid and did not want or chose not to use.

Designation of Principle 2 species

SA3.1.2 The team shall identify and categorise all Principle 2 (P2) species under the following Principle 2 components: ◙

a. In-scope species.

b. Endangered, threatened, or protected (ETP) and out-of-scope (OOS) species (hereafter ETP/OOS).

c. Habitats.

SA3.1.2.1 The team shall apply SA3.1.4–SA3.1.5 and the supporting decision tree in Figure SA3 to determine SA3.1.2.a and SA3.1.2.b.

SA3.1.2.2 The team shall assign any invertebrate identified as a benthic habitat-forming species (e.g. coral species), to the habitats scoring component.

SA3.1.2.3 The team shall provide a rationale for the categorisation of all Principle 2 species.

SA3.1.2.4 The team shall provide the common and the scientific name for each species assessed under P2.

SA3.1.2.5 If applicable, the team shall outline in the assessment report the stock component that each species belongs to.

SA3.1.2.6 The team shall score each Principle 2 species as a scoring element under the component to which it is assigned.

SA3.1.3 If the team determines that there are no scoring elements in a particular component, the team shall award a score of SG100 under the Outcome PI.

SA3.1.3.1 The team shall still score the Management and Information PIs.

SA3.1.4 The team shall assign species as ETP/OOS in P2 as follows:

a. Species impacted by the UoA that are classified as amphibians, reptiles, birds, or mammals (hereafter known as OOS species).

b. Species impacted by the UoA that are classified as fish or invertebrates and are listed in any of the following, subject to modifications if relevant as per SA3.1.4.1–4: ◙

i. Appendix 1 of the Convention on International Trade in Endangered Species (CITES).

ii. Appendix 2 of CITES.

iii. Appendix 1 of the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

iv. Appendix 2 of CMS.

v. The International Union for Conservation of Nature (IUCN) Red List of Threatened Species and classified globally as “Critically Endangered (Cr)”.

vi. The IUCN Red List of Threatened Species and classified globally as “Endangered (En)”.

vii. National ETP legislation.

SA3.1.4.1 The team shall make and document modifications to the species list created by the application of SA3.1.4.b for the purposes of component reclassification (e.g. to in-scope or Principle 1 components). The team shall base modifications on the application of a and b below:

a. Species taxonomy and associated ETP listing (SA3.1.4.2).

b. Whether the species meets modification criteria based on life history characteristics, management status, and stock status (SA3.1.4.3).

SA3.1.4.2 The team shall make modifications based on species taxonomy and associated ETP listing following the application of SA3.1.4.b, as follows: ◙

a. The team shall only make modifications to Chondrichthyan species listed on CMS Appendix 2 or CITES Appendix 2.

b. The team shall only make modifications to non-Chondrichthyan species listed on CMS Appendix 2, CITES Appendix 2, the IUCN Red List of Threatened species classified globally as "En" or listed in National ETP Legislation.

i. For a and b, the team shall only make modifications to species listed on CITES Appendix 2 in cases where the species concerned are permitted to be exported and traded by the relevant management authority/authorities.

c. The team shall make modifications to non-Chondrichthyan species globally listed as IUCN "Cr" as per SA3.1.4.3 in cases where the IUCN assessment is determined to be "needing update" as defined by the IUCN.

i. The team shall only implement modifications as per SA3.1.4.3. when the information supporting the modification criteria is more recent than the IUCN assessment.

SA3.1.4.3 The team shall only make modifications to the species list resulting from application of SA3.1.4.2 when at least 2 of the following modification criteria are met:

a. Life history characteristics: the species is inherently resilient to exploitation as demonstrated by high productivity attributes.

i. The team shall determine this criterion is met if the stock/species achieves an overall average productivity score of less than 2, using Table A8 in the MSC Fisheries Standard Toolbox (PSA productivity attributes and scores for fish and invertebrates).

b. Management status: the stock is subject to measures or management tools, reflected in either LRPs or TRPs (or equivalent), intended to achieve stock management objectives in response to directed exploitation.

c. Stock status: the stock is at a level that maintains high productivity.

i. The team shall determine this criterion is met if the stock is at or fluctuating around a level consistent with achieving SG80 for PI 1.1.1, scoring issue (b).

ii. The team shall make determinations as per SA3.1.4.3.c.i using information from stock assessment(s) that have been subject to peer review, consistent with achieving SG80 for PI 1.2.4, scoring issue (e).

SA3.1.4.4 The team shall only apply the modifications once per certification cycle at the beginning of each assessment (e.g. initial assessment; reassessment; transition assessment; scope extension assessment). ◙

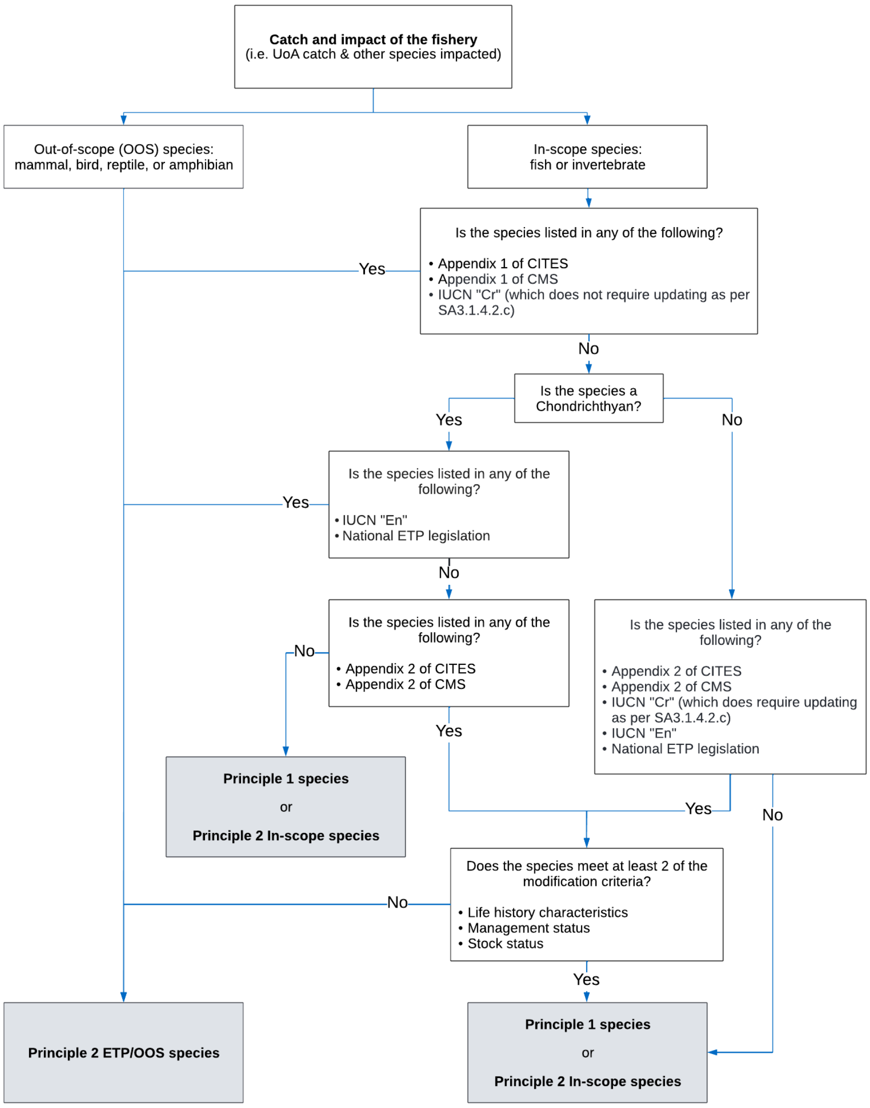

Figure SA3: Decision tree for species categorisation

SA3.1.5 The team shall assign species as In-scope in P2 as follows:

a. Species that are not assessed under Principle 1.

b. Species that are not classified as ETP/OOS.

c. Species used as bait in the UoA, whether caught by the UoA or purchased from elsewhere. ◙

SA3.1.6 When assessing the impact of the UoA on all components within P2, including "unwanted catch", the team shall assess mortality that is observed and mortality that is unobserved, including that from ghost fishing.

SA3.1.6.1 The team shall document the assessment of observed and unobserved mortality in scoring rationales. ◙

SA3.1.7 When considering the effectiveness of a management strategy and its ability to meet P2 outcomes, the team shall take into account any impacts of fishing overcapacity and other issues resulting from subsidies.

SA3.1.7.1 If overcapacity exists as a result of subsidies, the management system should be robust enough to deal with this issue and still deliver a sustainable fishery as per Principle 2.

SA3.2 General requirements for outcome PIs ◙

SA3.2.1 The team shall interpret definitions of required probability in Principle 2 as per Table SA8. ◙

Table SA8: Probability required at different scoring guideposts

Performance indicator	SG60 probability requirement	SG80 probability requirement	SG100 probability requirement
PI 2.1.1	"Likely" = > 70th %ile	"Highly likely" = > 80th %ile*	"High degree of certainty" = > 90th %ile
PI 2.2.1	"Unlikely" = > 70th %ile	"Highly unlikely" = > 80th %ile*	"High degree of certainty" = > 95th %ile
PI 2.3.1 and PI 2.4.1	"Unlikely" = < 40th %ile	"Highly unlikely" = < 30th %ile	Evidence of "highly unlikely" = < 20th %ile
PI 2.1.2d and PI 2.2.2d	"High degree of certainty" = > 95th %ile*		

SA3.3 General requirements for management PIs ◙

SA3.3.1 The team shall interpret:

a. "Measures" to mean actions or tools that explicitly manage impacts on the component or indirectly contribute to management of the component under assessment having been designed to manage impacts elsewhere.

b. "Partial strategy" to mean a cohesive arrangement that may comprise 1 or more measures, an understanding of how the measures work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. A "partial strategy" may not have been designed to manage the impact on that component specifically.

c. "Strategy" to mean a cohesive and strategic arrangement that may comprise 1 or more measures and an understanding of how the measures work to achieve an outcome. A "strategy" should be designed to manage impact on that component specifically, it needs to be appropriate to the scale, intensity, and cultural context of the fishery and should contain mechanisms for the modification of fishing practices if unacceptable impacts are identified.

d. "Comprehensive strategy" to mean a complete and tested strategy made up of linked monitoring, analyses, and management measures and responses. The term is only applicable to the ETP/OOS component.

SA3.4 General requirements for information PIs ◙

SA3.4.1 The team shall interpret the SG100 level relating to "information adequate to support a strategy" to include information provided by a strategic research plan that addresses the information needs of management.

SA3.4.1.1 This information shall go beyond the immediate short-term management needs to create a strategic body of research relevant to the long-term fishery-specific management system.

SA3.5 In-scope species outcome PI (PI 2.1.1)

Table SA9: PI 2.1.1 in-scope species outcome PISGs

In-scope species	Outcome status **2.1.1** The UoA aims to maintain in-scope species above the PRI and does not hinder recovery of in-scope species if they are below the PRI.	(a) **Main** in-scope species stock status	**Main** in-scope species are **likely** to be above the PRI. or If the species is below the PRI, it is **likely** that the UoA does not hinder recovery and rebuilding.	**Main** in-scope species are **highly likely** to be above the PRI. or If the species is below the PRI, there is evidence of recovery, or it is **highly likely** that the UoA does not hinder recovery and rebuilding.	There is a **high degree of certainty** that **main** in-scope species are fluctuating around a level consistent with MSY.

~~SA3.1.4.1 Are not considered 'primary' as defined in SA 3.1.3; or~~

~~SA3.1.4.2 Species that are out of scope of the program, but where the definition of ETP species is not applicable.~~

~~SA3.1.5 The team shall assign ETP (endangered, threatened or protected) species as follows:~~ ◙

~~SA3.1.5.1 Species that are recognised by national ETP legislation;~~

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		(b) **Minor** in-scope species stock status			~~Species listed~~**Minor** in-scope species are **highly likely** to be above the ~~binding international agreements given~~PRI. or If below~~:~~ ~~, unless it can be shown~~ the PRI, there is evidence that the ~~particular stock of~~UoA does not hinder the recovery and rebuilding of **minor** in-scope species ~~concluded under this Convention~~.

~~SA3.1.5.3 Species classified as 'out-of scope' (amphibians, reptiles, birds and mammals) that are listed in the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE).~~

~~SA3.1.6 In PIs 2.1.2 and 2.2.2, the term 'unwanted catch' shall be interpreted by the team as the part of the catch that a fisher did not intend to catch but could not avoid, and did not want or chose not to use.~~ ◙

~~SA3.1.7 The team shall consider species used as bait in the UoA, whether they were caught by the UoA or purchased from elsewhere, as either primary or secondary species using the definitions provided under SA 3.1.3 and SA 3.1.4 respectively.~~

~~SA3.1.8 The consideration of the impact of the UoA on all components in P2, including unwanted catch, shall include mortality that is observed and mortality that is unobserved.~~ ◙

~~SA3.1.9 The team shall interpret key words or phrases used in P2 as shown in Table SA8.~~ ◙

SA3.5.1 If information is not available on the stock status relative to the PRI or MSY levels, the team shall use proxy indicators and reference points as per SA2.2.3. ◙

SA3.5.2 The team shall determine and justify which in-scope species are considered "main" and which are "minor". ◙

SA3.5.2.1 The team shall consider a species "main" if: ◙

a. The catch of a species by the UoA comprises 5% or more by weight of the total catch of all species by the UoA, or

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b. The species is classified as "less resilient" and the catch of the species by the UoA comprises 2% or more by weight of the total catch of all species by the UoA, or:

i. The team shall classify a species as "less resilient" if:

A. The productivity of the species indicates that it is intrinsically of low resilience, and/or

B. Its intrinsic resilience is high and existing knowledge of the species indicates that its resilience has been lowered because of anthropogenic or natural changes to its life history.

c. The species is a shark and the fishery trades in shark fins.

SA3.5.2.2 If a species does not meet the designated weight thresholds of 5% or 2% as defined in SA3.5.2.1, the team shall still classify a species as "main" if the total catch of the UoA is exceptionally large, such that even small catch proportions of a P2 species significantly impact the affected stocks/populations.

SA3.5.2.3 The team shall consider all other in-scope species that are not considered "main" as "minor" species.

SA3.5.3 The team shall consider UoA impact as "negligible" for "minor species" that make up < 2% of total UoA catch, except in cases where SA3.5.2.2 applies.

SA3.5.4 If there are no "main" species scoring elements, the team shall award a score of 100 for scoring issue (a).

SA3.5.5 At the SG80 level, if a species is below the level at which recruitment could be impaired, the team shall recognise "evidence of recovery" using at least 1 of the following as rationale: ◙

a. Direct evidence from time-series estimates of stock status.

b. Indirect evidence from time-series of indicators or proxies of stock status that are indicative of the state of the whole stock.

c. Indicators, proxies, or absolute estimates of exploitation rate that show that fishing mortality experienced by the stock is lower than F_{MSY}.

d. Direct evidence that the proportion of catch by the UoA relative to the total catch of the stock does not hinder recovery.

SA3.6 In-scope species management strategy PI (PI 2.1.2) ◙

Table SA10: PI 2.1.2 in-scope species management strategy PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
In-scope species	Management strategy **2.1.2** There is a strategy in place that is designed to maintain or to not hinder rebuilding of in-scope species.	(a) Management strategy in place ◙	There are **measures** in place for the UoA, **if necessary**, that are expected to maintain or to not hinder rebuilding of the **main** in-scope species at/to the in-scope species outcome SG60 level.	There is a ~~benchmark against which status of a component can be evaluated, and~~ **partial strategy** in place for the ~~benchmark is chosen~~UoA, **if necessary**, that is expected to ~~provide a high probability of persistence~~maintain or to not hinder rebuilding of the **main** in-scope species at/to the in-scope species outcome SG80 level. or Where in-scope species outcome fails to meet the SG80, a demonstrably effective strategy is in place between all MSC UoAs that categorise this species as **main** In-scope to ensure that they collectively do not hinder recovery and rebuilding.	There is a **strategy** in place for the UoA for managing **main** and **minor** in-scope species to achieve the in-scope species outcome SG80 level of performance.

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Component	PI	Scoring issues	SG60	SG80	SG100
		(b) Management strategy effectiveness	The measures, **if necessary**, are considered **likely** to work for the **main** in-scope species, based on plausible argument.	There is some **evidence** that the measures/ partial strategy, **if necessary**, is achieving the objectives for **main** in-scope species set out in scoring issue (a), based on some information directly about the UoA and/or species involved.	**There is evidence** that the partial strategy/ strategy is achieving the objectives set out in scoring issue (a), based on information directly about the UoA and/or species involved.
		(c) Review of **alternative measures**	There is a **review** of **alternative measures** to minimise UoA-related mortality of **unwanted catch** of **main** in-scope species.	There is a **review** at least once every 5 years of **alternative measures** to minimise UoA-related mortality of **unwanted catch** of **main** in-scope species and they are **implemented, as appropriate**.	There is a **review** that happens every 2 years of **alternative measures** to minimise UoA-related mortality of **unwanted catch** of all in-scope species, and they are **implemented, as appropriate**.
		(d) Shark finning	There is a **high degree of certainty** that shark finning is not taking place.		
		(e) Ghost gear management strategy	There are measures in place for the UoA, **if necessary**, that are expected to minimise ghost gear and its impact	There is a partial strategy in place for the UoA, **if necessary**, that ~~either explicitly manage impacts on~~	There is a strategy in place for the UoA, **if necessary**, that is expected to minimise ghost gear and its impact

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Component	PI	Scoring issues	SG60	SG80	SG100
			on all in-scope species.	~~the component or indirectly contribute~~is expected to minimise ghost gear and its impact on all in-scope species.	on all in-scope species.

Reviewing "alternative measures" for "unwanted catch"

SA3.6.1 If there is "unwanted catch", the team shall score scoring issue (c).

SA3.6.1.1 The team shall interpret "alternative measures" as alternative fishing gear and/or practices (i.e. those not already used in the UoA prior to the review) that have been shown to minimise incidental mortality of the species or species type to the lowest achievable levels. ◙

a. The team shall only consider "alternative measures" directed at minimising mortality of "unwanted catch" from ghost gear within scoring issue (e).

SA3.6.1.2 The team shall verify that a "review" includes consideration of the potential effectiveness and practicality of "alternative measures". ◙

SA3.6.1.3 The team shall interpret "implemented as appropriate" as situations where potential "alternative measures" reviewed are: ◙

a. Determined to be more effective at minimising the mortality of "unwanted catch" than current fishing gear and practices.

b. Determined to be comparable to existing measures in terms of effect on target species catch and impacts on vessel and crew safety.

c. Determined to not negatively impact other species or habitats.

d. Not cost prohibitive to implement.

Shark finning

SA3.6.2 If the in-scope species is a shark, the team shall score scoring issue (d) following SA2.4.3–SA2.4.4.

Ghost gear management strategy ◙

SA3.6.3 The team shall score scoring issue (e) where the corresponding ghost gear management scoring issue, PI 2.2.2 scoring issue (e), is not scored (i.e. in scoring scenarios where there are no ETP/OOS scoring elements):

a. The term "if necessary" is used at SG60, SG80, and SG100 referring to whether the risk of ghost fishing or ghost gear impacts are either demonstrably absent or "negligible" (as defined in SA3.6.4.1). ◙~~SA3.2 General requirements for outcome PIs~~

SA3.6.4 The team shall interpret "minimise" in scoring issue (e) as a reduction of ghost gear and its impact to the point where the risk of ghost fishing or ghost gear impacts are either demonstrably absent or "negligible".

SA3.6.4.1 The team shall use its expert judgement in determining what is "negligible".

a. In making this determination, the team shall consider:

i. The significance of the ghost gear risk in relation to the prevalence of ghost gear and vulnerability of species (for in-scope and/or ETP/OOS scoring components).

ii. The significance of ghost gear risk in relation to the prevalence of ghost gear and the sensitivity/and or vulnerability of habitats (for habitats scoring component) at risk of ghost gear impact.

SA3.7 In-scope species information PI (PI 2.1.3)

Table SA11: PI 2.1.3 in-scope species information PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
In-scope species	~~SA3.~~Information **2.1.3** Information is adequate to determine the impact of the UoA on in-scope species and the effectiveness of management measures or strategies in place.	(a) Information adequacy for assessment of impact on **main** in-scope species	Information is adequate to **broadly understand** the impact of the UoA on the stock status of **main** in-scope species.	~~If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI.~~Information is adequate to **estimate** the impact of the UoA on the stock status of **main** in-scope species with a **high degree of accuracy.**	Information is adequate to **estimate** the impact of the UoA on the stock status of **main** in-scope species with a **very high degree of accuracy**.
~~SA3.2.2~~		(b) Information adequacy for assessment of impact on **minor** in-scope species			~~The team shall consider both the current outcome status and the resilience of historical arrangements to function adequately and deliver low risk under future conditions when scoring outcome PIs.~~Information is adequate to **estimate** the impact of the UoA on the stock status of **minor** in-scope species with a **high degree of accuracy**.

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Component	PI	Scoring issues	SG60	SG80	SG100
~~SA3.2.3~~		(c) Information adequacy for management strategy	Information is adequate to support **measures** to manage **main** in-scope species.	Information is adequate to support a **partial strategy** to manage **main** in-scope species.	~~The definitions of required probability in P2 shall be those in .~~ **Information is adequate to support a strategy** to manage **all** in-scope species and evaluate with a **high degree of certainty** whether the strategy is achieving its objective.

SA3.7.1 The team shall report the catch- and UoA-related mortality of all "main" species taken by the UoA.

SA3.7.1.1 If the team has assessed a species or proportion of the catch of a species as "unwanted catch", the team shall indicate the proportion of the catch that is unwanted for each of these species.

SA3.7.2 In scoring issues (a) and (b), the team shall apply the Evidence Requirements Framework in Tool B of the MSC Fisheries Standard Toolbox to determine which guidepost is met.

SA3.7.3 In scoring issue (c), the team shall use its expert judgement to consider the adequacy of information in relation to supporting the management measures, partial strategy, or strategy, including the ability to detect any changes in risk level to in-scope species. ◙

SA3.8 ETP/OOS species outcome PI (PI 2.2.1)

Table SA12 : PI 2.2.1 ETP/OOS species outcome PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
ETP/OOS species	~~PI~~ Outcome status **2.42.1** The direct effects of the UoA do not hinder recovery of the ETP/OOS unit to favourable conservation status.	(a) Direct effects ◙	The direct effects of the UoA are **unlikely** to hinder recovery of the ETP/OOS unit to favourable conservation status.	~~Evidence~~The direct effects of the UoA are **highly unlikely** to hinder recovery of the ETP/OOS unit to favourable conservation status.	There is a **high degree of certainty** that the direct effects of the UoA do not hinder recovery of the ETP/OOS unit to favourable conservation status.

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SA3.8.1 The team shall identify the ETP/OOS unit(s). ◙

SA3.8.1.1 The team shall identify the ETP/OOS unit(s) on the basis of either:

a. Biological distinctiveness (defined by any genetic, life history, behavioural, or morphological characteristics), or

b. Conservation and management purposes (defined based on geographic boundaries but drawing on biological information).

SA3.8.1.2 In making relevant determinations, the team shall consider biology and distribution of the ETP/OOS unit relative to the scale and intensity of the UoA, as per SA3.8.1.1.

SA3.8.1.3 Where organisations responsible for assessing status of species have identified specific ETP/OOS units in order to assess impacts of the UoA or wider fleet that meet the requirements in SA3.8.1.1 and SA3.8.1.2, the team shall select these units as the ETP/OOS unit.

SA3.8.1.4 Where organisations responsible for assessing status of species have not identified specific ETP/OOS units in order to assess impacts of the UoA or wider fleet, or those units do not meet the requirements in SA3.8.1.1 and SA3.8.1.2, the team shall select the most relevant unit for assessing the impacts of the UoA on the population, following SA3.8.1.1 and SA3.8.1.2.

SA3.8.1.5 The team shall treat each ETP/OOS unit selected as a separate scoring element.

SA3.8.1.6 The team shall justify the selection of each ETP/OOS unit.

SA3.8.2 The team shall evaluate the likelihood that the UoA does not hinder recovery of the ETP/OOS unit to favourable conservation status through:

a. Review of quantitative assessment(s) that determine the impact of the UoA with respect to favourable conservation status, or

b. Review of evidence that the UoA impact is “negligible”.

SA3.8.2.1 The team shall consider favourable conservation status to be a level equivalent to at least 50% carrying capacity unless the team has defined a higher level based on the life history characteristics of the ETP/OOS unit.

SA3.8.2.2 Where the following reference points are specified and are set at a level of at least 50% carrying capacity, the team shall consider the reference point equivalent to favourable conservation status:

a. Optimum Sustainable Population.

b. Maximum Net Productivity Level.

c. Maximum Sustained Fishing Mortality.

d. Fishing Mortality or Biomass-based reference points.

SA3.8.2.3 The team shall evaluate whether the UoA would hinder recovery (as defined in SA3.1.1) of the ETP/OOS unit to favourable conservation status within a timeframe of 3 generations or 100 years, whichever is shorter.

SA3.8.2.4 Where the UoA impact on the ETP/OOS unit is “negligible” (as defined in SA3.8.2.5), the team shall also consider this as evidence that the UoA is not hindering recovery at all SG levels.

SA3.8.2.5 The team shall define the UoA impact as “negligible” when the following requirements are met:

a. The UoA has achieved at least a score of 80 for PI 2.2.3 scoring issue (a), and:

i. For OOS species, based on the information in (a), the average estimates of mortality from the UoA are less than 10 individuals per year, and the lower bound of estimated breeding population size is equal to or greater than 5,000 individuals, or

ii. For fish or invertebrate species, UoA mortalities represent less than 2% of total UoA catch.

SA3.8.2.6 The team shall identify in the report all ETP/OOS species on which the UoA has a "negligible" impact and provide a rationale for considering them as such.

SA3.8.3 At the SG80 level for scoring issue (a), if the ETP/OOS unit is a marine mammal and intentional harassment or intentional killing of that ETP/OOS unit is an integral part of the fishing operation, the team shall verify that it is estimated to be at or above favourable conservation status with a "high degree of certainty" (as per Table SA8).

SA3.8.3.1 The team shall verify the status of the ETP/OOS unit using a quantitative estimate of the population size within the last 5 years that has been:

a. Produced by an independent research organisation or has been independently verified, and

b. Made publicly available.

SA3.8.3.2 "Intentional" shall mean any action that is not deemed to be "incidental" to fishing operations. ◙

a. The term "incidental" describes consequences or results that were neither intended nor anticipated.

SA3.8.3.3 "Harassment" shall mean any act of pursuit, torment, or annoyance that has the potential to:

a. Injure a marine mammal, or

b. Disturb a marine mammal by causing disruption of behavioural patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

SA3.8.3.4 "Integral part" shall mean a tactical or necessary part of the fishing operation of any vessel within the UoA.

a. The term "tactical" describes actions instituted by the UoA whilst undertaking fishing operations (e.g. deploying or hauling fishing gear) that either make use of (e.g. used to help facilitate capture of target species), or target (e.g. pursue or encircle) marine mammals.

b. The term "necessary" describes actions required, or expected, to maximise catch or its efficiency.

SA3.8.3.5 Where the team trigger SA3.8.3 for an ETP/OOS unit, the maximum score the team shall award for that unit is 80.

SA3.8.3.6 The team shall apply SA3.8.3 irrespective of:

a. Whether the UoA impact on the ETP/OOS unit is determined to be negligible as per SA3.8.2.5.

b. Whether the RBF is triggered for the relevant ETP/OOS unit.

c. Whether the client, or entities within the client group, are permitted to intentionally kill or harass marine mammals (i.e. through permits or other types of allowances).

SA3.9 ETP/OOS species management strategy PI (PI 2.2.2)

Table SA13: PI 2.2.2 ETP/OOS species management strategy PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
ETP/OOS species	~~SA3.~~Management strategy **2.**~~4~~**2.2** The UoA has precautionary management **strategies** in place designed to: – Ensure that incidental catches of the ETP/OOS unit are **minimised** and where possible eliminated – Ensure that the UoA does not hinder recovery to Favourable Conservation Status.	(a) Management **strategy** in place	There are **measures** in place, **if necessary**, that are expected to **minimise** the UoA-related mortality of the ETP/OOS unit and achieve the ETP/OOS outcome SG80 level of performance.	There is a **strategy** in place, **if necessary**, that is expected to minimise the UoA-related mortality of the ETP/OOS unit and achieve the ETP/OOS outcome SG80 level of performance.	There is a **comprehensive strategy** in place that is expected to **minimise** the UoA-related mortality of the ETP/OOS unit and achieve the ETP outcome SG80 level of performance.

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Component	PI	Scoring issues	SG60	SG80	SG100
		(b) Management **strategy** effectiveness ◙		Evidence indicates that the **measures**, **strategy**, or **comprehensive strategy** have reduced or **minimised** the mortality of the ETP/OOS unit.	
		(c) **Review** of **alternative measures** to **minimise** mortality of the ETP/OOS unit ◙		There is a **review** at least once every 5 years of the **alternative measures** to **minimise** UoA-related mortality of the ETP/OOS unit and they are implemented as appropriate for the ETP/OOS unit.	There is a **review** that happens every 2 years of **alternative measures** to **minimise** UoA-related mortality of the ETP/OOS unit, and they are implemented, as appropriate for the ETP/OOS unit.
		(d) Shark finning	There is a **high degree of certainty** that shark finning is not taking place.		
		(e) Ghost gear management **strategy**	There are **measures** in place, **if necessary**, for the UoA that are expected to **minimise** ghost gear and its impact on the ETP/OOS unit.	There is a **partial strategy** in place for the UoA, **if necessary**, that is expected to **minimise** ghost gear and its impact on the ETP/OOS unit.	There is a **strategy** in place for the UoA, **if necessary**, that is expected to **minimise** ghost gear and its impact on the ETP/OOS unit.

SA3.9.1 In scoring issue (a), the team shall interpret “measures”/“strategy”/“comprehensive strategy” in place that is/are expected to minimise mortality as including “measures” that have been shown to minimise mortalities through:

a. Spatial and/or temporal gear restrictions or closures, or

b. Modification of fishing gears and practices, or

c. Maximising the live release of individuals while ensuring the safety of the fishing crew.

SA3.9.1.1 The team shall justify how these measures are expected to minimise the UoA-related mortality based on at least 1 of the following:

a. The use of best practice mitigation “measures”, where these have demonstrably achieved minimisation of mortalities of a species with a specific gear type.

b. Comparison with similar fisheries and species (similar gear, area of operation, and interactions with the ETP/OOS unit).

c. From trials or application in the UoA itself.

SA3.9.2 In scoring issue (b), the team shall review evidence and provide rationale on the effectiveness of the “measures”, “strategy”, or “comprehensive strategy” in achieving the objective of minimising mortality of the ETP/OOS unit.

SA3.9.2.1 Within the rationale, the team shall include evidence of “demonstratable reductions in ETP/OOS unit mortalities” since implementation of the “measures”/”strategy”/”comprehensive strategy”, unless ETP/OOS mortalities are “negligible”, as per SA3.8.2.5, or “minimised”.

a. The team shall interpret ETP/OOS unit mortalities as “minimised” when both of the following are met:

i. The ETP/OOS unit score meets at least the SG80 for ETP outcome (PI 2.2.1) scoring issue (a) or achieves a score of 80 or above when applying the RBF in the ‘MSC Fisheries Standard Toolbox’.

ii. The ETP/OOS unit score meets the SG100 for ETP Management (PI 2.2.2) scoring issue (a).

b. The team shall interpret “Demonstrable reductions in ETP/OOS unit mortalities” as a clear trend showing a decline in mortalities due to the implementation of “measures” described in SA3.9.1 since the “measures” were introduced.

Reviewing “alternative measures” for ETP/OOS species

SA3.9.3 The CAB shall assess scoring issue (c) unless ETP mortalities are zero or “negligible”.

SA3.9.3.1 “Alternative measures” shall be interpreted as alternative fishing gear and practices (i.e. those not already used in the UoA prior to the review) that meet the criteria for “measures” that are expected to minimise mortality as per SA3.9.1.1.

SA3.9.3.2 “Implemented as appropriate for the ETP/OOS unit” shall be interpreted as situations where potential “alternative measures” reviewed are:

a. Determined to be more effective at minimising the mortality of the ETP/OOS unit than the current fishing gear and practices.

b. Determined to be comparable to existing measures in terms of effect on target species catch, and impacts on vessel and crew safety.

c. Determined to not negatively impact other species or habitats.

Shark finning

SA3.9.4 If the ETP species is a shark, the team shall score scoring issue (d) following SA2.4.3–SA2.4.4.

Ghost gear management strategy

SA3.9.5 In assessing scoring issue (e), the team shall apply SA3.6.3–4

~~SA3.3 General requirements for information PIs~~ .

a. The team shall only assess scoring issue (e) when there are ETP/OOS scoring elements.

b. The term "if necessary", used at SG60, SG80, and SG100, refers to whether the risk of ghost fishing or ghost gear impacts are either demonstrably absent or "negligible".

SA3.10 ETP/OOS species information PI (PI 2.2.3)

Table SA14: PI 2.2.3 ETP/OOS species information PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
ETP/OOS species	~~SA3~~Information **2.2.3**~~.1~~ Information is adequate to determine the impact of the UoA on the ETP/OOS unit and the effectiveness of management **measures** or **strategies** in place.	(a) Information adequacy for assessment of impacts	Information is adequate to **broadly understand** the impact of the UoA on the ETP/OOS unit.	Information is adequate to **estimate** the impact of the UoA on the ETP/OOS unit, and to **estimate** whether the UoA may be a threat to its recovery, with a **high degree of accuracy**.	Information is adequate to **estimate** the impact of the UoA on the ETP/OOS unit, and to **estimate** whether the UoA may be a threat to its recovery, with a **very high degree of accuracy**.
~~SA3.3.2~~		(b) Information adequacy for management **strategy**	Information is adequate to support **measures** to manage impacts on the ETP/OOS unit.	**Information is adequate to support a strategy** to manage impacts on the ETP/OOS unit, and to measure trends to evaluate the effectiveness of the **measures** to minimise mortality.	Information is adequate to support a **comprehensive strategy** to manage impacts on the ETP/OOS unit, and to evaluate the effectiveness of the **measures** to minimise mortality with a **high degree of certainty**.

SA3.10.1 In scoring issue (a), the team shall apply the Evidence Requirements Framework in Tool B of the MSC Fisheries Standard Toolbox~~4 Primary species~~ to determine which scoring guidepost is met.

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SA3.10.2 In scoring issue (b), the team shall use its expert judgement to consider the adequacy of information in relation to supporting the management “measures”, “strategy”, or “comprehensive strategy”.

SA3.11 Habitats outcome PI (PI 2.~~1~~3.1) ◙

Table SA15: PI 2.3.1 habitats outcome PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Habitats	Outcome status **2.3.1.~~1~~** The UoA does not cause **serious or irreversible harm** to habitat structure and function, considered on the basis of the area covered by the governance body(ies) responsible for fisheries management in the area(s) where the UoA operates.	(a) **Less** sensitive habitats	The UoA is **unlikely** to reduce structure and function of **less sensitive** habitats to a point where there would be **serious or irreversible harm**.	The UoA is **highly unlikely** to reduce structure and function of **less sensitive** habitats to a point where there would be **serious or irreversible harm**.	There is **evidence** that the UoA is **highly unlikely** to reduce structure and function of **less sensitive** habitats to a point where there would be **serious or irreversible harm**.
		(b) **More** sensitive habitats	The UoA is **unlikely** to reduce structure and function of **more** sensitive habitats to a point where there would be **serious or irreversible harm**.	The UoA is **highly unlikely** to reduce structure and function of **more** sensitive habitats to a point where there would be **serious or irreversible harm**.	There is **evidence** that the UoA ~~does not hinder the recovery~~is **highly unlikely** to reduce structure and function of **more** sensitive habitats to a point where there would be **serious or irreversible harm**.

SA3.11.1 The team shall assess the habitats component in relation to the effects of the UoA on the structure and function of the habitats impacted by the UoA. ◙

a. Each different habitat shall be scored as a separate element.

b. If there is insufficient information for assessment of PI 2.3.1, the team shall use the RBF Consequence Spatial Analysis (CSA) (as defined by A2.1.2 in the MSC Fisheries Standard Toolbox).

c. The team may use the RBF CSA even if there is sufficient information to assess PI 2.3.1.

SA3.11.2 If a benthic habitat is being assessed, the team shall recognise habitats based on the following habitat characteristics: ◙

a. Substratum – sediment type.

b. Geomorphology – seafloor topography.

c. Biota – characteristic floral and/or faunal group(s).

SA3.11.3 The team shall determine and justify which habitats impacted by the UoA are less sensitive or more sensitive, as follows: ◙

a. The team shall define a less sensitive habitat as a habitat that would be able to recover to at least 80% of its unimpacted structure and function within 20 years if fishing were to cease entirely.

b. The team shall define a more sensitive habitat as a habitat that would be unable to recover to at least 80% of its unimpacted structure and function within 20 years if fishing were to cease entirely.

~~SA3.13.3.1 A commonly encountered habitat shall be defined as a habitat that regularly comes into contact with a gear used by the UoA, considering the spatial (geographical) overlap of fishing effort with the habitat's range within the management area(s) covered by the governance body(s) relevant to the UoA.~~ ◙

~~SA3.13.3.2 A VME1 shall be defined as is done in paragraph 42 subparagraphs (i)-(v) of the FAO Guidelines2 (definition provided in GSA3.13.3.2). This definition shall be applied both inside and outside EEZs and irrespective of depth.~~ ◙

SA3.11.3.1 The team shall recognise habitats designated as FAO Vulnerable Marine Ecosystems (VMEs) as "more" sensitive habitats. ◙

SA3.11.3.2 The team shall determine whether a habitat is "less" or "more" sensitive, irrespective of its protection status.

SA3.11.4 In the case of "less" sensitive habitats, the team shall interpret "serious or irreversible harm" as reductions in habitat structure and function, such that the habitat would be unable to recover at least 80% of its hypothetical climax state within 20 years if fishing on the habitat were to cease entirely. ◙

SA3.11.5 In the case of "more" sensitive habitats, the team shall interpret "serious or irreversible harm" as reductions in habitat structure and function below 80% of the unimpacted state. ◙

SA3.11.6 When assessing the status of habitats and the impacts of fishing, the team shall consider the full area managed by the local, regional, national, or international body(ies) responsible for fisheries management in the area(s) where the UoA operates, otherwise known as the "managed area". ◙

SA3.11.6.1 The team shall use all available information (e.g. bioregional information) to determine the range and distribution of the habitat under consideration.

SA3.11.6.2 The team shall use all available information to determine whether this distribution is entirely within the "managed area" or extends beyond the "managed area".

SA3.11.6.3 If a habitat's range falls entirely within the "managed area", the team shall consider the habitat's range inside the "managed area".

SA3.11.6.4 If a habitat's range extends beyond the "managed area", the team shall consider the habitat's range both inside and outside the "managed area". ◙

SA3.12 Habitats management strategy PI (PI 2.3.2) ◙

Table SA16: PI 2.3.2 habitats management strategy PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Habitats	Management strategy **2.3.2** There is a **strategy** in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.	(a) Management **strategy** in place	There are **measures** in place, **if necessary**, that are expected to achieve the habitat outcome SG80 level.	There is a **partial strategy** in place, **if necessary**, that is expected to achieve the habitat outcome SG80 level or above.	There is a **strategy** in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.
		(b) Management **strategy** effectiveness	The **measures**, **if necessary**, are considered **likely** to work, based on **plausible argument**.	There is some **evidence** that the measures/ the partial strategy, **if necessary**, is achieving the objectives set out in SI (a), based on **information directly about the UoA and/or habitats** involved.	There is evidence that the **partial strategy/strategy** is achieving the objectives set out in SI (a), based on **information directly about the UoA and/or habitats** involved.
		(c) Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' **measures** to protect **more** sensitive habitats	Information is adequate to **broadly understand** compliance in the UoA with management requirements to protect **more** sensitive habitats.	Information is adequate to **determine**, with a **high degree of accuracy**, compliance in the UoA with both its management requirements and protection measures afforded to **more** sensitive habitats by	Information is adequate to **determine**, with a **very high degree of accuracy**, compliance in the UoA with both its management requirements and with protection measures afforded to **more** sensitive

Component	PI	Scoring issues	SG60	SG80	SG100
				other MSC UoAs/non-MSC fisheries, **where relevant**.	habitats by other MSC UoAs/non-MSC fisheries, **where relevant**.
		(d) Ghost gear management strategy	There are **measures** in place, **if necessary**, for the UoA that are expected to **minimise** ghost gear and its impact on all habitats.	There is a **partial strategy** in place for the UoA, **if necessary**, that is expected to **minimise** ghost gear and its impact on all habitats.	There is a **strategy** in place for the UoA, **if necessary**, that is expected to **minimise** ghost gear and its impact on all habitats.

SA3.12.1 The team shall consider the differences between "measures", "partial strategy", and "strategy" as they apply to habitat management. ◙

SA3.12.1.1 In scoring issue (a) at the SG60 and SG80 levels, the "measures" or "partial strategy" respectively, for a UoA that encounters more sensitive habitats shall include, at a minimum: ◙

a. Requirements to comply with management "measures" to protect "more" sensitive habitats.

b. Implementation by the UoA of precautionary measures to avoid encounters with "more" sensitive habitats and avoid potential serious or irreversible harm.

SA3.12.1.2 In scoring issue (a) at the SG100 level: ◙

a. The "strategy" for a UoA that encounters "more" sensitive habitats shall include a comprehensive management plan that is supported by a comprehensive impact assessment that determines that all fishing activities will not cause serious or irreversible harm to "more" sensitive habitats.

b. A management "strategy" shall be in place for all UoAs, including those that do not regularly contact benthic habitats, because gear loss or unexpected benthic impact could occur.

SA3.12.2 The team shall score scoring issue (c) if:

a. The UoA impacts a "more" sensitive habitat, and/or

b. Another MSC UoA or non-MSC fishery, where relevant, impacts a "more" sensitive habitat within the UoA's "managed area" (as defined in SA3.11.6).

SA3.12.2.1 For scoring issue (c), to avoid the possibility that the cumulative impact of MSC UoAs could cause serious or irreversible harm to "more" sensitive habitats, the team shall assess the extent to which the UoA:

a. Takes into account and implements, "where relevant", precautionary protection measures implemented by other MSC UoAs.

b. Takes into account information from non-MSC fisheries, where available and "where relevant".

SA3.12.2.2 In determining "where relevant", the team shall include: ◙

a. Consideration only of areas where closure is clearly aimed at precautionary protection of more sensitive habitats, based on scientific rationale and best practice. The team shall not include closures that are designed for other purposes.

b. Avoidance of closed areas arising from move-on rules and consideration of other "measures" implemented by all MSC UoAs.

c. Avoidance of any relevant move-on areas implemented by non-MSC fisheries if the area coordinates are available.

SA3.12.3 In scoring issue (c), the team shall apply the Evidence Requirements Framework in Tool B of the MSC Fisheries Standard Toolbox to determine which guidepost is met.

Ghost gear management strategy

SA3.12.4 In assessing (d), the team shall apply SA3.6.3 and SA3.6.4 ~~strategy~~.

SA3.12.4.1 The term "if necessary" used at SG60, SG80, and SG100 refers to whether the risk of ghost fishing or ghost gear impacts are either demonstrably absent or "negligible".

SA3.13 Habitats information PI (PI 2.~~1.2~~3.3) ◙

Table SA17: PI 2.3.3 habitats information PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Habitats	Information **2.~~1.2~~3.3** Information is adequate to determine the impact of the UoA on habitats, including changes in the risk posed by the UoA over time.	(a) Information quality	The types and distribution of habitats are **broadly understood**.	The nature, distribution, and **vulnerability** of habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA.	The distribution of habitats is known over their range, with particular attention given to the occurrence of **vulnerable** habitats.
		(b) Information adequacy for assessment of impacts	Information is adequate to **broadly understand** the impacts of gear use on habitats.	Information is adequate to **estimate** the impacts of the UoA on habitats with a **high degree of accuracy**.	Information is adequate to **estimate** the impacts of the UoA on habitats with a very **high degree of accuracy**.
		(c) Monitoring ◙		Adequate information continues to be collected to detect any	Changes in habitat distributions over time are measured.

Component	PI	Scoring issues	SG60	SG80	SG100
				increase in risk to habitats.	

SA3.13.1 The team shall interpret "vulnerability" for the SG80 and SG100 levels to mean the combination of:

a. The likelihood that the gear would encounter the habitat.

b. The likelihood that the habitat would be altered were an encounter between the gear and the habitat to occur.

SA3.13.2 In scoring issue (b), the team shall apply the Evidence Requirements Framework in Tool B of the MSC Fisheries Standard Toolbox to determine which guidepost is met.

SA3.14 Ecosystem outcome PI (PI 2.4.1)

Table SA18: PI 2.4.1 ecosystem outcome PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Ecosystem	Outcome status **2.4.1** The UoA does not cause serious or irreversible harm to the **key** elements underlying ecosystem structure and function.	(a) Ecosystem status	The UoA is **unlikely** to disrupt the **key** elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to disrupt the **key** elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is **highly unlikely** to disrupt the **key** elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm.

SA3.14.1 This PI considers the wider ecosystem structure and function. The team shall score the direct effects of the UoA on other components of the assessment (i.e. P1 target species, in-scope species, ETP/OOS species, and habitats) separately to this PI.

SA3.14.2 The team shall identify and describe the assessed ecosystem in relation to the spatial and temporal scale of the UoA and its intensity.

SA3.14.3 The team shall identify and assess all relevant key ecosystem elements on which the UoA has an impact.

SA3.14.4 The team shall interpret "key" ecosystem elements as: ◙

a. The features of an ecosystem considered most crucial to the ecosystem's characteristic nature and dynamics.

b. The features most crucial to maintaining the integrity of its structure and functions and the key determinants of its resilience and productivity.

SA3.14.5 The team shall identify whether the UoA impact on key ecosystem element(s) includes indirect effects on ETP/OOS units. ◙

SA3.14.5.1 The team shall evaluate whether any identified indirect impacts are "likely" to hinder the recovery of the ETP/OOS unit.

SA3.14.5.2 Where it is determined that indirect impacts are "likely" to hinder recovery of ETP/OOS units, the team shall consider this to be evidence that the UoA is "likely" to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm.

SA3.14.6 The team shall ensure that any qualitative analysis and/or expert judgements used to score a UoA at SG60 and SG80 are approximately equivalent to the quantitative probability interpretation in SA3.2.1 and Table SA8.

SA3.14.6.1 The team shall provide justification for equivalence.

SA3.14.6.2 The team shall use a range of informed viewpoints or alternative hypotheses to make qualitative judgements about the probability interpretation of the SG.

SA3.15 Ecosystem management strategy PI (PI 2.4.2)

Table SA19: PI 2.4.2 ecosystem management strategy PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Ecosystem	Management strategy **2.4.2** There are **measures** in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.	(a) Management **strategy** in place ◙	There are **measures** in place, **if necessary**, which considers the potential impacts of the UoA on the **key** elements underlying ecosystem structure and function.	There is a **partial strategy** in place, **if necessary**, that is expected to achieve the Ecosystem outcome SG80 level.	There is a **strategy** in place for managing the impact of the UoA on the **key** elements underlying ecosystem structure and function.
		(b) Management **strategy** effectiveness	The **measures, if necessary**, are considered **likely** to work, based on plausible argument.	There is **some evidence** that the **measures**/ **partial strategy**, **if necessary**, is achieving the objectives set out in scoring issue (a) based on some information directly about the UoA and/or the	There is **evidence** that the **partial strategy**/ **strategy** is achieving the objectives set out in scoring issue (a) based on information directly about the UoA and/or ecosystem involved.

Component	PI	Scoring issues	SG60	SG80	SG100
				ecosystem involved.	

SA3.15.1 In scoring issue (a), the team shall consider whether the management is capable of adapting to environmental changes.

SA3.15.2 In scoring issue (a) the team shall interpret “strategy” to include well-understood functional relationships between the UoA and the “key” elements of the ecosystem. ◙

~~SA3.17.1 The team shall note that the measures required by SG60 may exist primarily to manage the impact on target species or other components, but have the capacity to achieve ecosystem outcomes.~~

~~SA3.17.2 The team shall note that the plan and measures in place at SG100 should be based on well-understood functional relationships between the UoA and the components and elements of the ecosystem.~~

~~SA3.17.2.1 The plan should provide for the development of a full strategy that restrains impacts on the ecosystem to ensure the UoA does not cause serious or irreversible harm.~~

~~SA3.17.3 The team shall note that for SG80 and SG100, partial strategies and strategies respectively may also contain measures designed and implemented to address impacts on components that have been evaluated elsewhere in this framework.~~

~~SA3.17.3.1 If the measures address specific ecosystem impacts effectively enough to meet the appropriate standard, then it is not necessary to have special “ecosystem measures” to address the same impacts.~~

~~SA3.17.3.2 It may not be necessary to have a specific “ecosystem strategy” other than that which comprises the individual strategies for the other components under P1 and P2.~~

~~SA3.17.3.3 If there are ecosystem impacts that may not be addressed effectively by existing measures, it may be necessary to add new measures or strengthen existing ones to address those impacts.~~

SA3.16 Ecosystem information PI (PI 2.4.3)

Table SA20: PI 2.4.3 ecosystem information PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Ecosystem	Information **2.4.3** There is adequate knowledge of the ecosystem and the main impacts of the UoA on **key** ecosystem elements.	(a) Information quality	**Information is adequate** to **identify** the **key** elements of the ecosystem.	**Information is adequate** to **broadly understand** the **key** elements of the ecosystem.	
		(b) Investigation of UoA impacts	Main impacts of the UoA on the **key** ecosystem elements **can be inferred** from existing information.	Main impacts of the UoA on the **key** elements of the ecosystem **have been investigated in detail**.	Main interactions between the UoA and the **key** ecosystem elements **have been investigated in detail**.
		(c) Understand-ing of component (i.e. P1 target species, in-scope and ETP/OOS species, and habitats) functions		The main functions of the components in the ecosystem are **known**.	The impacts of the UoA on the components are identified and the main functions of these components in the ecosystem are **understood**.
		(d) Monitoring		Adequate data continue to be collected to detect any increase in risk level.	**Information is adequate** to support the development of strategies to manage ecosystem impacts.

SA3.16.1 In scoring issue (d) the team shall interpret “information is adequate” to include an understanding of the effects of climate change on the natural productivity of the UoAs. ◙

~~SA3.18.1 In scoring issue (b), the team shall: ◙~~

~~SA3.18.1.1 Require some information of “the main impacts of the UoA on these key ecosystem elements” at the SG80 level.~~

~~SA3.18.1.2 Focus on the "main interactions between the UoA and these ecosystem elements" at the SG100 level. At this level:~~

~~d. UoAs should be capable of adapting management to environmental changes as well as managing the effect of the UoA on the ecosystem.~~

~~e. Monitoring the effects of environmental change on the natural productivity of the UoAs should be considered best practice and should include recognition of the increasing importance of climate change~~

SA4 Principle 3

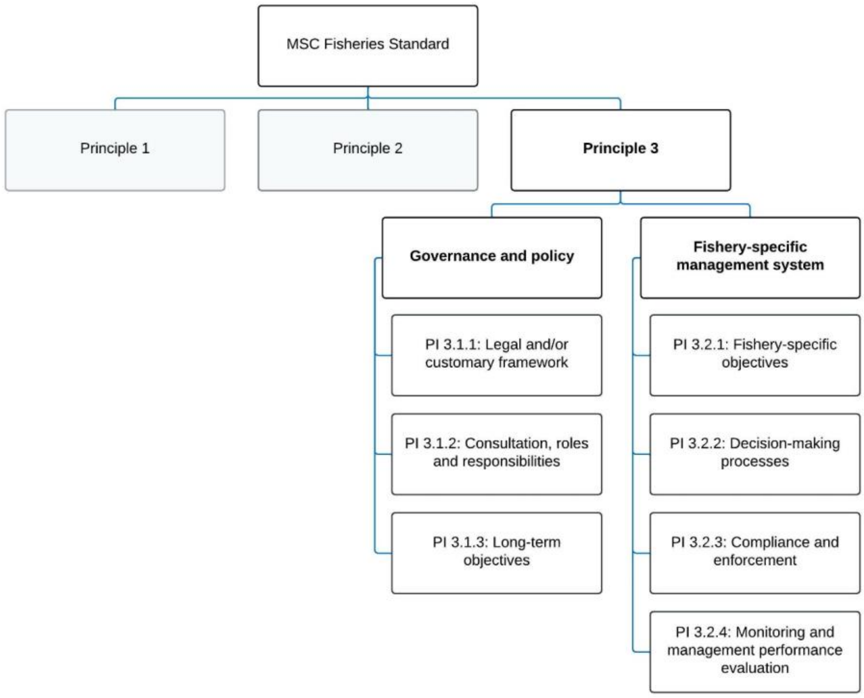
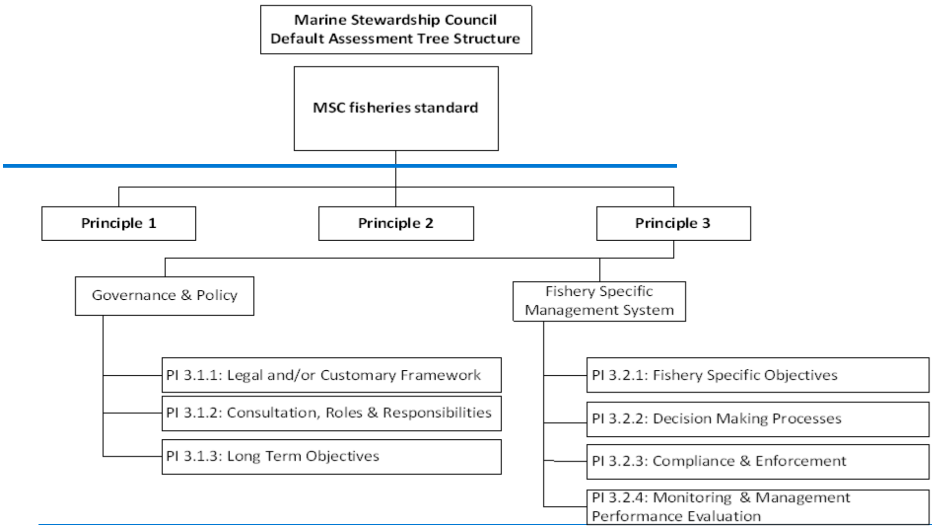


Figure ~~SA:~~SA4: Principle 3 default assessment tree ~~structure~~



SA4.1 General requirements for Principle 3 ◙

SA4.1.1 The team shall determine and document which jurisdictional category or combination of jurisdictional categories apply to the management system of the UoA, including: ◙

a. Single jurisdiction.

b. Single jurisdiction with indigenous component.

c. Shared stocks.

d. Straddling stocks.

e. Stocks of highly migratory species (HMS).

f. Stocks of discrete high seas non-HMS

SA4.1.1.1 The team shall consider formal, informal, and/or traditional management systems when assessing performance of UoAs under Principle 3.

SA4.1.2 The team shall evaluate all UoAs under P3 PIs, regardless of whether or not the UoA is subject to international cooperation to manage stocks.

SA4.1.3 The team shall not individually assess the performance of other fisheries' management bodies where they are also subject to international cooperation to manage the stock, except where they impact directly on P1 and P2 outcomes and/or P3 implementation. ◙

SA4.1.4 The team shall provide, in the rationale, evidence demonstrating the validity and robustness of the conclusions for scores that are based on the consideration of informal or traditional management systems.

a. Using different methods to collect information.

b. Cross-checking opinions and views from different segments of the stakeholder community.

SA4.1.5 The team shall consider the scale and intensity of the UoA in determining the appropriateness of the management system.

SA4.1.4.1 ~~Teams shall determine and state which jurisdictional category or combination of~~ The ~~jurisdictional categories apply to the management system of the UoA, including~~

team shall obtain this evidence by: ~~consideration of formal, informal and/or traditional management systems when assessing performance of UoAs under Principle 3, including:~~

~~SA4.1.1~~

- ~~a. Single jurisdiction;~~
- ~~b. Single jurisdiction with indigenous component;~~
- ~~c. Shared stocks;~~
- ~~d. Straddling stocks;~~
- ~~e. Stocks of highly migratory species (HMS);~~
- ~~f. Stocks of discrete high seas non-HMS.~~

~~SA4.1.2~~ ~~UoAs subject to international cooperation to manage stocks as well as UoAs not subject to international cooperation to manage stocks shall be subject to evaluation under P3 Performance Indicators.~~

~~SA4.1.3~~ ~~The performance of other fisheries' management bodies where they are also subject to international cooperation to manage the stock shall not be individually assessed, except where they impact directly on P1 and P2 outcomes and/or P3 implementation.~~

~~SA4.1.4~~ ~~When scores are based on the consideration of informal or traditional management systems, the team shall provide, in the rationale, evidence demonstrating the validity and robustness of the conclusions by:~~

- ~~g. Using different methods to collect information.~~
- ~~h. Cross checking opinions and views from different segments of the stakeholder community.~~

~~SA4.1.5~~ ~~Teams shall consider the scale and intensity of the UoA in determining the appropriateness of the management system.~~

SA4.2 Principle 3 terminology

~~SA4.2.1~~ ~~The term "explicit" as used in the Principle 3 scoring guideposts is not applicable solely to formally codified or documented management measures and mechanisms.~~

~~SA4.2.2~~ ~~The term "explicit" shall also refer to informal management measures and mechanisms that are well established and effective.~~

~~SA4.2.3~~ ~~In scoring management performance in the continuum from implicit to explicit, the team shall consider:~~

~~SA4.2.3.1~~ ~~The extent to which such management measures, whether formal or informal, are established in the UoA,~~

~~SA4.2.3.2~~ ~~How well they are understood and applied by users within the UoA, and~~

~~SA4.2.3.3~~ ~~The extent to which such measures are considered durable and unambiguous.~~

SA4.2.1 The term “explicit” as used in P3 scoring guideposts shall refer to:

a. Formally codified or documented management “measures” and mechanisms, and/or

b. Informal management “measures” and mechanisms that are well established and effective.

SA4.2.1.1 In scoring management performance in the continuum from implicit to “explicit”, the team shall consider:

a. The extent to which such management “measures”, whether formal or informal, are established in the UoA.

b. How well they are understood and applied by users within the UoA.

c. The extent to which such measures are considered durable and unambiguous.

SA4.3 Legal and/or customary framework PI (PI 3.1.1) ◙

Table SA21: PI 3.1.1 legal and/or customary framework PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Governance and policy	Legal and/or customary framework **3.1.1** The management system exists within an appropriate and effective legal and/or customary framework that ensures that it: – Is capable of delivering sustainability in the UoA(s). – Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood. – Incorporates an appropriate dispute	(a) **Compatibility of laws or standards with effective management** ◙	There is an **effective national legal system** and a **framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an **effective national legal system** and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an **effective national legal system** and **binding procedures governing cooperation with other parties** that deliver management outcomes consistent with MSC Principles 1 and 2.
		(b) Resolution of disputes ◙	The management system incorporates or is subject by law to a **mechanism** for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes, which is **considered to be effective** in dealing with most issues and that is appropriate to	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes, which is appropriate to the context of the fishery and has been **tested and proven to be effective**.

Component	PI	Scoring issues	SG60	SG80	SG100
	resolution framework.			the context of the UoA.	
		(c) Respect for rights ◙	The management system has a mechanism to **generally respect** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **observe** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **formally commit** to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

SA4.3.1 At the SG60 level for scoring issue (a), the team shall interpret "compatibility of laws or standards with effective management" as follows:

a. For a UoA not subject to international cooperation for management of the stock, this means:

i. The existence of national laws, agreements, and policies governing the actions of all the authorities and actors involved in managing the UoA.

ii. That these laws, agreements, and/or policies provide a framework for cooperation between national entities on national management issues, as appropriate for the context, size, scale, or intensity of the UoA.

b. For a UoA subject to international cooperation for management of the stock, for example, shared, straddling, HMS, and high seas non-HMS, this means:

i. The fishery is not conducted under a "controversial" "unilateral" "exemption" to an "international agreement", and ◙

ii. National and international laws, arrangements, agreements, and policies exist that govern the actions of the authorities and actors involved in managing the UoA, and

iii. A framework for cooperation with other territories, sub-regional, or regional fisheries management organisations exists, or

iv. Other bilateral/multilateral arrangements exist that create the cooperation required to deliver sustainable management under the obligations of the United Nations Convention on the Law of the Sea (UNCLOS) Articles 63(2), 64, 118, and 119, and the 1995 United Nations Fish Stocks Agreement (UNFSA) Article 8.

SA4.3.1.1 Cooperation shall at least deliver the intent of UNFSA Article 10 paragraphs relating to: ◙

a. The collection and sharing of scientific data.

b. The scientific assessment of stock status.

c. Development of scientific advice.

SA4.3.1.2 The flag state of participants in the UoA shall have at least cooperating non-member status within a relevant sub-regional or regional fisheries management organisation, or another bilateral/multilateral arrangement, if such exists.

SA4.3.2 At the SG80 level for scoring issue (a), the team shall interpret "compatibility of laws or standards with effective management" as follows:

a. For a UoA not subject to international cooperation for management of the stock, this means:

i. The existence of national laws, agreements, and policy governing the actions of all the authorities and actors involved in managing the UoA.

ii. That these laws, agreements, and/or policies also provide for organised cooperation between national entities on national management issues; for example, between regional and national management, state and federal management, indigenous, and other groups.

b. For a UoA subject to international cooperation for management of the stock, this means: ◙

i. The existence of national and international laws, agreements and policies governing the actions of the authorities and actors involved in managing the UoA.

ii. That effective regional and/or international cooperation creates a comprehensive cooperation under the obligations of UNCLOS Articles 63(2), 64, 118, 119, and UNFSA Article 8.

iii. That cooperation shall at least deliver the intent of UNFSA Article 10 paragraphs relating to the collection, sharing, and dissemination of scientific data; the scientific assessment of stock status and development of management advice; the agreement and delivery of management actions consistent with this sustainable management advice; and on monitoring and control.

iv. That the flag state of fishery participants in the UoA shall be members of the relevant organisation or participants in the arrangement, or agree to apply the conservation and management measures established by the organisation or arrangement, if such organisation or arrangement exists.

SA4.3.3 At the SG100 level for scoring issue (a), the team shall interpret "compatibility of laws or standards with effective management" as follows: ◙

a. For a UoA not subject to international cooperation for management of the stock, this means:

i. National laws, agreements, and policies governing the actions of all the authorities and actors involved in managing the UoA.

ii. That these laws, agreements, and/or policies also provide for a formal system for cooperation between national entities; for example, between regional and national management, state and federal management, indigenous, and other groups.

b. For a UoA subject to international cooperation for management of the stock, this means:

i. The existence of national laws, agreements, and policies governing the actions of the authorities and actors involved in managing the UoA.

ii. That binding legislation exists governing comprehensive international cooperation under the obligations of UNCLOS Articles 63(2), 64, 118, 119, and UNFSA Articles 8 and 10.

iii. That cooperation under the regional fisheries management organisation (RFMO)/arrangement, and the actions of the RFMO, shall demonstrably and effectively deliver UNFSA Article 10.

SA4.3.3.1 The team shall interpret across SGs 60, 80, and 100 that "effective national legal system" means that the client can provide objective evidence that most of the essential features and elements needed to deliver sustainable fisheries are present in:

a. A coherent, logical set of practices or procedures, or

b. Within a coherent, logical, supporting, "rule-making" structure.

SA4.3.4 At the SG60 level for scoring issue (b), the team shall expect that the UoA is not subject to disputes that overwhelm the fishery enough to prevent it from meeting the objectives of MSC P1 and P2. ◙

SA4.3.5 For scoring issue (c), the team shall not make its own judgements or unilateral decisions about whether or not custom or national treaties relating to aboriginal or indigenous people have conferred rights upon any particular group or individual.

SA4.3.6 The team shall interpret "generally respect" in scoring issue (c) at SG60 to mean that there is some evidence that the legal and/or customary framework for managing fisheries considers the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood, and their long-term interests.

SA4.3.7 The team shall interpret "observe" in scoring issue (c) at SG80 to mean that:

a. There are more-formal arrangements such as bylaws or regulations that make explicit the requirement to consider the legal rights created explicitly or by custom of people dependent on fishing for food or livelihood.

b. Those people's long-term interests are taken into account within the legal and/or customary framework for managing fisheries.

SA4.3.8 The team shall interpret "formally commit" in scoring issue (c) at SG100 to mean that the client can demonstrate a mandated legal basis where rights are fully codified within the fishery management system, and/or its policies and procedures for managing fisheries under a legal framework.

SA4.4 Consultation, roles, and responsibilities PI (PI 3.1.2) ◙

Table ~~SA:~~SA22: PI 3.1.2 consultation, roles, and responsibilities PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Governance and policy	Consultation, roles and responsibilities **3.1.2** The management system has effective consultation processes that are open to interested	(a) Roles and responsibilities	Organisations and individuals involved in the management process have been identified. Functions, roles, and responsibilities are **generally understood**.	Organisations and individuals involved in the management process have been identified. Functions, roles, and responsibilities are **explicitly defined and well**	Organisations and individuals involved in the management process have been identified. Functions, roles, and responsibilities are **explicitly defined and well**

Component	PI	Scoring issues	SG60	SG80	SG100
	and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties.			**understood for key areas** of responsibility and interaction.	**understood for all areas** of responsibility and interaction.
		(b) Consultation processes ◙	The management system includes consultation processes that **obtain relevant information** from the main affected parties, including **local knowledge**, to inform the management system.	The management system includes consultation processes that **regularly seek and accept** relevant information, including **local knowledge**. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that **regularly seek and accept** relevant information, including **local knowledge**. The management system demonstrates consideration of the information and **explains how it is used or not used**.
		(c) Participation		The consultation process **provides opportunity** for all interested and affected parties to be involved.	The consultation process provides **opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.

SA4.4.1 The team shall focus scoring on the effectiveness and transparency of the consultation processes implemented by fishery managers to obtain and consider information from a wide range of sources, including local knowledge, for input into a broad range of decisions, policies, and practices within the management system. ◙

SA4.4.2 The team shall not focus scoring under this PI on the type of information obtained, nor on mandating for what or how it must be used.

SA4.4.3 The team shall verify that consultation processes within the management system include consideration of consultation processes at the management system level and fishery-specific management systems that occur within it.

SA4.4.4 The team shall consider consultation processes that exist at a multinational level and a national level, subject to SA4.1.3.

a. Qualitative information, and/or
b. Anecdotal information, and/or
c. Quantitative information, and/or
d. Data that comes from individuals or groups local to the fisheries managed under the UoA's management system.

SA4.5 Long-term objectives PI (PI 3.1.3) ◙

Table ~~SA:~~SA23: PI 3.1.3 long-term objective PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Governance and policy	Long-term objectives **3.1.3** The **management policy** has clear long-term objectives to guide decision-making that are consistent with the MSC Fisheries Standard, and incorporates the **precautionary approach**.	(a) Objectives ◙	Long-term objectives to guide decision-making, consistent with the MSC Fisheries Standard and the **precautionary approach**, are **implicit** within **management policy**.	**Clear** long-term objectives that guide decision-making, consistent with the MSC Fisheries Standard and the **precautionary approach**, are **explicit** within **management policy**.	**Clear** long-term objectives that guide decision-making, consistent with the MSC Fisheries Standard and the **precautionary approach**, are **explicit** within and **required by management policy**.

SA4.5.1 The team shall interpret "management policy" to mean outside the specific UoA, hence at a higher level or within a broader context than the fishery-specific management system.

SA4.5.2 The team shall interpret the "precautionary approach" for the purposes of scoring this PI to mean:

a. Being cautious when information is uncertain, unreliable, or inadequate.
b. That the absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures.

SA4.6 Fishery-specific management system PIs

SA4.6.1 The team shall ensure that all aspects of the fishery-specific management system are appropriate to the scale, intensity, and cultural context of the fishery.

SA4.7 Fishery-specific objectives PI (PI 3.2.1)

Table ~~SA:~~SA24: PI 3.2.1 fishery-specific objectives PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Fishery-specific management system	Fishery-specific objectives **3.2.1** The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC Principles 1 and 2.	(a) Objectives ◙	**Objectives**, which are broadly consistent with achieving the outcomes expressed by MSC Principles 1 and 2, are **implicit** within the fishery-specific management system.	**Short- and long-term objectives**, which are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, are **explicit** within the fishery-specific management system.	**Well-defined and measurable short- and long-term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC Principles 1 and 2, are **explicit** within the fishery-specific management system.

SA4.7.1 The team shall verify that the individual harvest or management strategies that are scored in PIs under P1 and P2 are consistent with the fishery-specific objectives being scored under P3.

SA4.7.1.1 The team shall assess objectives under this PI.

SA4.7.1.2 The team shall assess strategies that implement the objectives under P1 and P2.

~~SA4.7.2 The team shall interpret “measurable” at SG100 to mean that in addition to setting fishery-specific objectives that make broad statements objectives are operationally defined in such a way that the performance against the objective can be measured. ◙~~

SA4.8 Decision-making processes PI (PI 3.2.2)

Table SA25: PI 3.2.2 decision-making processes PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Fishery-specific management system	Decision-making processes **3.2.2** The fishery-specific management system includes effective decision-making processes that result in **measures** and **strategies** to achieve the objectives, and has an appropriate approach to actual disputes in the fishery.	(a) Decision-making processes ◙	There are **some** decision-making processes in place that result in **measures** and **strategies** to achieve the fishery-specific objectives.	There are **established** decision-making processes that result in **measures** and **strategies** to achieve the fishery-specific objectives.	
		(b) Responsive-ness of decision-making processes ◙	Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation, and consultation, in a transparent, timely, and adaptive manner, and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation, and consultation, in a transparent, timely, and adaptive manner, and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation, and consultation, in a transparent, timely, and adaptive manner, and take account of the wider implications of decisions.
		(c) Use of precautionary approach		Decision-making processes use the **precautionary approach** and are based on best available information.	
		(d) Accountability and transparency of	Some information on the fishery's performance and	**Information on the fishery's performance and**	Formal reporting to all interested stakeholders **provides**

		management system and decision-making process ◙	management action is generally available on request to stakeholders.	**management action is available on request,** and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation, and review activity.	**comprehensive information on the fishery's performance and management actions** and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation, and review activity.
		(e) Approach to disputes ◙	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability of the fishery.	The management system or UoA is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or UoA acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.

SA4.8.1 The team shall verify that the absence of adequate scientific information is not used as a reason for postponing or failing to take conservation and management measures.

SA4.8.2 At SG80 and SG100, the team shall interpret the "precautionary approach" in this PI to mean that decision-making processes use caution when information is uncertain, unreliable, or inadequate.

SA4.8.3 At SG100, the team shall verify that resulting measures and strategies from decision-making processes involve comprehensive, integrated measures or holistic strategies, rather than individual or single measures.

SA4.8.4 In assessing scoring issue (d), the team shall consider:

a. Public access to information on the fishery's performance and fisheries data.

a. Availability of information to stakeholders on actions taken by management that have implications for sustainable use of fisheries resources.

b. Transparency of the decision-making process, so that it is clear to all stakeholders that decisions were arrived at based on available evidence and due process.

SA2.4.4.1 At the SG60 level, the team should make available to all stakeholders on request at least a general summary of information on subsidies, allocation, compliance, and fisheries management decisions.

SA2.4.4.2 At the SG80 level, in addition to the information provided at the SG60 level, the team should make available to all stakeholders:

a. Information on decisions.

b. Fisheries data supporting decisions.

c. The reasons for decisions.

SA2.4.4.3 At the SG100 level, the information listed in the SG60 and SG80 levels shall be comprehensive and available openly, publicly, and regularly to all stakeholders.

SA2.5 Compliance and enforcement PI (PI 3.2.3) ◙

Table SA26: **PI 3.2.3 compliance and enforcement PISGs**

Component	PI	Scoring issues	SG60	SG80	SG100
Fishery-specific management system	Compliance and enforcement **3.2.3** Monitoring, control, and surveillance (MCS) mechanisms ensure the management measures in the UoA are enforced and complied with.	(a) MCS system ◙	MCS **mechanisms** ~~has been implemented~~ exist within the UoA. ~~and are implemented in the fishery and there is a reasonable expectation that they are effective.~~	An MCS **system** ~~has been implemented~~ exists within the UoA. ~~and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.~~	A **comprehensive** MCS **system** is well ~~implemented~~ established within the UoA.~~and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.~~
		(b) Sanctions ◙	Sanctions to address non-compliance exist within the UoA. ~~and there is some evidence that they are applied.~~	Sanctions to address non-compliance exist, which are appropriate to the UoA, and are applied. ~~are consistently applied and thought to provide effective deterrence.~~	Comprehensive sanctions to address non-compliance exist that are appropriate to the UoA and are consistently applied ~~and demonstrably provide effective deterrence..~~
		(c) Compliance (information)	Information is adequate to **broadly understand** compliance in the UoA. ~~Fishers are generally thought to comply with the management system under assessment, including, when required, providing information of importance to the effective~~	Information is adequate to **estimate** compliance in the UoA with a **high degree of accuracy**. ~~Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing~~	Information is adequate to **estimate** compliance in the UoA with a **very high degree of accuracy**. ~~There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to~~

			management of the fishery.	~~information of importance to the effective management of the fishery.~~	~~the effective management of the fishery.~~
		(d) Compliance (outcome) ◙	**Systematic non-compliance** of regulations specific to governing sustainable fishing practices on the water is not evident within the UoA.	Majority of regulations, including all regulations specific to governing sustainable fishing practices on the water, are **likely** to be complied with. ~~There is no evidence of systematic non - compliance.~~	Majority of regulations, including all regulations specific to governing sustainable fishing practices on the water, are consistently complied with.

SA2.5.1 The team's judgement on this PI shall be informed, to the extent possible, by independent and credible information from relevant compliance and enforcement agencies or individuals and/or stakeholders.

SA2.5.2 In scoring issue (d), the team shall include compliance with regulations associated with "protected habitats" and "protected species".

SA2.5.2.1 The team shall interpret "protected habitats" to mean habitats that have been afforded a level of protection by a competent authority.

SA2.5.2.2 The team shall interpret "protected species" to mean species, stocks, or populations that have been listed in national ETP legislation.

SA2.5.3 The team shall, at SG100 for scoring issue (a), consider whether the MCS systems are comprehensive in relation to their coverage, the independence of the systems, and the internal checks and balances.

SA2.5.4 In scoring issue (c), the team shall apply the Evidence Requirements Framework in Tool B of the MSC Fisheries Standard Toolbox to determine which guidepost is met.

SA2.5.5 In scoring issue (d), the team shall interpret "systematic non-compliance" to mean the recurring infringement of regulations specific to governing sustainable fishing practices on the water.

SA2.6 Monitoring and management performance evaluation PI (PI 3.2.4) ◙

Table ~~SA:~~SA27: PI 3.2.4 monitoring and management performance evaluation PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Fishery-specific management system	Monitoring and management performance evaluation **3.2.4** There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives. There is effective and timely review of the fishery-specific management system.	(a) Evaluation coverage	There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **key** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.
		(b) Internal and/or **external review**	The fishery-specific management system is subject to **occasional** internal review.	The fishery-specific management system is subject to **regular** internal and **occasional external review**.	The fishery-specific management system is subject to **regular** internal and external review.

SA2.6.2 The team shall interpret "occasional" and "regular" relative to the intensity of the UoA.

SA2.6.1 The team shall interpret "external review" at SG80 and 100 to mean external to the fishery-specific management system, but not necessarily international.

End of Section SA

Section SB: Modifications to the default assessment tree for enhanced bivalves – normative ◙

Modifications to the default assessment tree structure to be used in enhanced bivalve fishery assessments.

SB1 General

SB1.1 General requirements

SB1.1.1 The team shall apply Section SB as a supplement to Section SA in all enhanced bivalve fishery assessments.

SB1.1.1.1 This Section includes only additions or modifications to the default assessment tree and requirements in Section SA.

SB1.1.1.2 Unless otherwise noted, all other Section SA PISGs and requirements apply.

SB2 Principle 1

SB2.1 General requirements for Principle 1 ◙

SB2.1.1 The team shall clearly define in the Announcement Comment Draft Report (FCP 7.8) the type of enhanced bivalve fishery that will be assessed.

SB2.1.2 The team shall make an initial evaluation of whether there is evidence that an enhanced CAG bivalve fishery negatively impacts the parent stock.

SB2.1.3 The team shall make an initial evaluation of whether there is translocation. ◙

SB2.1.3.1 The team shall include in the rationale whether translocation negatively impacts the parent stock.

SB2.1.4 If an enhanced CAG bivalve fishery does not involve translocations, and there is no evidence that it negatively impacts the parent stock, the team may choose not to score Principle 1.

SB2.1.4.1 The team shall include a rationale for this decision in the 'MSC Notification Report Form' and Full Assessment Report.

SB2.1.4.2 If Principle 1 is not to be scored, Row 1 in FCP Table PC3 is not applicable.

~~SB2.1.2 Teams shall make an initial evaluation of whether there is evidence that an enhanced catch-and-grow (CAG) bivalve fishery negatively impacts the parent stock. ◙~~

~~SB2.1.3 Teams shall assume that CAG fisheries that involve translocations may impact the parent stock. ◙~~

~~SB2.1.4 If an enhanced CAG bivalve fishery does not involve translocations, and there is no evidence that it negatively impacts the parent stock, teams may choose not to score Principle 1.~~

~~SB2.1.4.1 The team shall include a rationale for this decision in the MSC Notification Report Form, and Full Assessment Report.~~

~~SB2.1.4.2 If Principle 1 is not to be scored, Row 1 in FCP Table PC3 is not applicable.~~

~~SB2.1.5 If there are translocations within an enhanced CAG bivalve fishery, Principle 1 PIs shall be scored in accordance with the RBF requirements.~~

~~SB2.1.5.1 The assessment shall be conducted on all sources of seed stock used in the fishery.~~

~~SB2.1.5.2 Enhanced CAG bivalve fisheries that involve translocations shall also be scored against the Genetic outcome PI 1.1.3.~~

~~SB2.1.6 Bivalve fisheries involving hatchery enhancement assessed as hatch-and-catch (HAC) fisheries shall be scored against Principle 1 PIs in accordance with the default assessment tree or the RBF requirements specified in Annex SA or FCP Annex PF, respectively.~~

~~SB2.1.6.1 Enhanced HAC bivalve fisheries shall also be scored against the Genetics PIs 1.1.3, 1.2.5, and 1.2.6.~~

~~SB2.2 Genetics~~

~~Table SB:~~

SB2.1.5.1 The team shall conduct the assessment on all sources of seed stock used in the fishery.

SB2.1.5.2 The team shall score enhanced CAG bivalve fisheries that involve translocations against the genetic outcome PI 1.1.3.

SB2.1.6 The team shall score bivalve fisheries that involve hatchery enhancement and that are assessed as HAC fisheries against Principle 1 PIs as per the default assessment tree in Section SA or the RBF requirements in Tool A of the MSC Fisheries Standard Toolbox ~~Genetics~~.

SB2.1.6.1 The team shall score enhanced HAC bivalve fisheries against the genetic component PIs 1.1.3, 1.2.5, and 1.2.6.

SB2.2 Genetic outcome PI (PI 1.1.3)

Table SB1: PI 1.1.3 genetic outcome PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Genetics	Genetic outcome **1.1.3** The fishery has **negligible** discernible impact on the genetic structure of the population.	(a) Genetic impact of enhancement activity	The fishery is **unlikely** to impact genetic structure of wild populations to a point where there would be serious or irreversible harm.	The fishery is **highly unlikely** to impact genetic structure of wild populations to a point where there would be serious or irreversible harm.	An independent peer-reviewed scientific assessment confirms with a **high degree of certainty** that there are no risks to the genetic structure of the wild population associated with the enhancement activity.

SB2.3 Genetic management PI (PI 1.2.5)

Table SB2: PI 1.2.5 ~~Genetics component~~genetic management PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Genetics	Genetic management **1.2.5** There is a **strategy** in place for managing the hatchery enhancement activity such that it does not pose a risk of serious or irreversible harm to the genetic diversity of the wild population.	(a) Genetic management **strategy** in place	There are **measures** in place, **if necessary**, which are expected to maintain the genetic structure of the population at levels compatible with the SG80 genetic outcome level of performance (PI 1.1.3).	There is a **partial strategy** in place, **if necessary**, which is expected to maintain the genetic structure of the population at levels compatible with the SG80 genetic outcome level of performance (PI 1.1.3).	There is a **strategy** in place to maintain the genetic structure of the population at levels compatible with the SG80 genetic outcome level of performance (PI 1.1.3).
		(b) Genetic management **strategy** evaluation ◙	The **measures** are considered **likely** to work based on plausible argument.	There is some **objective basis for confidence** that the **partial strategy** will work based on information directly relevant to the population(s) involved.	The **strategy** is based on **in-depth knowledge** of the genetic structure of the population, and **testing** supports **high confidence** that the **strategy** will work.
		(c) Genetic management strategy implementation		There is **some evidence** that the **partial strategy** is being implemented successfully, **if necessary**.	There is **clear evidence** that the **strategy** is being **implemented successfully**. There is some evidence that the **strategy** is **achieving its overall objective**.

SB2.4 Genetic information PI (PI 1.2.6)

Table SB3: PI 1.2.6 ~~Genetics component~~genetic information PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Genetics	Genetic information **1.2.6** Information on the genetic structure of the population is adequate to determine the risk posed by the enhancement activity and the effectiveness of the management of genetic diversity.	(a) Information quality	**Qualitative or inferential information** is available on the genetic structure of the population. Information is **adequate** to broadly understand the **likely** impact of hatchery enhancement.	**Qualitative or inferential information and some quantitative information** are available on the genetic structure of the population. Information is **sufficient** to estimate the **likely** impact of hatchery enhancement.	The genetic structure of the population is understood in **detail**. Information is **sufficient** to estimate the impact of hatchery enhancement with a **high degree of certainty**.
		(b) Information adequacy for genetic management **strategy**	Information is adequate to support **measures** to manage main genetic impacts of the enhancement activity on the stock, **if necessary**.	Information is adequate to support a **partial strategy** to manage the main genetic impacts of the enhancement activity on the stock, **if necessary**.	Information is adequate to support a **comprehensive strategy** to manage the genetic impacts of the enhancement activity on the stock and evaluate with a **high degree of certainty** whether the **strategy** is achieving its objective.

SB3 Principle 2

SB3.1 General requirements for Principle 2 ◙

SB3.1.1 All Principle 2 PIs in Section SA are applicable to enhanced HAC bivalve fisheries.

SB3.1.2 The team shall not score enhanced CAG bivalve fisheries based solely on spat collection for the in-scope species PIs. ◙

SB3.1.2.1 The team shall score enhanced CAG bivalve fisheries involving dredging for seed against the in-scope species PIs as per Section SA.

SB3.1.3 For enhanced CAG bivalve fisheries, the team shall score PIs for ETP/OOS species as per the requirements in Section SA.

SB3.1.4 For enhanced CAG bivalve fisheries, the team shall score PIs for habitats and ecosystems as per Section SA.

SB3.1.4.1 The team shall take into account the specific habitat and ecosystem impacts associated with enhanced CAG bivalve fisheries.

SB3.1.4.2 For suspended culture systems, the team's scoring shall consider the habitat impacts of bio-deposition and benthic organic enrichment, and the ecosystem and carrying capacity impacts of localised phytoplankton depletion from bivalve filtration. ◙

SB3.1.5 If an enhanced CAG bivalve fishery involves the translocation of seed or adult shellfish, the team shall score the fishery against the translocation PISGs 2.5.1, 2.5.2, and 2.5.3.

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SB3.2 Translocation outcome PI (PI 2.5.1)

Table SB4: PI 2.5.1 translocation ~~component~~outcome PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Translocation	Translocation outcome **2.5.1** The translocation activity has **negligible** discernible impact on the surrounding ecosystem.	(a) Impact of translocation activity ◙	The translocation activity is **unlikely** to introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem.	The translocation activity is **highly unlikely** to introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem.	There is **evidence** that the translocation activity is **highly unlikely** to introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem.

SB3.3 Translocation management PI (PI 2.5.2)

Table SB5: PI 2.~~6~~5.2 translocation component

Component	PI	Scoring issues	SG60	SG80	SG100
Translocation	Translocation management **2.5.2** There is a **strategy** in place for managing translocations such that the fishery does not pose a risk of serious or irreversible harm to the surrounding ecosystem.	(a) Translocation management **strategy** in place	There are **measures** in place which are expected to protect the surrounding ecosystem from the translocation activity at levels compatible with the SG80 translocation outcome level of performance (PI 2.5.1).	There is a **partial strategy** in place, **if necessary**, that is expected to protect the surrounding ecosystem from the translocation activity at levels compatible with the SG80 translocation outcome level of performance (PI 2.5.1).	There is a **strategy** in place for managing the impacts of translocation on the surrounding ecosystem.
		(b) Translocation management **strategy** evaluation ◙	The measures are considered **likely** to work based on plausible argument.	A valid documented risk assessment or equivalent environmental impact assessment demonstrates that the translocation activity is **highly unlikely** to introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem.	An independent peer-reviewed scientific assessment confirms with a **high degree of certainty** that there are no risks to the surrounding ecosystem associated with the translocation activity.
		(c) Translocation contingency measures		Contingency **measures** have been agreed in the case of an accidental introduction of diseases, pests, pathogens, or	A **formalised contingency plan** in the case of an accidental introduction of diseases, pests, pathogens, or non-native

				non-native species due to the translocation.	species due to the translocation is documented and available.

SB3.4 Translocation information PI (PI 2.5.3)

Table SB6: PI 2.~~6~~5.3 translocation component

Component	PI	Scoring issues	SG60	SG80	SG100
Translocation	Translocation information **2.5.3** Information on the impact of the translocation activity on the environment is adequate to determine the risk posed by the fishery.	(a) Information quality	Information is available on the presence or absence of diseases, pests, pathogens, and non-native species at the source and destination of the translocated stock to guide the management **strategy** and reduce the risks associated with the translocation.	Information is **sufficient** to adequately inform the risk and impact assessments required in the SG80 translocation management level of performance (PI 2.5.2).	Information from frequent and **comprehensive monitoring** demonstrates no impact from introduced diseases, pests, and non-native species with a **high degree of certainty**.

SB4 Principle 3

SB4.1 General requirements for Principle 3 ◙

SB4.1.1 The team shall score enhanced bivalve fisheries against Principle 3 PIs as per Section SA, with the exception of CAG fisheries, where P1 is not scored.

SB4.1.2 If P1 is not scored, the team shall focus P3 scoring on whether or not the appropriate and effective legal and/or customary framework is capable of delivering sustainable fisheries in accordance with P2 PISGs.

End of Section SB

Section SC: Modifications to the default assessment tree for salmon fisheries – normative

Modifications to the default assessment tree structure, including the PISGs for each of the 3 MSC Principles to be used in salmon fishery assessments. ◙

SC1 General

SC1.1 General requirements

SC1.1.1 The team shall apply Section SC as a supplement to Section SA in all salmon fishery assessments. ◙

SC1.1.1.1 Only additions or modifications in relevant sections of the default assessment tree and requirements are included in this Section.

SC1.1.2 The team shall score salmon fisheries against all PIs and scoring issues in Section SC.

Table SC1: Terms and definitions

Term	Definition and discussion
Artificial production	The artificial propagation of fish that are released into the natural environment. Artificial production is commonly used to increase the number of fish available to be caught or to rebuild depleted populations. It includes hatchery operations.
Artificially produced fish	Those fish whose parents spawned in a hatchery or artificial habitat as described above.
Biological Escapement Goal (BEG)	The escapement that provides the greatest potential for maximum sustainable yield.[2]
Diversity (of salmon)	The genetic variation and adaptations to different environments that have accumulated between populations of salmon.
Enhancement	Artificial intervention in the natural life cycle of salmon. This may include artificial production as defined above or other measures such as spawning channels, and lake ~~fertilization.~~fertilisation.
Population	A component of ~~an~~ a stock management unit (SMU~~.~~). Population refers to the wild production components ~~which~~that may occupy different locations at different times. A population could be a group of interbreeding salmon that is relatively isolated ~~(i.e.,~~, hence relatively demographically uncoupled from other such groups, and is likely to be adapted to the local habitat~~)~~.
Production (of salmon)	Recruits per spawner x total spawners. ~~i.e.,~~The total production of the population.
Productivity (of salmon)	The number of recruits per spawner. The term productivity is used in Section SA to mean productivity at the stock, not individual level. ~~Assessment teams~~The team should consider this when assessing salmon fisheries.

[2] Alaska Department of Fish and Game. (N.d.) Alaska fisheries sonar – escapement goals.

Term	Definition and discussion
Productivity (related to the ecological community or the ecosystem)	The rate of biomass production per unit area per time.
S_{MSY}	Spawner abundance at maximum sustainable yield.[3]
Stock management unit ~~(SMU)~~	A group of ~~one~~1 or more salmon populations. Generally, fishery management goals have been established by the management agency at this aggregate level. SMU is a broad management concept; not every population with a defined goal need be an individual SMU, but may be part of an SMU. For salmon fishery assessments ~~'stock'~~, "stock" in Section SA refers to the SMU level.
Wild fish	F1 generation fish whose parents spawned in the wild, regardless of parental lineage ~~(F1 generation);~~. Wild fish are also referred to as natural-origin fish.

[3] Department of Fisheries and Oceans. (2013) Proceedings of the National Workshop for Technical Expertise in Stock Assessment (TESA): Maximum Sustainable Yield (MSY) Reference Points and the Precautionary Approach when Productivity Varies. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2012/055

SC2 Principle 1

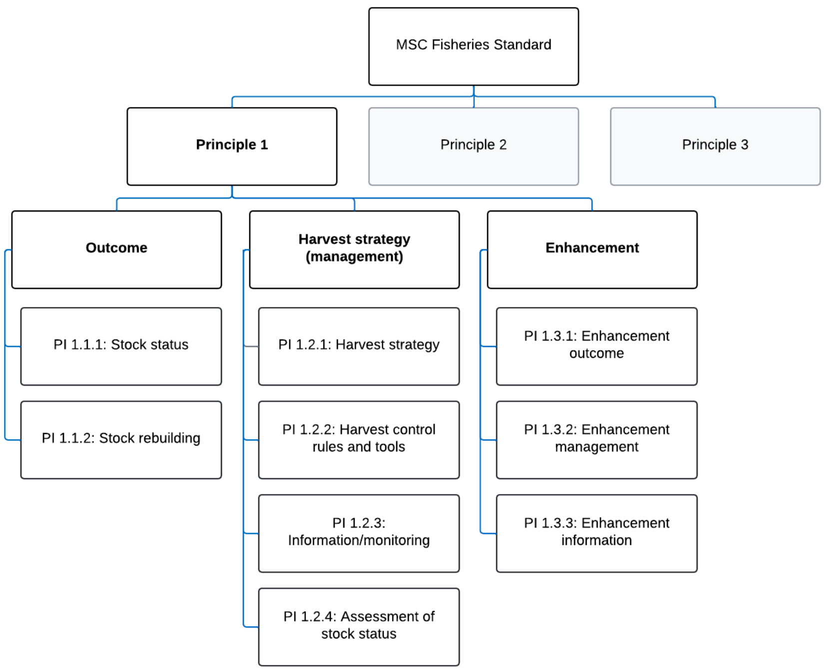

Figure SC1: Principle 1 modified default ~~Tree Structure~~assessment tree for salmon fisheries

SC2.1 General requirements for Principle 1

SC2.1.1 The team shall consider the unique population structure of salmon in its assessment of Principle 1. ◙

SC2.1.2 The team shall regard stock management units (SMUs) as equivalent to single stocks in Section SA.

SC2.1.3 Where Section SA default requirements apply, this is specifically noted in that section for Principle 1.

SC2.2 Stock status PI (PI 1.1.1) ◙

Table SC2: PI 1.1.1 stock status PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Outcome	Stock status **1.1.1** The SMU is at a level which maintains high production and has a low probability of falling below its LRP.	(a) Stock status	It is **likely** that the SMU is above the LRP.	It is **highly likely** that the SMU is above the LRP.	There is a **high degree of certainty** that the SMU is above the LRP.
		(b) Stock status in relation to the TRP. ◙		The SMU is at or **fluctuating around** its TRP.	There is a **high degree of certainty** that the SMU has been **fluctuating around** its TRP, or has been above its TRP over recent years.
		(c) Status of component populations.			The **majority** of component populations in the SMU are within the range of expected variability.

Scoring stock status

SC2.2.1 In scoring PI 1.1.1 for salmon fisheries, the level of the LRPs and TRPs shall be consistent with the intent in SA PI 1.1.1 for the outcome PIs. ◙

SC2.2.1.1 The LRP shall be a level at which the SMU has a high probability of:

Persistence in the presence of directed fishing.b. Recovery to high production in the absence of directed fishing.

SC2.2.1.2 The TRP, generally expressed as a target escapement goal or target harvest rate, shall be a level at which the SMU maintains high production, such as BEGs or S_{MSY}.

SC2.2.2 In an enhanced fishery, the team shall assess status based solely on the wild salmon in the SMU. ◙

SC2.2.2.1 The team shall not include artificially produced fish when assessing spawning escapement goals, or other surrogate reference points. ◙

SC2.2.2.2 If no distinction is made between wild fish and artificially produced fish in estimates of spawning escapements or other surrogate reference points, the team shall score stock status lower than in cases where wild fish are enumerated separately.

SC2.2.3 The team shall consider the following in scoring PI 1.1.1 for salmon, reflecting the periodic recruitment patterns of these species. ◙

SC2.2.3.1 Stock status: taking into consideration the specific dynamics of salmon stocks, the fishery shall meet the SG60 requirement in PI 1.1.1 scoring issue (a) if the average SMU spawning stock size is above the LRP.

SC2.2.3.2 The terms “likely”, “highly likely”, and “high degree of certainty” are used to allow for qualitative and quantitative evaluation. Where time-series data are available, the team shall interpret:

a. “Likely” to mean ≥ 60% of the 15 most recent years (≥ 9 of the 15 years).

b. “Highly likely” to mean ≥ 80% of the 15 most recent years (≥ 12 of the 15 years).

c. “High degree of certainty” to mean > 90% of the 15 most recent years.

SC2.2.3.3 Stock status in relation to TRPs: in scoring issue (b) of PI 1.1.1, where time-series data is available, the team shall interpret:

a. “Fluctuating around” at the SG80 level to mean an SMU meeting its TRP in ≥ 50% of the 15 most recent years (≥ 8 of the 15 years).

b. A “high degree of certainty” at the SG100 level to mean that the SMU has met its TRP in ≥ 80% of the15 most recent years (≥ 12 of the 15 years).

SC2.2.3.4 Status of component populations: scoring issue (c) allows for qualitative and/or quantitative analysis. If population-specific reference points are neither defined, nor individual populations monitored, the team may make a reasoned argument based on expert judgement and qualitative information to score this scoring issue.

a. Fishing should allow for the persistence of component populations, recognising that at any point in time there are “likely” to be some populations at low and high productivity in the absence of fishing.

SC2.2.4 SA2.2.2–SA2.2.7 shall also apply.

SC2.3 Stock rebuilding PI (PI 1.1.2) ◙

Table SC3: PI 1.1.2 stock rebuilding PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Outcome	Stock rebuilding **1.1.2** Where the SMU is reduced, there is evidence of stock rebuilding within a specified timeframe.	(a) Rebuilding timeframes	A rebuilding timeframe is specified for the SMU that is the **shorter of 20 years or 2 times its generation time**.		The shortest practicable rebuilding timeframe is specified that does not exceed **1 generation time** for the SMU.

Component	PI	Scoring issues	SG60	SG80	SG100
		(b) Rebuilding evaluation	Monitoring is in place to determine whether the fishery-based rebuilding **strategies** are effective in rebuilding the SMU within the specified timeframe.	There is **evidence** that the fishery-based rebuilding **strategies** are being implemented effectively, or it is **likely** based on simulation modelling, exploitation rates, or previous performance that they will be able to rebuild the SMU within the **specified timeframe**.	There is **strong evidence** that the rebuilding **strategies** are being implemented effectively, or it is **highly likely** based on simulation modelling, exploitation rates, or previous performance that they will be able to rebuild the SMU within the **specified timeframe**.
		(c) Use of enhancement in stock rebuilding ◙	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.	Enhancement activities are **very seldom used** as a stock rebuilding strategy.	Enhancement activities are **not used** as a stock rebuilding strategy.

SC2.3.1 The team shall only score this PI when stock status does not meet the SG80 level in PI 1.1.1 because of low stock levels, such that the SMU needs rebuilding. ◙

SC2.3.3 In scoring issue (a), at the SG60 level, for cases where the time for 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.

SC2.3.4 In scoring issue (c), the team shall interpret:

management strategy or used in lieu of wild salmon population management.

b. “Very seldom” as used only for short-term emergency cases that do not form part of a long-term management or rebuilding strategy.

SC2.3.5 SA2.3.2–SA2.3.5 shall also apply.

SC2.4 Harvest strategy PI (PI 1.2.1)

Table SC4: PI 1.2.1 harvest strategy PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Harvest strategy (management)	Harvest strategy **1.2.1** There is a robust and precautionary harvest **strategy** in place.	(a) Harvest strategy design	The harvest strategy is **expected** to achieve SMU management objectives reflected in PI 1.1.1 SG80, including **measures** that address component population status issues.	The harvest strategy is **responsive** to the state of the SMU, and the elements of the harvest strategy **work together** towards achieving SMU management objectives reflected in PI 1.1.1 SG80, including **measures** that address component population status issues.	The harvest strategy is **responsive** to the state of the SMU and is **designed** to achieve SMU management objectives reflected in PI 1.1.1 SG80, including **measures** that address component population status issues.
		(b) Harvest strategy evaluation	The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy has been **tested** and is expected to meet the objectives reflected in PI 1.1.1 SG80 or there is evidence that the harvest strategy is achieving its objectives reflected in PI 1.1.1 SG80.	The performance of the harvest strategy has been **evaluated** and evidence exists to show that it is achieving its objectives reflected in PI 1.1.1 SG80, including being clearly able to maintain SMUs at target levels.
		(c) Harvest strategy monitoring	Monitoring is in place that is expected to determine		

Component	PI	Scoring issues	SG60	SG80	SG100
			whether the harvest strategy is working.		
		(d) Harvest strategy review			The harvest strategy is periodically reviewed and improved as necessary.
		(e) Review of alternative measures	There has been a review of the potential effectiveness and practicality of **alternative measures** to minimise UoA-related mortality of **unwanted catch** of the target stock.	There is a review every 5 years of **alternative measures** to minimise UoA-related mortality of **unwanted catch** of the target stock and they are implemented as appropriate.	There is a review every 2 years of the potential effectiveness and practicality of **alternative measures** to minimise UoA-related mortality of **unwanted catch** of the target stock, and they are implemented, as appropriate.

SC2.4.1 In scoring issue (a), the team shall evaluate whether fishery managers attempt to minimise harvest of any weak component population(s) within the SMU through differential harvest. ◙

SC2.4.2 In scoring issue (a), the team shall consider whether the harvest strategy of a salmon fishery with artificial production is designed to control exploitation rates on wild stocks in order to allow for self-sustaining, locally adapted wild populations. ◙

SC2.4.3 SA2.4.1–SA2.4.5 shall also apply.

SC2.5 Harvest control rules and tools PI (PI 1.2.2) ◙

Table SC5: PI 1.2.2 HCRs and tools PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Harvest strategy	HCRs and tools **1.2.2** There are well-defined	(a) HCR design and application	**Generally understood** HCRs are **in place** or available that are **expected**	**Well-defined** HCRs are **in place** that **ensure** that the exploitation	The HCRs are expected to keep the SMU **fluctuating at or above** a target level

Component	PI	Scoring issues	SG60	SG80	SG100
	and effective HCRs in place.		to reduce the exploitation rate as the SMU **LRP** is approached.	rate is reduced as the **LRP** is approached and are expected to keep the SMU **fluctuating around** a target level consistent with MSY.	consistent with MSY or another more appropriate level, taking into account the ecological role of the stock, **most** of the time.
		(b) HCR robustness to uncertainty		The HCRs are **likely** to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties, including the ecological role of the SMU, and there is **evidence** that the HCRs are robust to the main uncertainties.
		(c) HCR evaluation	There is **some evidence** that tools used or **available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.
		(d) Maintenance of wild component populations	It is **likely** that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component populations.	It is **highly likely** that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component populations.	There is a **high degree of certainty** that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild

Component	PI	Scoring issues	SG60	SG80	SG100
					component populations.

SC2.5.1 In scoring issue (a), the team shall consider whether the HCRs and tools are capable of maintaining the SMU at an abundance consistent with high production.

SC2.5.2 In scoring issue (d), the team shall consider empirical and/or analytical evidence, such as field evidence and/or simulations of multiple population complexes, that supports the likelihood that the established set of HCRs and tools will result in the abundance and spatial/temporal distribution of component populations consistent with maintaining their diversity and productivity. ◙

SC2.5.3 The following shall also apply:

a. SA2.5.1–SA2.5.3.

SC2.6 Information and monitoring PI (PI 1.2.~~4.1~~3) ◙

Table SC6: PI 1.2.3 information and monitoring PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Harvest strategy	Information and monitoring **1.2.3** Relevant information is collected to support the harvest strategy.	(a) Range of information ◙	**Some** relevant information related to SMU structure, SMU production, and fleet composition is available to support the harvest strategy, including **indirect or direct information is available on some component populations**.	**Sufficient** relevant information related to SMU structure, SMU production, fleet composition and other data is available to support the harvest strategy, **including harvests and spawning escapements for a representative range of wild component populations.**	A **comprehensive range** of information, including some that may not be relevant to the current harvest strategy, **is available.**
		(b) Monitoring	SMU wild abundance and UoA removals are monitored and	SMU wild abundance and UoA removals are **regularly**	**All information** required by the harvest strategy is

Component	PI	Scoring issues	SG60	SG80	SG100
			at least 1 indicator is available and monitored with sufficient frequency to support the harvest strategy.	**monitored at a level of accuracy and coverage consistent with the harvest strategy**, and **1 or more indicators** are available and monitored with sufficient frequency to support the harvest strategy.	monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information (data) and the robustness of assessment and management to this uncertainty.
		(c) Comprehensiveness of information		There is good information on all other fishery removals from the **SMU**.	

SC2.6.1 For scoring issue (a), at the SG80 level, “sufficient relevant information” shall include direct evidence and/or analysis and risk assessments. ◙

SC2.6.2 SA2.6.1–SA2.6.6 shall also apply.

SC2.7 Assessment of stock status PI (PI 1.2.4) ◙

Table SC7: PI 1.2.4 assessment of stock status PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Harvest strategy	Assessment of stock status **1.2.4** There is an adequate assessment of the stock status of the SMU.	(a) Appropriateness of assessment to stock under consideration		The assessment is appropriate for the SMU and for the harvest strategy.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
		(b) Assessment approach ◙	The assessment estimates stock status	The assessment estimates stock status	The assessment estimates with a high level of

Component	PI	Scoring issues	SG60	SG80	SG100
			relative to generic reference points appropriate to salmon.	relative to reference points that are appropriate to the SMU and can be estimated.	confidence both stock status and reference points that are appropriate to the SMU and its wild component populations.
		(c) Uncertainty in the assessment	The assessment **identifies major sources** of uncertainty.	The assessment **takes uncertainty into account**.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
		(d) Evaluation of assessment			The assessment has been tested and shown to be robust, and alternative hypotheses and assessment approaches have been rigorously explored.
		(e) Peer review of assessment		The assessment of SMU status, including the choice of indicator populations and methods for evaluating wild salmon in enhanced fisheries, is subject to peer review.	The assessment, including design for using indicator populations and methods for evaluating wild salmon in enhanced fisheries, has been **internally and externally**

Component	PI	Scoring issues	SG60	SG80	SG100
					peer reviewed.
		(f) Representativeness of indicator stocks ◙	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some scientific basis** for the choice of indicators.	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some evidence of coherence** between the status of the indicator streams and the status of the other populations they represent within the management unit, including selection of indicator stocks with low productivity to match those of the representative SMU where applicable.	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, the status of the indicator streams are **well correlated** with other populations they represent within the management unit, including stocks with lower productivity.
		(g) Definition of SMUs ◙	The majority of SMUs are defined with a clear rationale for conservation, fishery management, and stock assessment requirements.	The SMUs are well defined and include definitions of the major populations, with a clear rationale for conservation, fishery management, and stock assessment requirements.	There is an unambiguous description of each SMU that may include the geographic location, run timing, migration patterns, and/or genetics of component populations, with a clear rationale for

Component	PI	Scoring issues	SG60	SG80	SG100
					conservation, fishery management, and stock assessment requirements.

SC2.7.1 In scoring issue (b), the team shall assess whether reference points will maintain the S_{MSY} or similarly abundant levels. ◙

SC2.7.1.1 In enhanced salmon fisheries, the team shall consider whether the reference points are based only on wild fish. ◙

SC2.7.1.2 TRPs shall be a level at which the SMU maintains high production, such as BEGs or S_{MSY}.

SC2.7.2 In scoring issue (f), the team shall evaluate factors such as number, spatial distribution, and migration timing of the indicator stocks relative to the SMU. ◙

SC2.7.3 In scoring issue (g), the definition of SMUs shall reflect an understanding of the population structure, including information on the component populations. ◙

SC2.7.3.1 In defining SMUs, the team shall assess whether wild and artificially influenced components are clearly distinguished. ◙

SC2.8 General requirements for enhancement PIs

SC2.8.1 The team shall score all salmon fisheries against the enhancement PIs.

SC2.8.1.1 Where there are no enhancement activities associated with the UoA, the default score for these enhancement PIs shall be 100.

SC2.8.2 The team shall interpret key words or phrases used in the enhancement PIs in Section SC as per Table SC8.

Table SC8: Enhancement terms and definitions ◙

Term	Definition and discussion
Habitat enhancement	The team should consider any modification to habitat that increases the production beyond the normative processes of the habitat, with the intent of increasing fishery production, to be artificial production. The team may consider habitat modification intended to return habitat to its normative state to be restoration. The team does not need to consider this under the enhancement PIs.
Hatchery enhancement	Hatchery operations, such as seeding of a lake with fish released after being raised in a hatchery.
“Integrated” hatchery production	Where a hatchery population is associated with a wild population and the hatchery program is managed, intentionally or in practice, in such a way that gene flow from the wild to the hatchery population is non-negligible.

Term	Definition and discussion
pHOS	The proportion of **h**atchery-**o**rigin fish spawning naturally contributing to the natural **s**pawning population. The team should use the simple 4-year arithmetic mean for the purpose of assessments.
pNOB	The **p**roportion of **n**atural-**o**rigin (wild) fish contributing to the hatchery **b**roodstock. The team should use the simple 4-year arithmetic mean for the purpose of assessments.
“Segregated” hatchery production	Where hatchery populations are maintained as isolated reproductive groups and hatchery fish do not stray into and spawn with wild populations, or do so only to a very limited extent.
Stray rate	The proportion of fish that do not home accurately and return to some other location.

SC2.9 Enhancement outcomes PI (PI 1.3.1) ◙

Table SC9: PI 1.3.1 enhancement outcomes PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Fishery enhancement	Enhancement outcomes **1.3.1** Enhancement activities do not negatively impact the wild stock(s).	(a) Enhancement impacts ◙	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance, or productivity and diversity of wild stocks.	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance, or productivity and diversity of wild stocks.	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance, or productivity and diversity of wild stocks.

SC2.9.1 The team shall determine the method used to score this PI based on the level of available information.

SC2.9.1.1 If relevant studies on enhancement outcomes are available, the team shall use these to score this PI. ◙

SC2.9.1.2 If there are no relevant studies on enhancement outcomes, but estimated pHOS and proportion of natural-origin, wild fish contributing to the hatchery broodstock (pNOB) values are available, the team shall use these to score this PI in relation to default values appropriate to the species and type of enhancement. ◙

SC2.9.1.3 If neither relevant studies nor estimates of pHOS nor pNOB are available, the team shall use expert judgement to score this PI using a precautionary approach. ◙

SC2.10 Enhancement management PI (PI 1.3.2)

Table SC10: PI 1.3.2 enhancement management PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Fishery enhancement	Enhancement management **1.3.2** Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock(s).	(a) Management strategy in place ◙	**Practices and protocols** are in place to protect wild stocks from significant negative impacts of enhancement.	There is a **partial strategy** in place to protect wild stocks from significant negative impacts of enhancement.	There is a **comprehensive strategy** in place to protect wild stocks from significant negative impacts of enhancement.
		(b) Management strategy evaluation	The practices and protocols in place are considered **likely** to be effective based on plausible argument.	There is **some objective basis for confidence** that the **strategy** is effective, based on evidence that the **strategy** is achieving the outcome metrics used to define the minimum detrimental impacts.	There is **clear evidence** that the **comprehensive strategy** is successfully protecting wild stocks from significant detrimental impacts of enhancement.

SC2.10.1 The team shall assess whether management seeks to minimise the number and proportion of hatchery fish interbreeding with wild fish in natural spawning areas. ◙

SC2.11 Enhancement information PI (PI 1.3.3) ◙

Table SC11: PI 1.3.3 enhancement information PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Fishery enhancement	Enhancement information **1.3.3**	(a) Information adequacy ◙	**Some relevant information** is available on the	**Sufficient relevant qualitative and quantitative**	A **comprehensive range of relevant quantitative**

Component	PI	Scoring issues	SG60	SG80	SG100
	Relevant **information** is collected, and assessments are adequate to determine the effect of enhancement activities on wild stock(s).		contribution of enhanced fish to the fishery harvest, total escapement, and hatchery broodstock.	**information** is available on the contribution of enhanced fish to the fishery harvest, total escapement**,** and hatchery broodstock.	**information** is available on the contribution of enhanced fish to the fishery harvest, total escapement, and hatchery broodstock.
		(b) Use of information in assessment	The effect of enhancement activities on wild-stock status, productivity, and diversity are taken into account qualitatively.	A **moderate-level analysis** of relevant information is conducted and used by decision makers to quantitatively estimate the impact of enhancement activities on wild-stock status, productivity, and diversity.	A **comprehensive analysis** of relevant information is conducted and routinely used by decision makers to determine, with a **high degree of certainty**, the quantitative impact of enhancement activities on wild-stock status, productivity, and diversity.

SC2.11.1 In scoring issue (a), "information" shall include the marking and monitoring of artificially produced fish. ◙

SC2.11.2 In its assessment, the team shall consider the methods of artificial production. ◙

SC3 Principle 2

SC3.1 General requirements for Principle 2

SC3.1.1 All Principle 2 PIs in Section SA shall apply.

SC3.1.2 This section includes only additions and modifications.

SC3.1.3 The team shall explicitly consider enhancement activities that are associated with the fishery.

SC3.1.4 The team shall score all Performance Indicators and Scoring Issues even in the absence of enhancement activities.

SC3.2–9 No modifications to Section SA

SC3.10 ETP/OOS species outcome PI (PI 2.2.1)

Table SC12: PI 2.2.1 ETP/OOS species outcome PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
ETP/OOS species	Outcome status **2.2.1** The ETP/OOS unit is at favourable conservation status, or the UoA and associated enhancement activities do not hinder recovery to this level.	(a) Direct effects	The direct effects of the UoA, including enhancement activities, are **unlikely** to hinder recovery of the ETP/OOS unit to favourable conservation status.	The direct effects of the UoA, including enhancement activities, are **highly unlikely** to hinder recovery of the ETP/OOS unit to favourable conservation status.	There is a **high degree of certainty** that the direct effect of the UoA, including enhancement activities, do not hinder recovery of the ETP/OOS unit to favourable conservation status.

SC3.11 ETP/OOS species management strategy PI (PI 2.2.2)

Table SC13: PI 2.2.2 ETP/OOS species management strategy PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
ETP/OOS species	Management strategy **2.2.2** The UoA and associated enhancement activities have precautionary management **strategies** designed to: – Ensure that incidental catches of the ETP/OOS unit are minimised	(a) Management strategy in place	There are **measures** in place, **if necessary,** that are expected to minimise the UoA- and enhancement related-mortality of the ETP/OOS unit and achieve the ETP/OOS outcome SG80 level of performance.	There is a **strategy** in place, **if necessary,** that is expected to minimise the UoA- and enhancement related-mortality of the ETP/OOS unit and achieve the ETP/OOS outcome SG80 level of performance.	There is a **comprehensive strategy** in place that is expected to **minimise** the UoA- and enhancement related-mortality of the ETP/OOS unit and achieve the ETP/OOS outcome SG80 level of performance.

Component	PI	Scoring issues	SG60	SG80	SG100
	and where possible eliminated. – Ensure that the ETP/OOS unit is at favourable conservation status, or the UoA and associated enhancement activities do not hinder recovery to this level.	(b) Management **strategy** effectiveness		Evidence indicates that the **measures, strategy, or comprehensive strategy** have reduced or **minimised** the mortality of the ETP/OOS unit.	
		(c) Review of **alternative measures** to minimise mortality of the ETP/OOS unit		There is a **review** every 5 years of the **alternative measures** to **minimise** UoA- and enhancement related-mortality of the ETP/OOS unit, and they are implemented as appropriate for the ETP/OOS unit.	There is a **review** every 2 years of **alternative measures** to **minimise** UoA- and enhancement related-mortality of the ETP/OOS unit, and they are implemented, as appropriate, for the ETP/OOS unit.
		(d) Shark finning	There is a **high degree of certainty** that shark finning is not taking place.		
		(e) Ghost gear management strategy	There are **measures** in place, **if necessary**, for the UoA and associated enhancement activities, that are expected to **minimise** ghost gear and its impact on the ETP/OOS unit.	There is a **partial strategy** in place for the UoA and associated enhancement activities, **if necessary**, that is expected to **minimise** ghost gear and its impact on the ETP/OOS unit.	There is a **strategy** in place for the UoA and associated enhancement activities, **if necessary**, that is expected to **minimise** ghost gear and its impact on the ETP/OOS unit.

SC3.12 ETP/OOS species information (PI 2.2.3)

Table SC14: PI 2.2.3 ETP/OOS species information PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
ETP/OOS species	Information **2.2.3** Information is adequate to determine the impact of the UoA and enhancement activities on the ETP/OOS unit and the effectiveness of management **measures** or **strategies** in place.	(a) Information adequacy for assessment of impacts	Information is adequate to **broadly understand** the impact of the UoA and associated enhancement activities on the ETP/OOS unit.	Information is adequate to **estimate** the impact of the UoA and associated enhancement activities on the ETP/OOS unit, and to estimate whether the UoA and associated enhancement activities may be a threat to its recovery, with a **high degree of accuracy**.	Information is adequate to **estimate** the impact of the UoA and associated enhancement activities on the ETP/OOS unit, and to estimate whether the UoA and associated enhancement activities may be a threat to its recovery, with a **very high degree of accuracy.**
		(b) Information adequacy for management strategy	Information is adequate to support **measures** to manage the impacts on the ETP/OOS unit.	Information is adequate to support a **strategy** to manage impacts on the ETP/OOS unit, and to measure trends to evaluate the effectiveness of the measures to minimise mortality.	Information is adequate to support a **comprehensive strategy** to manage impacts on the ETP/OOS unit, and to evaluate the effectiveness of the **measures** to minimise mortality with a **high degree of certainty**.

SC3.13 Habitats outcome PI (PI 2.3.1)

Table SC15: PI 2.3.1 habitats outcome PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Habitats	Outcome status **2.3.1** The UoA and its associated enhancement activities do not cause serious or irreversible harm to **habitat** structure and function, considered on the basis of the area covered by the governance body(ies) responsible for fisheries management in the area(s) where the UoA operates.	(a) Less sensitive habitats	The UoA and its associated enhancement activities, is **unlikely** to reduce structure and function of less sensitive habitats to a point where there would be serious or irreversible harm.	The UoA and its associated enhancement activities is **highly unlikely** to reduce structure and function of less sensitive habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA and its associated enhancement activities is **highly unlikely** to reduce structure and function of less sensitive habitats to a point where there would be serious or irreversible harm.
		(b) More sensitive habitats	The UoA and its associated enhancement activities is **unlikely** to reduce structure and function of more sensitive habitats to a point where there would be serious or irreversible harm.	The UoA and its associated enhancement activities is **highly unlikely** to reduce structure and function of more sensitive habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA and its associated enhancement activities is **highly unlikely** to reduce structure and function of more sensitive habitats to a point where there would be serious or irreversible harm.
		(c) Impacts due to enhancement activities within the UoA ◙	The enhancement activities are **unlikely** to have adverse impacts on habitat.	The enhancement activities are **highly unlikely** to have adverse impacts on habitat.	There is a **high degree of certainty** that the enhancement activities do not have adverse impacts on habitat.

SC3.13.1 The team shall interpret “habitat” in this PI to include, but not be limited to:

a. Water quality.

b. Access for wild fish to spawning habitat.

c. Quality of stream habitat. ◙

SC3.13.2 The team shall assess impacts that result from the physical operation of the culture facility are not necessarily evaluated in the context of some broader regional resource consequence.

SC3.13.2.1 The enhancement-related habitat modifications shall have minimal adverse impacts on the surrounding habitats. ◙

SC3.14 Habitats management strategy PI (PI 2.3.2) ◙

Table SC16: PI 2.3.2 habitats management strategy PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Habitats	Management strategy **2.3.2** There is a **strategy** in place that is designed to ensure the UoA and associated enhancement activities do not pose a risk of serious or irreversible harm to the habitats.	(a) Management strategy in place	There are **measures** in place, **if necessary**, that are expected to achieve the habitat outcome SG80 level.	There is a **partial strategy** in place, **if necessary**, that is expected to achieve the habitat outcome SG80 level or above.	There is a **strategy** in place for managing the impact of all MSC UoAs/non-MSC fisheries UoAs and associated enhancement activities on habitats.
		(b) Management strategy effectiveness ◙	The measures are considered **likely** to work, based on plausible argument.	There is some **evidence** that the **measures/partial strategy** is achieving the objectives set out in SI (a), based on information directly about the UoA, its enhancement activities, and/or habitats involved.	There is **evidence** that the **partial strategy/strategy** is achieving the objectives set out in SI (a), based on information directly about the UoA, its enhancement activities, and/or habitats involved.

Component	PI	Scoring issues	SG60	SG80	SG100
		(c) Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect more sensitive habitats	Information is adequate to **broadly understand** compliance in the UoA with management requirements to protect more sensitive habitats.	Information is adequate to **estimate**, with a **high degree of accuracy**, compliance in the UoA with its management requirements and protection measures afforded to more sensitive habitats by other MSC UoAs/non-MSC fisheries, **where relevant**.	Information is adequate to **estimate**, with a **very high degree of accuracy**, compliance in the UoA with its management requirements and with protection measures afforded to more sensitive habitats by other MSC UoAs/non-MSC fisheries, **where relevant**.
		(d) Ghost gear management strategy	There are **measures** in place, **if necessary**, for the UoA and associated enhancement activities, that are expected to minimise ghost gear and its impact on all habitats.	There is a **partial strategy** in place, **if necessary**, for the UoA and associated enhancement activities, that is expected to minimise ghost gear and its impact on all habitats.	There is a **strategy** in place for the UoA and associated enhancement activities that is expected to minimise ghost gear and its impact on all habitats.

SC3.14.1 The team shall consider whether management strategies for enhancement activities are in place to reduce impact on: ◙

a. Water quality,

b. Access of natural origin fish to spawning habitat, and

c. Quality of stream habitat.

SC3.15 Habitats information PI (PI 2.3.3)

Table SC17: PI 2. 3.3 habitats information PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Habitats	Information and monitoring **2.3.3** Information is adequate to determine the risk posed to the habitat by the UoA and associated enhancement activities and the effectiveness of the strategy to manage impacts on the habitat.	(a) Information quality	The types and distribution of the habitats are **broadly understood**.	The nature, distribution, and vulnerability of the habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA.	The distribution of habitats is known over their range, with particular attention given to the occurrence of vulnerable habitats.
		(b) Information adequacy for assessment of impacts	Information is adequate to **broadly understand** the impacts of gear use and enhancement activities on habitats.	Information is adequate to **estimate** the impacts of the UoA, including enhancement activities, on habitats with a **high degree of accuracy**.	Information is adequate to **estimate** the impacts of the UoA, including enhancement activities, on habitats with a very **high degree of accuracy**.
		(c) Monitoring		Adequate information continues to be collected to detect any increase in risk to habitats.	Changes in all habitat distributions over time are measured.

SC3.15.1 The team shall consider whether information on enhancement facilities and activities is collected to support the outcome in PI 2.3.1. ◙

SC3.15.2 In scoring issue (b) at SG60, the team shall verify that any information legally required by operating permits relevant to these habitat issues is collected.

SC3.16 Ecosystem outcome PI (PI 2.4.1)

Table SC18: PI 2.4.1 ecosystem outcome PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Ecosystem	Outcome status **2.4.1** The UoA and associated enhancement activities do not cause serious or irreversible harm to the key elements of ecosystem structure and function.	(a) Ecosystem status	The UoA is **unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm.
		(b) Impacts due to enhancement ◙	Enhancement activities are **unlikely** to disrupt the key elements underlying ecosystem structure and **function** to a point where there would be serious or irreversible harm.	Enhancement activities are **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm.	There is **evidence** that the enhancement activities are **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm.

SC3.16.1 In scoring issue (b), the team shall consider “key elements underlying ecosystem structure and function” to include the ecological productivity and abundance of wild salmon and other components of the aquatic ecosystem as a result of predation, competition for resources, and disease transmission. ◙

SC3.16.2 The team shall organise its assessment of ecological interaction risks from enhancement programs into the following 2 categories: ◙

a. Disease transmission.

b. Predation/competition.

SC3.17 Ecosystem management PI (PI 2.4.2) ◙

Table SC19: PI 2.4.2 ecosystem management PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Ecosystem	Management strategy **2.4.2** There are measures in place to ensure the UoA and enhancement activities do not pose a risk of serious or irreversible harm to ecosystem structure and function.	(a) Management strategy in place	There are **measures** in place, **if necessary**, which consider the **potential impacts** of the UoA on the key elements underlying ecosystem structure and function.	There is a **partial strategy** in place, **if necessary**, which takes into account **available information and is expected to limit impacts** of the UoA on the ecosystem so as to achieve the Ecosystem outcome SG80 level.	There is a **strategy** that consists of a **plan** in place that includes measures to **address all main impacts of the UoA** on the ecosystem, and at least some of these measures are in place.
		(b) Management strategy effectiveness ◙	The **measures** are considered **likely** to work, based on plausible argument.	There is **some evidence** that the **measures/partial strategy** are achieving the objectives set out in scoring issue (a), based on some information directly about the UoA and/or the ecosystem involved.	There is evidence that the **partial strategy**/ **strategy** is achieving the objectives set out in scoring issue (a), based on information directly about the UoA and/or ecosystem involved.
		(c) Management strategy implementation		There is **some evidence** that the **measures/partial strategy** is being implemented successfully.	There is **clear evidence** that the **partial strategy/strategy** is being implemented successfully and is achieving its objective as set out in

Component	PI	Scoring issues	SG60	SG80	SG100
					scoring issue (a).
		(d) Management of enhancement activities ◙	There is an **established** artificial production strategy in place that is expected to achieve the Ecosystem outcome SG60 level.	There is a **tested and evaluated** artificial production strategy with sufficient monitoring in place, and evidence is available to reasonably ensure with high likelihood that the strategy is effective in achieving the Ecosystem outcome SG80 level.	There is a **comprehensive and fully evaluated** artificial production strategy to verify with certainty that the Ecosystem outcome SG100 level is achieved.

SC3.17.1 In scoring issue (d), the team shall consider whether management measures are in place that decrease ecological risk of enhancement activities. ◙

SC3.18 Ecosystem information PI (PI 2.4.3)

Table SC20: PI 2.4.3 ecosystem information PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Ecosystem	Information and monitoring **2.4.3** There is adequate knowledge of the impacts of the UoA and associated enhancement activities on the ecosystem.	(a) Information quality	Information is adequate to **identify** the key elements of the ecosystem.	Information is adequate to **broadly understand** the key elements of the ecosystem.	
		(b) Investigation of UoA impacts	Main impacts of the UoA and associated enhancement activities on the key ecosystem elements can be inferred	Main impacts of the UoA and associated enhancement activities on the key elements of the ecosystem	Main interactions between the UoA and associated enhancement activities and the key ecosystem elements

Component	PI	Scoring issues	SG60	SG80	SG100
			from existing information.	**have been investigated in detail**.	**have been investigated in detail**.
		(c) Understanding of component (i.e. P1 target species, in-scope and ETP/OOS species, and habitats) functions		The main functions of the components in the ecosystem are **known**.	The impacts of the UoA and associated enhancement activities on the components are identified, and the main functions of these components in the ecosystem are **understood**.
		(d) Information relevance		Adequate information is available on the impacts of the UoA and associated enhancement activities on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA and associated enhancement activities on the components **and elements** to allow the main consequences for the ecosystem to be inferred.
		(e) Monitoring		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.

SC3.18.1 The team shall assess whether relevant information is collected to understand the impacts of enhancement activities on the receiving ecosystem. ◙

SC4 Principle 3

SC4.1 General requirements for Principle 3

SC4.1.1 All Principle 3 PIs in Section SA shall apply. This Section includes only additions and modifications. ◙

SC4.1.2 The team shall explicitly consider enhancement activities that are associated with the fishery. ◙

SC4.2–3 No modifications to Section SA

SC4.4 Consultation, roles, and responsibilities PI (PI 3.1.2)

SC4.4.1 In scoring this PI, the team shall consider whether the consultation process covers both the fishery and enhancement activities. ◙

SC4.4.2 There are no modifications to Table SA18.

SC4.5 Long-term objectives PI (PI 3.1.3)

Table SC21: PI 3.1.3 long-term objective PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Governance and policy	Long-term objectives **3.1.3** The management policy for the SMU and associated enhancement activities has clear long-term objectives to guide decision-making that are consistent with the MSC Fisheries Standard and incorporates the precautionary approach.	(a) Objectives	Long-term objectives to guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are **implicit** within management policy.	Clear long-term objectives that guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are **explicit** within management policy.	Clear long-term objectives that guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are **explicit** within **and required by** management policy.

SC4.5.1 The team shall assess whether the fishery's enhancement activities have explicit long-term objectives and a guiding policy context that: ◙

a. Is consistent with managing for sustainable Principle 1 and Principle 2 outcomes for wild salmon.

b. Shapes short-term objectives and decision-making processes.

SC4.6 No modifications to Section SA

SC4.7 Fishery-specific objectives PI (PI 3.2.1)

Table SC22: PI 3.2.1 fishery-specific objectives PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Fishery-specific management system	Fishery-specific objectives **3.2.1** The fishery-specific and associated enhancement management system(s) have clear, specific objectives designed to achieve the outcomes expressed by the MSC Principles 1 and 2.	(a) Objectives	**Objectives**, which are broadly consistent with achieving the outcomes expressed by the MSC Principles 1 and 2, are **implicit** within the fishery and associated enhancement management system(s).	**Short- and long-term objectives**, which are consistent with achieving the outcomes expressed by the MSC Principles 1 and 2, are **explicit** within the fishery and associated enhancement management system(s).	**Well defined and measurable short- and long-term objectives**, which are demonstrably consistent with achieving the outcomes expressed by the MSC Principles 1 and 2, are **explicit** within the fishery and associated enhancement management system(s).

SC4.7.1 The team shall evaluate whether clear objectives exist for the fishery's enhancement activities that are consistent with achieving specific, related outcomes in Principles 1 and 2. ◙

SC4.8 Decision-making processes PI (PI 3.2.2)

Table SC23: PI 3.2.2 decision-making processes PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Fishery-specific management system	Decision-making processes **3.2.2** The fishery-specific and associated enhancement management system includes effective	(a) Decision-making processes	There are **some** decision-making processes in place that result in measures and strategies to achieve the fishery-specific and	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific and enhancement objectives.	

Component	PI	Scoring issues	SG60	SG80	SG100
	decision-making processes that result in measures and strategies to achieve the objectives and has an appropriate approach to actual disputes in the fishery.		enhancement objectives.		
		(b) Responsive-ness of decision-making processes	Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation, and consultation, in a transparent, timely, and adaptive manner, and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation, and consultation, in a transparent, timely, and adaptive manner, and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation, and consultation, in a transparent, timely, and adaptive manner, and take account of the wider implications of decisions.
		(c) Use of precautionary approach		Decision-making processes use the precautionary approach and are based on best available information.	
		(d) Accountability and transparency of management system and decision-making process	Some information on performance and management action is generally available on request to stakeholders.	**Information on fishery performance and management action is available on request**, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging	Formal reporting to all interested stakeholders **provides comprehensive information on fishery performance and management actions** and describes how the management system responded to

Component	PI	Scoring issues	SG60	SG80	SG100
				from research, monitoring, evaluation, and review activity.	findings and relevant recommendations emerging from research, monitoring, evaluation, and review activity.
		(e) Approach to disputes	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability of the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.

SC4.8.1 In scoring issue (a), the team shall include determination of production levels and strategies in decision-making processes surrounding enhancement activities. ◙

SC4.9 Compliance and enforcement PI (PI 3.2.3) ◙

Table SC24: PI 3.2.3 compliance and enforcement PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Fishery-specific management system	Compliance and enforcement **3.2.3** MCS mechanisms ensure the management measures in the UoA and associated enhancement activities are enforced and complied with.	(a) MCS system	MCS **mechanisms** exist within the UoA and associated enhancement activities.	An MCS **system** exists within the UoA and associated enhancement activities.	A **comprehensive** MCS system is well established within the UoA and associated enhancement activities.
		(b) Sanctions	Sanctions to address non-compliance exist within the UoA and associated enhancement activities.	Sanctions to deal with non-compliance exist that are appropriate to the UoA and associated enhancement activities, and are applied.	Comprehensive sanctions to address non-compliance exist that are appropriate to the UoA and associated enhancement activities, and are consistently applied.
		(c) Compliance (information)	Information is adequate to **broadly understand** compliance in the UoA	Information is adequate to **estimate** compliance in the UoA with a high degree of accuracy.	Information is adequate to **estimate** compliance in the UoA with a very high degree of accuracy.
		(d) Compliance (outcome)	Systematic non-compliance of regulations specific to governing sustainable fishing practices on the water is not evident within the UoA and associated enhancement activities.	Majority of regulations, including all regulations specific to governing sustainable fishing practices on the water, are **likely** to be complied with.	Majority of regulations, including all regulations specific to governing sustainable fishing practices on the water, are **consistently** complied with.

SC4.9.1 The team shall consider whether private hatchery operators cooperate with management authorities in collection and sharing of information important to ensure that artificial production activities are complying with legal and management system objectives and requirements.

SC4.10 Monitoring and management performance evaluation PI (PI 3.2.4)

Table SC25: PI 3.2.4 monitoring and management performance evaluation PISGs

Component	PI	Scoring issues	SG60	SG80	SG100
Fishery-specific management system	Monitoring and management performance evaluation **3.2.4** There is a system for monitoring and evaluating the performance of the fishery-specific and enhancement management system(s) against its objectives. There is effective and timely review of the fishery-specific and associated enhancement program(s) management system.	(a) Evaluation coverage	The fishery and associated enhancement program(s) have in place mechanisms to evaluate **some** parts of the management system.	The fishery and associated enhancement program(s) have in place mechanisms to evaluate **key** parts of the management system.	The fishery and associated enhancement program(s**)** have in place mechanisms to evaluate **all** parts of the management system.
		(b) Internal and/or external review ◙	The fishery-specific and associated enhancement program(s) management system is subject to **occasional internal** review.	The fishery-specific and associated enhancement program(s) management system is subject to **regular internal** and **occasional external** review.	The fishery-specific and associated enhancement program(s) management system is subject to **regular internal** and **external** review.

SC4.10.1 The team shall evaluate whether hatchery operational plans include well-designed and supported provisions for monitoring the fishery's enhancement activities that are consistent with achieving specific, related outcomes and objectives in Principles 1 and 2.

SC4.10.1.1 The team shall evaluate the impacts of enhancement activities on natural production components and ecosystem function.

SC5 Allowances for inseparable or practicably inseparable catches in salmon fisheries

SC5.1 Inseparable or practicably inseparable catches in salmon fisheries

SC5.1.1 The CAB shall only treat catches of salmon stock as inseparable or practicably inseparable (IPI), as per FCP 7.5.12, if they are not certified separately and are either:

a. Non-target species (scored in P2, not P1), or

b. Non-local stocks of species targeted in the fishery (stocks that are caught in the fishery but do not breed within the UoA and are not therefore normally scored as part of the SMU).

SC5.1.1.1 If the proposed IPI stock is a different salmon species to the target species (SC5.1.1.a), the CAB shall:

a. Only consider it not commercially feasible to separate the species when the total catches from the IPI stock(s) do not exceed 5% by weight of the total combined catches of target and IPI stock(s) within the UoA.

b. Assess the proposed IPI stock under P2 in accordance with FCP Annex PA.

SC5.1.1.2 If the proposed IPI stocks are non-local stocks of the same species as the P1 target stock within the UoA (SC5.1.1.b):

a. The total catches from the IPI stock(s) shall not exceed 5% by weight of the total combined catches of target and IPI stock(s) within the UoA.

b. FCP 7.5.12.1.d shall not apply to these stocks. However, if these stocks are outside biologically based limits, the CAB shall demonstrate that the fishery:

i. Does not catch 30% or more of the total removal of the stock.

ii. Is “highly likely” not to significantly hinder (consistent with GSA3.6) the stock’s recovery.

iii. Has implemented practical measures to reduce impacts on the stock.

SC5.1.2 In considering whether proposed IPI stocks meet the defined 5% upper catch limits (SC5.1.1.1 and SC5.1.1.2), the CAB shall take into account catch data from the most recent 2 or more years prior to the date on which the eligibility is decided, as necessary to allow for the normal age at spawning of each of the species under consideration. ◙

SD: Introduced species Based Fisheries (ISBF) – Normative

SD1 General ◙

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SD1.1.1.1 “Introduced species” are defined as per Table 2.

SD1.1.1.2 This Section includes only additions and modifications in relevant sections of the default assessment tree and requirements.

SD2 Principle 1

SD2.1 General requirements for Principle 1

SD2.1.1 The team shall consider the ecological role of the introduced species.

SD2.1.2 The team shall assess the ISBF against default PISGs in Principle 1. ◙

SD2.1.2.1 If necessary, the team shall make modifications to the scoring issues at PI 1.1.1 and PI 1.2.2 for fisheries that include setting TRPs at levels that may be lower than MSY, to reduce biodiversity impact.

a. The team shall not accept LRPs set at levels below which there is an appreciable risk of impairing reproductive capacity.

SD3 Principle 2

SD3.1 General requirements for Principle 2

SD3.1.1 The team shall determine whether the introduced species is not the target species in the fishery being considered for certification but is an in-scope species that is impacted in some way by fishing activity on the target species.

SD3.1.1.1 If the in-scope introduced species is being managed for high productivity because it is a target species in another managed fishery, the team shall evaluate the fishery to determine whether its impact on the in-scope introduced species is acceptable.

SD3.1.1.2 If the in-scope introduced species is subject to a formal or informal eradication policy because it is considered to have a “nuisance” status, the team shall not take the impact of the fishery on the introduced species into consideration in the assessment.

SD3.1.2 The team shall assess measures in place in the fishery to prevent further ecosystem impacts that may have occurred as a result of the introduction of the species to the new location under the ecosystem component of Principle 2. ◙

SD3.1.2.1 If relevant, the team shall add an additional scoring issue and corresponding guideposts at 60, 80, and 100 levels to the ecosystem management PI 2.4.2, to evaluate measures in the fishery to prevent progression of further ecosystem impacts from occurring as a result of the presence of the introduced species.

SD3.1.2.2 The team shall review the following measures when assessing this additional scoring issue:

a. Setting TRPs at levels that allow for recovery of species impacted by the introduction.

b. Containment measures, such as fishing down at the boundaries of the stock to prevent further spread.

c. Protection and/or creation of faunal refugia.

d. Provisions in legislation to prohibit further introductions of any other alien species.

e. Other relevant mechanisms.

SD3.1.3 If relevant, the team shall add a corresponding ecosystem information scoring issue that addresses the collection of information important to understanding and preventing further impact of the introduced species on biodiversity.

SD3.1.4 If the fishery has no measures in place for PI 2.4.2 and corresponding information in PI 2.4.3, the team shall justify why measures are not considered necessary in that fishery to prevent further impact on biodiversity, if applicable.

End of Section SD

Section SE: Principle 1 for stocks managed by Regional Fisheries Management Organisations

This section contains modifications to the FCP and the default assessment tree structure for the assessment of stocks managed by RFMOs. Section SE relates to the scoring and associated conditions of scoring issues (a) and (b) in PI 1.2.1 and PI 1.2.2.

SE1 General requirements for Section SE

SE1.1 Modifications to the FCP and default assessment tree

SE1.1.1 The team shall apply Section SE when the target stock(s) being assessed is/are managed by an RFMO. ◙

SE1.1.2 The team may apply Section SE when the target stock(s) being assessed is/are not managed by an RFMO.

SE1.1.2.1 Where there are overlapping UoAs, the CAB shall ensure a harmonised approach to the application of Section SE.

SE1.1.2.2 The team shall apply Section SE to UoAs that include target stocks not managed by RFMOs only if the majority (more than half) of overlapping UoCs (i.e. UoCs that include the same P1 target stock) agree to do so. ◙

a. Where no overlapping UoCs exist, SE1.1.2.2 shall apply to UoAs.

SE1.1.3 The team shall apply Section SE only if there is evidence that the RFMO is committed to the development of a harvest strategy that includes a management procedure (MP) tested within a management strategy evaluation (MSE) framework. ◙

SE1.1.3.1 Evidence could include:

a. The adoption of a workplan with an associated timeline by the RFMO for development and implementation of harvest strategies.

b. Letters of correspondence identifying the commitment of that RFMO or the management strategy evaluation testing framework being outlined in management measures and/or resolutions.

SE1.1.3.2 The team shall confirm the commitment of the RFMO.

a. The team shall include evidence for this in the Announcement Comment Draft Report.

SE1.1.4 Unless specifically noted, the CAB and the team shall follow:

a. All other FCP requirements.

b. Section SA default assessment tree PISGs and requirements.

SE1.1.5 This section only includes additions or modifications to the requirements of the FCP and the Section SA default assessment tree.

SE2 Principle 1 requirements

SE2.1 Harvest Strategy PI 1.2.1

SE2.1.1 To determine whether the harvest strategy is “evaluated”, the team shall use only evidence from the adopted harvest strategy, either: ◙

a. Through direct application of the harvest strategy, or

b. From modelled predictions of the harvest strategy, if an effectiveness review has not occurred before the end of the second phase.

SE2.1.2 If “available” HCRs are scored in PI 1.2.2 (SE2.2), PI 1.2.1 scoring issue (a) (Table SA4) shall only meet SG60.

SE2.2 Harvest control rules and tools PI (PI 1.2.2) ◙

Table SE1: PI 1.2.2 harvest control rules and tools PISGS

Component	PI	Scoring issues	SG60	SG80	SG100
Harvest strategy	HCRs and tools **1.2.2** There are **well-defined** and effective HCRs **in place**.	(a) HCR design and application◙	HCRs are **expected to reduce the exploitation rate as the PRI is approached** and are either **generally understood** and **in place**, or **available**.	**Well-defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, and are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species at a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level, taking into account the ecological role of the stock, **most of the time**.
		(b) HCR robustness to uncertainty ◙		The HCRs are **likely** to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.
		(c) HCR evaluation ◙	There is **some evidence** that tools used or **available** to implement HCRs are appropriate	**Available evidence indicates** that the tools in use are appropriate and **effective** in achieving	**Evidence clearly shows** that the tools in use are **effective** in achieving the exploitation

Component	PI	Scoring issues	SG60	SG80	SG100
			and **effective** in controlling exploitation.	the exploitation levels required under the HCRs.	levels required under the HCRs.

SE2.2.1 The team should require additional precaution to be built into the HCR at SG100 so that the HCR keeps stocks well above LRPs.

SE2.2.2 The team shall interpret:

a. "Generally understood" at SG60 to mean HCRs that can be shown to have been applied in some way in the past but have not been explicitly defined or agreed.

b. "Well defined" at SG80 to mean HCRs that exist in some written form that has been agreed by the management agency, ideally with stakeholders, and that state what actions will be taken at what specific TRP levels.

c. "In place" at SG60 and SG80 to mean the HCR has been adopted by the management agency and/or there is evidence or documentation that management actions have been taken where required.

Scoring "available" HCRs at SG60 ◙

SE2.2.3 In scoring issue (a) at the SG60 level, the team shall accept "available" HCRs instead of HCRs that are "in place" if:

a. Stock biomass has not previously been reduced below the MSY level, or has been maintained at that level for a recent period of time that is at least longer than 2 generation times of the species, and is not predicted to be reduced below B_{MSY} within the next 5 years, or

b. In UoAs where B_{MSY} estimates are not available, the stock has been maintained to date by the measures in use at levels that have not declined significantly over time, nor shown any evidence of recruitment impairment.

SE2.2.4 The team shall recognise "available" HCRs as "expected to reduce the exploitation rate as the PRI is approached" only if:

a. "Generally understood" or "well-defined" HCRs are in place for some other UoAs that are under the control of the same management body, and of a similar size and scale as the UoA, or

b. An agreement or framework is in place that requires the management body to adopt HCRs before the stock declines below B_{MSY}.

SE2.2.5 In scoring issue (a) at the SG100 level, where quantitative simulation testing is available "most of the time", the team should interpret the stock as being maintained at or above MSY or some ecologically more relevant target point at least 70% of the time.

SE2.2.6 In scoring issue (c) at the SG60 level, where HCRs are recognised as "available", the team shall include in its rationale:

a. Evidence that HCRs are being "effectively" used in other named UoAs that are managed by the same management body, and the basis on which they are regarded as "effective", or

b. A description of the formal agreement or legal framework that the management body has defined, and the indicators and trigger levels that will require the development of HCRs.

Evaluating the effectiveness of HCRs

SE2.2.7 In scoring issue (c) for "evidence", the team shall use the current levels of exploitation in the UoA, such as measured by the fishing mortality rate or harvest rate, where available.

SE2.2.7.1 If information is not available on the exploitation rate consistent with achieving a long-term MSY, the team shall provide justification where available proxy indicators and reference points are used as reasonable proxies of the exploitation rate.

SE3 Process requirements for Section SE

SE3.1 Setting conditions

SE3.1.1 The CAB shall follow SE3.2–SE3.4 when setting a condition for PI 1.2.1 and PI 1.2.2 under Section SE. ◙

SE3.1.1.1 The CAB shall not follow condition setting requirements in the FCP for PI 1.2.1 and PI 1.2.2.

SE3.2 Requirements for setting a condition for a P1 target stock that has not been part of a certified UoA prior to effective date of the MSC Fisheries Standard v3.0

SE3.2.1 If the UoA comprises a target stock(s) that is not part of a certified UoA, the CAB shall follow SE3.2.2 to SE3.2.9.

SE3.2.1.1 If the target stock(s) is part of a UoA that is already certified against either v1.3, v2.0 or v2.01 of the MSC Fisheries Standard, the CAB shall follow SE3.3.

SE3.2.1.2 If the target stock(s) is part of a UoA that is already certified against v3.0 of the MSC Fisheries Standard, the CAB shall follow SE3.4.

SE3.2.2 If the UoA does not meet SG100 for PI 1.2.1 scoring issues (a) and (b) and does not meet SG80 for PI 1.2.2 scoring issues (a), (b), and (c), the CAB shall set a condition to result in improved performance sufficient to meet these SGs.

SE3.2.3 The CAB shall structure the condition in two phases and set a timeline of a maximum of two terms of certification.

SE3.2.3.1 For phase 1 of the condition, the CAB shall:

a. Set phase 1 of the condition to result in improved performance to SG100 for PI 1.2.1 scoring issue (a) and SG80 for PI 1.2.2 scoring issue (a).

b. Draft phase 1 of the condition to follow the narrative form of SG100 for PI 1.2.1 scoring issue (a) and SG80 for PI 1.2.2 scoring issue (a) and the relevant accompanying requirements used in the assessment tree.

c. Specify the deadline as a maximum of one term of certification.

SE3.2.3.2 For phase 2 of the condition, the CAB shall:

a. Set phase 2 of the condition to result in improved performance to SG100 for PI 1.2.1 scoring issue (b) and SG80 for PI 1.2.2 scoring issues (b) and (c).

b. Draft phase 2 of the condition to follow the narrative form of SG100 for PI 1.2.1 scoring issue (b), SG80 for PI 1.2.2 scoring issues (b) and (c), and the relevant accompanying requirements used in the assessment tree.

c. Specify the deadline for phase 2 as a maximum of one term of certification.

d. Specify that the outcomes of phase 1 (SE3.2.3.1) are to be maintained during phase 2. ◙

SE3.2.4 The CAB shall specify the following milestones in the condition: ◙

a. Phase 1:

i. Management objectives, performance indicators, and data needs are defined.

ii. Operating models and candidate management procedures that include mechanisms for catch or effort constraints are tested through management strategy evaluation simulations.

iii. Demonstration of consultation and input from stakeholders.

iv. Preferred harvest strategy(ies) adhering to a management procedure approach with an agreed catch or effort constraint identified.

b. Phase 2:

i. Mechanism for catch or effort constraints is agreed.

ii. Harvest strategy adhering to a management procedure approach, with and including catch or effort constraints or resource-sharing mechanism that follows scientific advice, is adopted and implemented.

iii. Effectiveness review schedule of implemented harvest strategy is determined.

SE3.2.5 The CAB shall specify the timeframes over which the milestones must be met within each phase. ◙

SE3.2.5.1 The CAB should ensure that milestone timeframes align with the plans developed by the relevant management agency of the UoA(s).

SE3.2.6 The CAB shall use the milestones and associated timeframes to evaluate progress against the condition at each surveillance audit. ◙

SE3.2.7 The CAB shall inform the client that if they are unable to complete phase 1 within the first term of certification, they will not be eligible for reassessment at the end of the first term of certification.

SE3.2.8 If the client and the CAB cannot agree on the condition, milestones, timeframes, and deadlines, the CAB shall not certify the UoA.

SE3.2.9 The CAB shall include the condition and milestones in the Client and Peer Review Draft Report and all subsequent reports.

SE3.3 Requirements for setting a condition for a P1 target stock that is part of a UoA previously certified against v1.3, v2.0, or v2.01 of the MSC Fisheries Standard

SE3.3.1 If the UoA comprises a target stock(s) that is part of a UoA that is certified against either v1.3, v2.0 or v2.01 of the MSC Fisheries Standard, including those with open conditions on PI 1.2.1 and PI 1.2.2, the CAB shall follow SE3.3.2 to SE3.3.9.

SE3.3.1.1 If the target stock(s) is part of a UoA that is already certified against v3.0 of the MSC Fisheries Standard, the CAB shall follow SE3.4.

SE3.3.2 If the UoA does not meet SG100 for PI 1.2.1 scoring issues (a) and (b) and SG80 for PI 1.2.2 scoring issues (a), (b), and (c), the CAB shall conduct a gap analysis to determine the status of the UoA relative to the milestones in SE3.3.5. ◙

SE3.3.2.1 The CAB shall complete the gap analysis during the preparation phase of the Announcement Comment Draft Report.

SE3.3.2.2 The CAB shall include the gap analysis as an annex to the Announcement Comment Draft Report.

SE3.3.3 If the UoA does not meet SG100 for PI 1.2.1 scoring issues (a) and (b) and does not meet SG80 for PI 1.2.2 scoring issues (a), (b), and (c), the CAB shall set a condition to result in improved performance sufficient to meet these SGs.

SE3.3.4 The CAB shall structure the condition to set a deadline of a maximum of one term of certification.

SE3.3.4.1 The CAB shall use the results of the gap analysis in SE3.3.2 to determine the exact condition deadline. ◙

SE3.3.5 The CAB shall draft the condition to specify the following milestones within the timeline outlined in SE3.3.4.

a. Management objectives, performance indicators, and data needs are defined.

b. Operating models and candidate management procedures that include mechanisms for catch or effort constraints are tested through management strategy evaluation simulations.

c. Demonstration of consultation and input from stakeholders.

d. Preferred harvest strategy(ies) adhering to a management procedure approach with an agreed catch or effort constraint identified.

e. Mechanism for catch or effort constraints is agreed.

f. Harvest strategy adhering to a management procedure approach, with and including catch or effort constraints or resource-sharing mechanism that follows scientific advice, is adopted and implemented.

g. Effectiveness review schedule of implemented harvest strategy is determined.

SE3.3.6 The CAB shall specify the timeframes over which the milestones must be met.

SE3.3.6.1 The CAB should ensure that milestone timeframes align with the plans developed by the relevant management agency of the UoA(s).

SE3.3.7 The CAB shall use the milestones and associated timeframes to evaluate progress against the condition at each surveillance audit.

SE3.3.8 If the client and the CAB cannot agree on the condition, milestones, timeframes, and deadlines, the CAB shall not certify the UoA.

SE3.3.9 The CAB shall include the condition and milestones in the Client and Peer Review Draft Report and all subsequent reports.

SE3.4 Requirements for setting a condition for a P1 target stock that is already part of a UoA that is certified against v3.0 of the MSC Fisheries Standard

SE3.4.1 If the UoA comprises a target stock(s) that is already certified against version v3.0 of the Fisheries Standard, including those that have undertaken early application of Section SE as per Tool D of the MSC Fisheries Standard Toolbox, the CAB shall adopt the condition, milestones, timeframes, and deadlines set for the UoA that is already certified.

SE3.5 Requirements for evaluating progress against the condition

SE3.5.1 The CAB shall follow SE3.5 when evaluating progress against the condition for PI 1.2.1 and PI 1.2.2 under Section SE. ◙

SE3.5.1.1 The CAB shall not follow requirements for evaluating progress against conditions in the FCP.

SE3.5.2 At each surveillance audit, the team shall evaluate progress against the condition.

SE3.5.2.1 The team shall use the milestones and associated timeframes to evaluate progress against the condition.

SE3.5.3 The team shall document whether progress is “on target”, “ahead of target” or “behind target”. ◙

SE3.5.3.1 The team shall justify the determination.

SE3.5.3.2 If progress against the milestones is behind target, the team may specify remedial action and revise milestone timeframes that are required to bring progress back on target within 12 months (and by the next surveillance audit) to achieve the condition by the deadline.

SE3.5.3.3 The CAB shall not revise deadlines for phases or the condition deadline (see SE3.5.5.2 and SE3.6.2).

SE3.5.4 If the CAB determines that progress against a condition is not back “on target” by the next surveillance audit, the CAB shall: ◙

a. Consider progress against the condition as inadequate.

b. Apply the requirements of GCR 7.4 (suspension or withdrawal).

c. Inform the fishery client that they cannot enter the same UoC(s), or any entity in the UoC(s), into full assessment under either the same or an alternative name, unless the cause for suspension has been addressed.

SE3.5.5 For conditions set for P1 target stocks under SE3.2. ◙

SE3.5.5.1 By the phase 1 timeframe in SE3.2.5, the CAB shall determine whether phase 1 of the condition is complete.

a. The team shall confirm that all milestones in phase 1 have been achieved.

b. The team shall rescore PI 1.2.1 scoring issue (a) and PI 1.2.2 scoring issue (a).

c. The CAB shall only record phase 1 as completed if:

i. The UoC meets SG100 for PI 1.2.1 scoring issue (a).

ii. The UoC meets SG80 for PI 1.2.2 scoring issue (a).

SE3.5.5.2 If phase 1 of the condition is not completed by its deadline, the CAB shall:

a. Consider progress against the condition as inadequate.

b. Apply the requirements of GCR 7.4 (suspension or withdrawal).

c. Inform the client that they cannot enter into reassessment.

d. Inform the fishery client that they cannot enter the same UoC(s), or any entity in the UoC(s), into full assessment under either the same or an alternative name unless the cause for suspension has been addressed.

SE3.5.5.3 By the phase 2 timeframe in SE3.2.5 the CAB shall determine whether phase 2 of the condition is complete.

a. The team shall confirm that all milestones in phase 2 have been completed.

b. The team shall rescore PI 1.2.1 scoring issue (b) and PI 1.2.2 scoring issues (b) and (c).

c. The CAB shall only record phase 2 as completed if:

i. The UoC meets SG100 for PI 1.2.1 scoring issue (b).

ii. The UoC meets SG80 for PI 1.2.2 scoring issues (b) and (c).

iii. The UoC continues to meet milestones completed in phase 1 in SE3.5.5.2.

SE3.5.5.4 If phase 2 of the condition is not completed by its deadline, the CAB shall:

a. Consider progress against the condition as inadequate.

b. Apply the requirements of GCR 7.4 (suspension or withdrawal).

c. Inform the client that they cannot enter into reassessment.

d. Inform the fishery client that they cannot enter the same UoC(s), or any entity in the UoC(s), into full assessment under either the same or an alternative name unless the cause for suspension has been addressed.

SE3.5.6 For conditions set for P1 target stocks under SE3.3. ◙

SE3.5.6.1 By the milestone timeframes in SE.3.3.6 the CAB shall determine the condition is complete.

a. The team shall confirm that all milestones in SE3.3.5 have been completed.

b. The CAB shall only record the milestones as completed if:

i. The UoC meets SG100 for PI 1.2.1 scoring issues (a) and (b).

ii. The UoC meets SG80 for PI 1.2.2 scoring issues (a), (b), and (c).

SE3.5.6.2 If all milestones in SE3.3.5 are not completed by the condition deadline, the CAB shall:

a. Consider progress against the condition as inadequate.

b. Apply the requirements of GCR 7.4 (suspension or withdrawal).

c. Inform the client that they cannot enter into reassessment.

d. Inform the fishery client that they cannot enter the same UoC(s), or any entity in the UoC(s), into full assessment under either the same or an alternative name unless the cause for suspension has been addressed.

SE3.5.7 The CAB shall clearly report the progress of the condition in all surveillance reports and at reassessment reporting stage. ◙

SE3.6 Requirements for closing the condition

SE3.6.1 The CAB shall only confirm that the condition is closed when:

a. The milestones in phase 1 and phase 2 have been achieved.

b. The UoC meets SG100 for PI 1.2.1 scoring issues (a) and (b), and SG80 for PI 1.2.2 scoring issues (a), (b), and (c).

SE3.6.2 If the condition is not closed by its deadline, the CAB shall:

a. Consider progress as inadequate.

b. Apply the requirements of GCR 7.4 (suspension or withdrawal).

c. Inform the client that they cannot enter into reassessment.

Marine Stewardship Council

MSC Guidance to the Fisheries Standard

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Copyright information

Marine Stewardship Council

Marine House

1 Snow Hill

London EC1A 2DH

United Kingdom

Phone: + 44 (0) 20 7246 8900

Fax: + 44 (0) 20 7246 8901

Email: standards@msc.org

Responsibility for ~~the MSC Guidance to the Fisheries Standard~~these requirements

The Marine Stewardship Council (MSC) is responsible for ~~the MSC Guidance to the Fisheries Standard~~these requirements.

Readers should verify that they are using the latest copy of this and other documents. Updated documents, together with a master list of all available MSC documents, can be found on the MSC website (msc.org~~.~~).

Versions published

Version no.	Date	Description of amendment
2.0	~~1 October 2014~~15 August 2011	New document issued as part of the MSC Fisheries Standard Review, which was completed in 2014.
2.01	31 August 2018	Version issued incorporating updated cross-references in alignment with revision to the MSC Fisheries Certification Process.
3.0	31 October 2022	Version issued incorporating changes to the MSC Fisheries Standard as a result of the MSC Fisheries Standard review.

Introduction to this document

The MSC Guidance to the Fisheries Standard is composed of Annexes GSA, GSB, GSC and GSD.

The MSC Guidance to the Fisheries Standard is provided to help Conformity Assessment Bodies (CABs) interpret the MSC Fisheries Standard. The MSC maintains the MSC Guidance to the Fisheries Standard ~~is maintained~~ as a separate document.

The headings and numbering in the MSC Guidance to the Fisheries Standard, when included, match those in the MSC Fisheries Standard ~~exactly, with~~. Numbers prefaced with the letter “G” ~~to~~ indicate guidance.

The MSC recommends that CABs read the MSC Fisheries Standard in conjunction with the MSC Guidance to the Fisheries Standard. ~~Text in the MSC Fisheries Standard is not repeated in~~ The MSC Guidance to the Fisheries Standard does not repeat text in the MSC Fisheries Standard.

~~Where~~ In the MSC Fisheries Standard, this icon ◙ at the end of the section title or clause indicates that there is guidance ~~is provided~~ that generally relates to the subject of ~~a major heading, or relates to the content of a specific clause, this icon ◙ appears at the end of the title or clause in the MSC Fisheries Standard, and if critical guidance is included, this icon ‼ appears~~that section or clause. These icons provide hyperlinks to the related guidance section in the MSC Guidance to the Fisheries Standard.

~~Critical guidance is identified within the MSC Guidance to the Fisheries Standard using a sidebar, as illustrated~~ In this ~~paragraph.~~
~~Within the guidance~~document, this icon ▲ provides a hyperlink ~~back~~ to the corresponding section or clause in the MSC Fisheries Standard.

Auditability of the MSC Guidance to the Fisheries Standard

The guidance contained in the MSC Guidance to the Fisheries Standard is not directly auditable. ~~It is, however, expected that the critical guidance identified in this document will be followed by CABs where applicable unless there is a justification for not doing so. It is likely that this critical guidance would be referenced by the accreditation body in any non-conformity to related clauses.~~

~~The presence of critical guidance is identified with this icon ‼ in~~

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GS1 Scope

GS1.1 Scope requirements of the MSC Fisheries Standard

GS1.1.3 Enhanced fisheries ▲

Categories of enhanced fisheries

Table 1 in the MSC Fisheries Standard defines the criteria by which enhanced fisheries may be identified as being within the scope of the MSC Fisheries Standard. The categories of enhanced fisheries that may be in scope are as follows:

- **Hatch and ~~includes:~~catch (HAC).**
    - This production system may be considered within scope in certain circumstances, reflecting the established case history and precedent set by hatchery-stocked salmon fisheries.
    - For these types of fishery, more-intensive culture activities may be allowed as long as they only apply to a brief period within the species' life cycle.
    - HAC operations that must not form the basis of a recovery and rebuilding plan. If rebuilding has been done by stocking in the past, it shall not result in an out-of-scope determination as long as other measures are now in place to manage wild stocks.
- **Catch and grow (CAG).**
    - This production system's "grow-out" and holding systems may be considered within scope under certain conditions.
    - CAG has some features of intensive aquaculture, requiring routine inputs, such as feed, chemical, or medicinal treatments, that are out of scope.
    - CAG systems that only require limited enhancement, such as rope culture of bivalves, may be considered within scope for the entirety of their operation.
- **Habitat-modified.**
    - This production system involves modification to habitat, such as salmon fry farms located next to river systems.

A single fishery may display several of the features of CAG, HAC, or habitat-modified fisheries. In the application of MSC requirements, it is intended that any overlap between categories should not become complicating factors in determining whether a Unit of Assessment (UoA) is in or out of scope. In some cases, distinctions are drawn between applications of the criteria to these different categories.

For enhanced fisheries, only the part of the catch that is clearly landed during the catching operation, such as that permanently removed from the water by the fishery, would be eligible to enter into MSC certified chains of custody. The part of the catch that is clearly landed would be subject to the normal chain of custody and fishery traceability requirements. Operations in which no part of the catch is clearly landed are considered inseparable from any subsequent "grow-out" phase, and the scope criteria for enhanced fisheries apply to the operation in its entirety.

Scope criteria B: feeding and husbandry

The application of criterion Bii in Table 1 specifically to CAG operations recognises that some HAC fisheries may routinely use disease prevention and other measures to maximise survival. These practices are allowed because the short duration of the captive-growth phase will limit the potential environmental impacts. However, these impacts are included in the Principle 2 assessment.

Scope criteria C: habitat and ecosystem impacts

Habitat modifications in enhanced fisheries can include:

- Physical changes to the seabed or river course. The wide range of possible modifications include:
  - Construction of simple ponds in intertidal areas.
  - Watercourse management measures aimed at improving spawning habitats.
- The use of a range of man-made structures associated with the rearing or capture of fish that are not strictly fishing gear. For example:
- Fish attracting and/or fish aggregating devices (FADs).
- Lobster casitas.
- Mussel culture ropes in CAG systems.

Such artificial habitat modifications either enhance the productivity of the fishery, or facilitate the capture or production of commercial marine species.

GS1.1.5 & GS1.1.6 Exclusion of vessels ▲

The MSC's intent is to prevent access to a certificate where there is evidence of serious crimes or shark-finning offences whilst undertaking fishing operations. This is achieved by preventing vessels implicated in these activities from being included on a fishery certificate.

The team should interpret implication of a vessel to mean that a person, or people, committed a serious crime or a shark-finning offence on board the vessel at some point in the "last 2 years".

In cases where fishing operations are not vessel-based, the requirement should be interpreted to mean the exclusion of the individual fishing operator who committed a serious crime or a shark-finning offence while undertaking fishing operations.

Two-year timeframe

The team should calculate the "last 2 years" from the date the CAB announces the fishery assessment on the MSC website.

Location of the activity

If a vessel has been implicated in the conviction of a serious crime or a shark-finning violation in the "last 2 years" in any jurisdiction or area, not only those included in the UoA, the vessel should not be included on a certificate.

GS1.1.5 Conviction for a serious crime ▲

The definition for serious crime provided is based on that used in the United Nations (UN) Convention against Transnational Organized Crime.

GS1.1.5.1 & GS1.1.6.1 Excluding vessels for 2 years ▲

The 2-year exclusion timeframe is calculated from the date the vessel was excluded. The date of exclusion is the date the updated certification documents were published on the MSC website.

If the vessel was excluded at the point of the initial certification, the date of its exclusion is the date the CAB announces the fishery assessment on the MSC website.

- GS1.1.5.1.b & GS1.1.6.1.b Relevant information ▲~~**Special cases:** These relate to requirements that apply to a particular type of fishery, data or situation. For example, when assessing an LTL stock the species' role in the ecosystem should be considered in reference points.~~
- ~~**Additional clarification** on how a clause in the MSC Fisheries Standard would usually be expected to be implemented. The use of different methods would need to be justified.~~

An updated vessel list is an example of relevant information.

~~Section~~ GSA The default assessment tree ~~– Guidance~~

Background to Annex GSA guidance ▲

~~The Fisheries Standard contains the default assessment tree that ensures high quality, credible fishery assessments and certifications based upon an assessment methodology to be applied consistently across fisheries regardless of ecological, geographical, technological or other variations in characteristics.~~

Unless the team can show just cause for why a different tree should apply, the team should use the hierarchical structure and the prescribed default set of Performance ~~indicators and~~ Indicator Scoring Guideposts (PISGs) ~~are used~~ in all assessments ~~unless a team can show just cause for why a different tree should apply~~.

~~The specific objectives and benefits of the default tree are to:~~

~~SC1 Improve the common understanding by CABs, clients and stakeholders of how fisheries will be assessed by use of a simple, transparent assessment structure;~~

~~SC2 Ensure consistent interpretation and application of the MSC Fisheries Standard to ensure all fisheries are assessed in a similar and equitable manner;~~

~~SC3 Increase future certainty about re-assessment for currently certified fisheries;~~

~~SC4 Improve the robustness and credibility of fishery assessments by providing greater clarity on required performance;~~

~~SC5 Improve the efficiency of the assessment process while maintaining the integrity of the MSC's third party certification approach.~~

Structure of the default assessment tree

The default assessment tree structure is divided into ~~four~~4 main levels for the purposes of scoring, as summarised below:

- Principle: the Principles represent the overarching basis for the assessment tree.
- Component: a high-level sub-division of the Principle.
- Performance Indicator (PI): A PI is a further sub-division of the Principle.
- Scoring Issue (SI): a sub-division of the PI into related but different topics. Each PI has one or more ~~scoring issues~~SIs against which the fishery is assessed at the ~~SG 60, 80~~SG60, SG80, and ~~100~~SG100 levels.

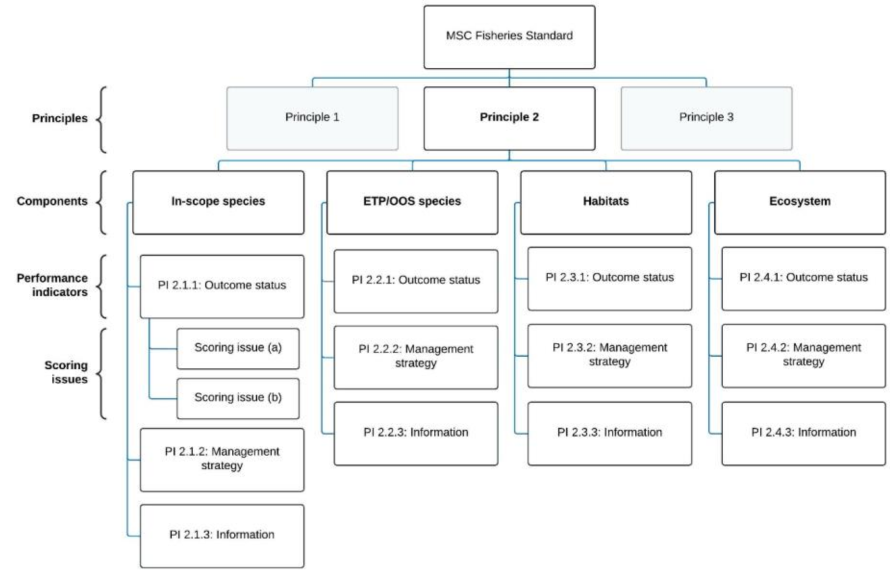
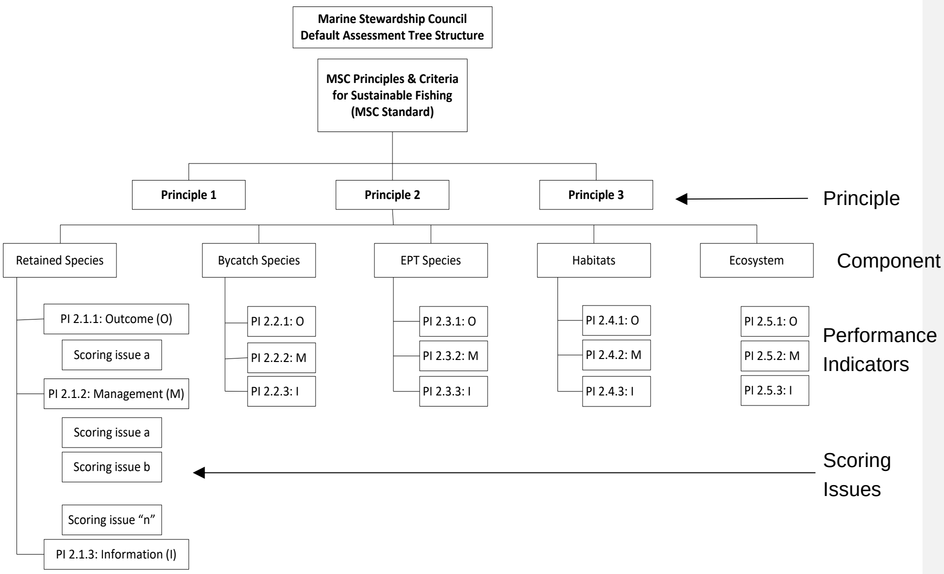


Figure ~~GSA:~~GSA1: Default assessment tree levels relevant to scoring fisheries



For each ~~scoring issue, scoring guideposts~~SI, SGs are defined at 60, 80, and 100 levels. In scoring a fishery, ~~CABs, identify~~ the CAB identifies:

- The level achieved by the fishery for each ~~scoring issue, and~~ SI.

- The overall level achieved as a result for the PI.

In order to pass, a fishery ~~must~~ is required to achieve:

- At least a 60 score for each PI~~, and~~ .
- At least an aggregate 80 score for each Principle ~~in order to pass. Where~~ . For a score of less than 80 ~~is achieved~~, a condition is assigned.

In some fisheries, the CAB can also score multiple ~~'~~"scoring ~~elements'~~ (elements", such as multiple bycatch species or habitats~~) can also be scored~~, within a given PI.

For specific details on scoring, see FCP 7.15~~,~~ and ~~the~~ related guidance.

Default~~, draft and final~~ assessment trees

Section SA is designed to be applicable to most ~~standard types of fishery. Other~~ fisheries. Section SB and Section SC are default assessment trees ~~are available~~ for ~~some special fishery types such as enhanced~~ bivalves and salmon~~. Other special~~ respectively. The CAB may develop modified assessment trees ~~can be developed by CABs where needed for other unusual fishery types, subject to approval by MSC (see). In these cases, the "default tree" becomes a "draft tree" while a variation request and stakeholder comment is being sought, then a "final tree" when it is ready for use, with or without changes, in the specific fishery assessment.~~

~~Relationship between the Default Tree and the MSC Principles and Criteria~~

~~was developed to reflect the 1999 MSC Principles and Criteria as its foundation. illustrates the relationship between topics in the P&Cs and their locations in the Fisheries Standard v2.0 default tree (as changed from v1.3).~~

~~Taking Principle 1 as an example, the three P1 Criteria in the 1999 Principles and Criteria are~~for fishery types that cannot be adequately assessed ~~by the combination of PIs in the~~against existing default ~~tree, as:~~

~~SC6 Each of the outcomes required by the three Criteria is covered by the single Outcome PI (1.1.1).~~

~~SC7 The Harvest Strategy (Management) PIs assess a fishery's ability to manage the impact on target stocks to achieve those outcomes sought by the three Criteria.~~

~~SC8 Criterion 3, with no specific Outcome PI, is covered by considering its impact on the formulation of the management strategy and the Harvest Control Rule (HCR) and tools.~~

~~SC9 For example, the Point below which Recruitment could be Impaired (PRI), scored as a limit reference point in PI 1.1.1, should be set at a point where:~~

~~SC9.1 There is no danger that genetic changes in the stock would reduce reproductive productivity, and~~

~~SC9.2 If there is a risk that this may not be so, the limit reference point should be increased accordingly.~~

~~The problem might be addressed through changes to the component of the stock that is harvested,~~

~~for instance by changing the distribution or selectivity of fishing.~~

~~Table GSA: Comparison between the MSC's Principles and Criteria for Sustainable Fishing and the default tree structure (PIs shown in strikeout font and boxes shaded green indicate the changes between the~~assessment trees (see FCP 7.10.5~~in CR v1.3 and Fisheries Standard v2.0)~~).

	Principle 1							Principle 2															Principle 3									Scope
	1. Outcome			2. Harvest strategy				1. Retained species			2. Bycatch species			3. ETP species			4. Habitats			5. Ecosystem			1. Governance and policy				2. Fishery specific management					
Performance indicators	Stock status	~~Reference points~~	Recovery & Rebuilding	Performance of harvest strategy	Harvest control rules & tools	Information / monitoring	Assessment	Status	Management	Information	Status	Management	Information	Status	Management	Information	Status	Management	Information	Status	Management	Information	Legal and/or customary framewor	Consultation roles and resps	Long term objectives	~~Incentives for sust. fishing~~	Fishery specific objectives	Decision making processes	Compliance and enforcement	~~Research plan~~	Monitoring and evaluation	
Criteria	1	2	3	1	2	3	4	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	4	1	2	3	4	5	
Principle 1. Target species																																
1 High productivity																																
2 If depleted, recovery plan																																
3 Reproductive capacity																																
Principle 2. Ecosystem																																
1 Functional relationships																																
2 Biodiversity and ETP spp																																
3 If depleted, recovery plan																																
Principle 3. Management system																																
A Management system criteria																																
A1 No controversial unilateral exemption																																
A2 Clear long-term objectives, etc																																
A3 Appropriate to cultural context and scale																																
A4 Observe legal and customary rights																																
A5 Dispute resolution mechanism																																
A6 Incentives, no negative subsidies																																
A7 Timely, adaptive, precautionary																																
A8 Research plan																																
A9 Stock assessments conducted																																
A10 Mgmt measures and strategies																																
A11 Compliance, MCS																																
B Operational criteria																																
B12 Bycatch and discards																																
B13 Habitat impacts																																
B14 Destructive fishing practices																																
B15 Operational waste																																
B16 System, legal and admin requirements																																
B17 Collaboration in data collection																																

~~G~~

~~The standard is available to all operations engaged in the wild capture of marine or freshwater organisms with the following exceptions:~~

1. ~~Operations targeting (as Principle 1) amphibians, reptiles, birds and mammals~~
2. ~~Operations using explosives or poison as their fishing method~~
3. ~~Operations that are conducted under controversial unilateral exemptions from international agreements, or under conditions of unresolved dispute, if the exemption or dispute creates a situation where effective management of the resource cannot be delivered ().~~
4. ~~Farmed aquaculture operations, except where these can be described as enhanced fisheries as defined in .~~
5. ~~Introduced species, except where these can be described as historical and irreversible as defined in .~~

GSA1.1 General requirements ▲

Field Code Changed

Box GSA1: Precautionary approach

~~**The precautionary approach**~~

International and customary law requires the use of the precautionary approach in fisheries management. The MSC uses as its baseline definition for the precautionary approach the definitions included in the Food and Agriculture Organization of the UN (FAO) International Code of Conduct for Responsible Fisheries[4] ~~(1995)~~ and the UN Fish Stocks Agreement[5] ~~(1995),~~, Article 6 of which states:

The precautionary approach shall be interpreted to mean being cautious when information is uncertain, unreliable or inadequate and that the absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures ~~(The UN Fish Stocks Agreement, 1995).~~.

In the 'MSC ~~standard~~Fisheries Standard', the application of the precautionary approach in fisheries management systems is explicitly scored in PIs 3.1.3 and 3.2.2. However, the ~~MSC also intends~~MSC's intent is that the precautionary approach ~~to~~ be applied implicitly throughout the ~~Certification Requirements~~Standard. To capture this intent, the MSC system has been designed to give higher scores where there is more certainty about the outcome, or where management systems appropriately apply precaution under conditions of uncertainty. The team should, where limited information is available, ~~teams should~~ be more precautionary in ~~their~~its assessment of information adequacy to support an outcome PI score.~~References~~

~~FAO *Code of Conduct for Responsible Fisheries*. Rome: FAO.1995~~

~~FAO *Technical Consultation on the Precautionary approach to capture fisheries*. Rome, FAO. 1996.~~

~~Rio Declaration on Environment and Development, 1992~~

[4] *FAO Code of Conduct for Responsible Fisheries*. Rome: FAO.1995.
[5] The UN Fish Stocks Agreement, United Nations conference on straddling fish stocks and highly migratory fish stocks, Sixth session, New York, 24 July – 4 August, 1995.

~~The UN Fish Stocks Agreement, United Nations conference on straddling fish stocks and highly migratory fish stocks, Sixth session, New York, 24 July-4 August, 1995~~

Box GSA2: The MSC's intent and understanding of the standard in relation to illegal, unreported, and unregulated fishing

~~**Box GSA2: IUU fishing**~~

~~**MSC's intent and understanding of the standard in relation to**~~ The FAO definition of illegal, unreported, and unregulated (IUU) fishing
~~The FAO definition of IUU fishing~~ is as follows[6] ~~(FAO, 2002):~~:

Illegal fishing refers to fishing activities:

- Conducted by national or foreign vessels in waters under the jurisdiction of a state, without the permission of that state, or in contravention of its laws and regulations~~;~~.
- Conducted by vessels flying the flag of states that are parties to a relevant regional fisheries management organisation (RFMO) but operate in contravention of the conservation and management measures (CMMs) adopted by that organisation and by which the states are bound, or relevant provisions of the applicable international law~~; or~~.
- In violation of national laws or international obligations, including those ~~undertaken~~conducted by cooperating States to a relevant ~~regional fisheries management organisation~~RFMO.

Unreported fishing refers to fishing activities:

- ~~Which~~ That have not been reported, or have been misreported, to the relevant national authority, in contravention of national laws and regulations~~; or~~.
- ~~Undertaken~~ Conducted in the area of competence of a relevant ~~regional fisheries management organisation which~~RFMO that have not been reported or have been misreported, in contravention of the reporting procedures of that organisation.

Unregulated fishing refers to fishing activities:

- In the area of application of a relevant ~~regional fisheries management organisation~~RFMO that are conducted by vessels without nationality, or by those flying the flag of a state not party to that organisation, or by a fishing entity, in a manner that is not consistent with or contravenes the ~~conservation and management measures~~CMMs of that organisation~~; or~~.
- In areas or for fish stocks in relation to which there are no applicable conservation or management measures and where such fishing activities are conducted in a manner inconsistent with state responsibilities for the conservation of living marine resources under international law.

These definitions of IUU fishing have been adopted and incorporated into action plans to deter and eliminate IUU fishing at both the national level ~~(~~in the case of the United States, New Zealand, and Australia~~)~~, and ~~regional fisheries management organisations (~~RFMOs~~)~~, such as the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR~~,~~), as well as economic entities ~~(e.g.,~~, such as the European Union~~)~~. RFMOs publish lists of vessels engaged in IUU fishing in their areas of responsibility.

[6] FAO (2002) Implementation of the International Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing. FAO Technical Guidelines for Responsible Fisheries 9. Rome: Food and Agriculture Organization, FAO. Available at: http://www.fao.org/3/y3536e/y3536e00.htm [accessed on 17 July 2022].

IUU fishing can also apply at a state level~~,~~; for example, where coastal nations or their sub-jurisdictions~~ (e.g.,~~, such as internal states or provinces~~)~~, have inadequate regulation to prevent illegal, unreported, or unregulated catches.

In relation to IUU, the ~~MSC intention~~MSC's intent is that Units of Assessment (UoAs) be harvested legally and that IUU is non-existent~~,~~; or where IUU does exist, it is at a minimum level such that management measures, including assessments~~ and~~, harvest control rules (HCRs), and the estimation of IUU impacts on harvested species and the ecosystem~~,~~ are capable of maintaining affected populations at sustainable levels.

Specifically:

- The team should consider unreported IUU fishing ~~should be considered~~ as "unobserved mortality".
- The ~~unit of assessment (~~UoA~~)~~ should be free from IUU catches of target (P1) species. ~~This will be assessed~~ The team should assess this in P1, and in P3~~ (~~: compliance with national and international laws and monitoring, control, and surveillance ~~[~~(MCS~~];~~), such as in PIs 3.1.1, 3.2.2, 3.2.3~~)~~.
- The stocks that are the source of P1 certified fish should have only minimal IUU fishing, which ~~must~~should be taken into account by management and ~~must~~should not have a material impact on the ability of the management system to deliver a sustainable fishery~~; this~~. The team should ~~be clearly considered by assessment teams~~consider this in the PIs on ~~harvest control rules~~HCRs, information, and assessment of stock status in P1~~ (e.g.,~~, such as in PIs 1.2.2, 1.2.3, 1.2.4~~)~~, including ~~in~~ documentation of "unobserved mortality~~.~~".
- The requirement for compliance with national and international laws combined with the requirement that the UoA should not be causing serious and irreversible harm in P2 means that the UoA should also be free from IUU fishing for P2 species. ~~While~~The team should document the impact of other IUU fishing on P2 components ~~should be documented~~ where known. However, unlike in P1, ~~it~~the team need not ~~be introduced~~introduce it into the assessment of the specific impact of the UoA~~ (~~, or cumulative UoAs~~)~~.
- The MSC Chain of Custody Standard~~MSC chain of custody standard~~ requires that neither chain of custody certificate holders nor certified UoAs should use vessels that are listed on IUU blacklists to catch or transport fish.
- The MSC Chain of Custody Standard~~MSC chain of custody standard~~ is designed to ensure that MSC ~~-~~labelled products cannot be mixed with products from a non-certified UoA, where there may be a risk of IUU fishing.

Specific guidance is provided in ~~the GCR, which has evolved since FAM v1 (2008) to include guidance in~~ relation to local~~ and~~, national~~ laws, as well as~~, and international laws as follows:

- PI 1.2.3: GSA2.6.3 on information categories to consider for fishery removals.
- P2 general guidance: GSA3.1.6.1 on considering observed and unobserved fishing mortality, including illegal fishing, and/or unregulated catches.
- PI 3.2.3: GSA4.1 on considering compliance and enforcement.

~~Evaluation of~~When evaluating the effectiveness of MCS in UoAs where a less formalised MCS system exists, the team may consider the role and effectiveness of a range of factors in deterring illegal activity, ~~which are~~as described in GSA4.9 on assessing informal and traditional approaches in PI 3.2.3. GSA4.9 also includes additional guidance on P3 (PI 3.2.3~~.) is given in~~.

~~References~~

~~FAO (2002) Implementation of the International Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing. FAO Technical Guidelines for Responsible Fisheries 9. Rome: Food and Agriculture Organization, FAO. Retrieved April 11, 2011: from FAO:).~~

GSA2 Principle 1

GSA2.1 General requirements for Principle 1 ▲

~~There are two components in Principle 1: an outcome component with two PIs and a management component with four PIs.~~

Outcome component

Background

The ~~outcome component has two PIs. The~~team should score stock status PI (1.1.1) ~~is scored~~ to reflect management behaviour that:

- Increases the probability that exploited biomass fluctuates around the biomass at maximum sustainable yield (B_{MSY}) target, or a higher target if this is warranted from a consideration of the trophic inter-dependencies of the target species (see Box GSA3 below~~); and~~).
- Decreases the probability that exploited biomass will drop significantly towards the point where recruitment becomes impaired~~, either~~ through recruitment "overfishing~~ or through~~", genetic effects, or imbalances in sex ratio.

~~The rebuilding PI (1.1.2) is triggered in cases where PI 1.1.1 does not achieve an 80 level, to ensure that stock rebuilding is expected.~~ Stocks ~~whose~~with a status ~~is currently~~ below the point ~~at which~~of recruitment ~~is impaired (termed the~~ impairment (PRI) would not achieve the necessary pass level in PI 1.1.1, even if there ~~are~~were recovery plans or programmes in place ~~which~~that are effectively increasing the status of the stock, until such time as the stock status again meets SG60.

The following outcomes would attract scores of 80 or higher:

- A higher likelihood of fluctuation around the target biomass level.
- Biomass levels in excess of target levels, which imply a lower probability of being below target levels.
- A higher probability of being above the point at which recruitment could be impaired, often used as a biomass limit reference point~~.~~ (LRP).
- In PI 1.1.2, a more rapid demonstrated rebuilding of stocks from the point where they attract only a 60 score to levels able to deliver MSY.

An explanation of the MSC's intent and understanding in relation to MSY is provided in Box GSA3.

Box GSA3: ~~MSC~~The MSC's intent on the achievement of MSY in P1

The ~~MSC intention~~MSC's intent is that fisheries be harvested no more than is consistent with MSY ~~(~~, as required by the United Nations Convention on the Law of the Sea (UNCLOS), and that this is achieved through use of appropriate target reference points (TRPs) and limit reference points (LRPs), and of harvest strategies ~~(~~, as required by the 1995 United Nations Fish Stocks Agreement (UNFSA) and ~~CoCRF).~~the UN Food and Agriculture Organization (FAO) 1995 Code of Conduct for Responsible Fisheries (CCRF), where:

- A ~~target reference point~~TRP reflects a management objective to be achieved ~~(e.g.,~~; for example, performance consistent with MSY~~) while the limit~~.
- An LRP reflects an undesirable state to be avoided with high probability ~~(e.g.,~~; for example, impaired recruitment~~)~~.

The most basic definition of MSY is the largest long-term average annual catch that can be sustained over time. The FAO Glossary defines MSY as ~~"~~:

The largest average catch or yield that can continuously be taken from a stock under existing environmental conditions. For species with fluctuating recruitment, the maximum might be obtained by taking fewer fish in some years than in others.~~"~~ .

The constant fishing mortality that gives this MSY is F_{MSY}, ~~and~~where F is the fishing mortality rate. The average population size while MSY is provided is B_{MSY}.

MSY was originally defined in terms of simple production models~~, but~~. However, the concept is now equally applicable to any model of the stock and fishery ~~(e.g.,~~; for example, more complex production models, dynamic pool models, ~~'~~"per-recruit ~~models'~~" models, multi-stock/mixed stock models, ecosystem models, and meta-population models~~)~~.

There are many ways to estimate MSY and related reference points. Many of them, ~~and~~ particularly the older methods ~~which were~~ common at the time UNCLOS and UNFSA were agreed, make substantial assumptions ~~and so~~. Therefore, there can be considerable uncertainty about the accuracy of the estimates of MSY and related reference points.

Because the productivity ~~(e.g.,~~, or recruitment~~)~~, of many fish stocks is naturally highly variable through time, the biomass can vary greatly around B_{MSY} ~~(~~, in some cases even with an appreciable chance of the stock being below the biomass ~~limit reference point)~~LRP, when fished at the constant F_{MSY}. ~~To an extent~~ This variability in stock biomass can be mitigated by ~~use of a harvest control rule~~using an HCR that reduces the fishing mortality when stock biomass is low or ~~a limit reference point~~an LRP is approached, as recommended by UNFSA and ~~CoCRF~~CCRF. For some ~~harvest control rules~~HCRs, including the constant escapement policies common in salmon and some low small pelagic fisheries, the fishing mortality is reduced to zero at a threshold stock biomass[7] ~~(e.g., Mace 2001)~~.

Reflecting the uncertainty usual in the estimation of MSY reference points and the variability of productivity usual in fish stocks, the UNFSA guidelines and others[8] ~~(e.g., Mace 2001)~~ recommend that F_{MSY} should be treated as a precautionary ~~limit reference point~~LRP, rather than a ~~target reference point.~~TRP. This is appropriate in ~~'common practice'~~"common practice" application of ~~the~~ MSY concepts, in which there is little explicit consideration of uncertainty and/or use of approximate methods for determining MSY reference points and/or use of surrogates for fishing mortality or stock biomass.

The ~~'~~"best ~~practice'~~practice" current view of MSY is that it is the largest long~~-~~-term average catch that results from a constant F or variable F ~~harvest control rule~~HCR, while simultaneously giving a high chance of avoiding the biomass ~~limit reference point, with~~LRP. MSY is determined by simulation testing ~~(e.g.,~~, such as via management strategy evaluation methods[9]~~; Sainsbury et al. 2000, Butterworth and Punt 2003)~~, that includes realistic representation of the major likely uncertainties ~~(e.g.,~~; for example, observation uncertainty, estimation uncertainty, recruitment variability, model structure uncertainty, and implementation uncertainty~~)~~. F_{MSY} determined this way could be an appropriate ~~target reference point~~TRP, because its method of calculation internalises uncertainty, variability, and the biomass ~~limit reference point~~LRP.

MSY stock status

The stock status consistent with MSY is fundamentally defined in the terms F_{MSY} and B_{MSY}~~, and so~~. Hence, the 'MSC ~~standard~~Fisheries Standard' provides default ~~target~~TRPs and ~~limit reference points~~LRPs for these. The team can use approximations for F_{MSY} and B_{MSY} ~~can be used~~ where they are expected to achieve performance consistent with MSY[10] ~~(e.g., Witherall et al 2000, Clarke 2002, Zhou et al 2012)~~.

[7] Mace, P.M. (2001) A new role for MSY in single-species and ecosystem approaches to fisheries stock assessment and management. *Fish and Fisheries* 2: 2–32.

[8] Mace, P.M. (2001) A new role for MSY in single-species and ecosystem approaches to fisheries stock assessment and management. *Fish and Fisheries* 2: 2–32.

[9] Sainsbury, K.J., Punt, A.E., and Smith, A.D.M. (2000) Design of operational management strategies for achieving fishery ecosystem objectives. *ICES Journal of Marine Science* 57: 731–741.
For example: Butterworth, D.S., and Punt, A.E. (1999) Experiences in the evaluation and implementation of management procedures. *ICES Journal of Marine Science* 56: 985–998.

[10] Witherall, D., Pautzke, C., and Fluharty, D. (2000) An ecosystem-based approach for Alaska groundfish fisheries. *ICES Journal of Marine Science* 57: 771–7.
Clark, W.G. (2002) $F_{35\%}$ revisited ten years later. *North American Journal of Fisheries Management* 22(1): 251–257.
Zhou, S., Shaowu, Y., Thorson, J.T., Smith, A.D.M., and Fuller, M. (2012) Linking fishing mortality reference points to life history traits: an empirical study. *Canadian Journal of Fisheries and Aquatic Science* 69: 1292–1301.

~~SC10~~ The team can use directly measurable~~ (~~, empirical~~)~~ proxies or surrogates for fishing mortality or biomass~~ (eg.,~~, for example average length or length distribution, catch rate, recruitment, and escapement~~ etc.),~~, and associated empirical harvest strategies, ~~can be used~~ where they are expected to achieve performance consistent with MSY or a similar "highly productive" level[11]~~ (Starr et al 1997, Prince et al 2011).~~

~~Multi-stock~~ (i.e. multispecies fisheries~~ (containing biological interactions but stocks are separately assessable), mixed-stock fisheries (containing technical interactions but stocks are separately assessable) and stock-complex fisheries (where some or all of the stocks cannot be individually assessed so are managed as a group).~~

~~SC11 Multi-stock fisheries and mixed-stock fisheries. The existence of biological and/or technical interactions means that fishing on one stock has an effect on others. So it is not possible to simultaneously obtain the maximum sustainable yield from each of the individual component stocks. A compromise is required to obtain what is considered the best yield from the combination of stocks. At two extremes, for example, it could be considered that the least productive stock will be harvested up to its MSY so that all other stocks are harvested at less than their individual MSYs or it could be considered that the most productive stock will be harvested up to its MSY so that all other species will be harvested beyond their individual MSYs (i.e., fishing mortality higher and biomass lower than the MSY levels). MSC recognises this as a management choice for the target reference point for each species (e.g., UNFSA Annex II para 2), but also currently requires that the single species (or single stock) limit reference points be maintained (cf the US approach that requires no species be reduced such that it triggers the threatened species listing).~~

~~SC12 Stock-complex fisheries. MSY for the stock complex as a whole may be determined or indicator stocks may be used for assessment purposes (e.g., US National Standard), but MSC requires that there is a good basis for expecting that none of the component stocks are reduced below their limit reference point.~~

~~SC13 The MSC requirements in Principle 1 do not currently take account of such interactions between stocks, being based on expectations applicable in a single species (or single stock) context. MSC is considering further developments in this area, and monitoring the development and application of such methods as 'best practice' in management agencies, globally. Further consideration of this will be given in the 2018 standard review. Prior to that point, CABs may propose the use of special assessment trees for the assessment of such fisheries (per).~~

~~SC14 In the statements above, the term 'stock' may refer to either a single species, or to a sub-stock of a species, consistent with the MSC definition given in the Glossary. A 'mixed-stock' fishery may for example be based on several different species, or on two or more sub-stocks of the same species, which have overlapping distributions in the area of capture. The distinctions made between multi-stock, mixed-stock and stock-complex fisheries here thus relate to the nature of their interactions and the practicalities of their management, and not to the levels of genetic differences between the stocks.~~

~~SC15 Where fisheries are based on multiple sub-stocks of a single species, attention should also be given to the guidance on metapopulations (), In these cases, the recognition of specific 'source' and 'sink' populations may lead to different expectations for these individual stocks, but the metapopulation as a whole should still be maintained at productive levels (as required in).~~

~~SC16 Further consideration is also needed in the case of salmon fisheries, as outlined in the modified assessment tree in . In this case, overall fishery production is assessed at the level of 'Stock Management Unit' (SMU), equivalent to the normal stock in a single~~

[11] Starr, P.J., Breen, P.A., Hilborn, R., and Kendrick, T.H. (1997) Evaluation of a management decision rule for a New Zealand rock lobster substock. *Marine and Freshwater Research* 48: 1093–1101.
Prince, J.D., Dowling, N.A., Davies, C.R., Campbell, R.A., and Kolody, D.S. (2011) A simple cost-effective and scale-less empirical approach to harvest strategies. *ICES Journal of Marine Science* 68: 947–960.

~~species/stock fishery, but fisheries are also expected to manage the diversity and productivity of individual populations within the SMU.~~

~~References~~

~~Butterworth, D. S. and A. E. Punt (1999) Experiences in the evaluation and implementation of management procedures. *ICES Journal of Marine Science* 56: 985-998.~~

~~Clark, W.G. (2002) $F_{35\%}$ revisited ten years later. *North American Journal of Fisheries Management* 22(1): 251-257.~~

~~Mace, P.M. (2001) A new role for MSY in single-species and ecosystem approaches to fisheries stock assessment and management. *Fish and Fisheries* 2: 2-32.~~

~~Prince, J.D., N.A. Dowling, C. R. Davies , R. A. Campbell and D. S. Kolody (2011) A simple cost-effective and scale-less empirical approach to harvest strategies. *ICES Journal of Marine Science*. 68: 947–960.~~

~~Sainsbury, K.J., A. E. Punt, and A. D. M. Smith. (2000) Design of operational management strategies for achieving fishery ecosystem objectives. *ICES Journal of Marine Science* 57: 731-741.~~

~~Starr, P.J., P.A. Breen, R. Hilborn and T.H. Kendrick (1997) Evaluation of a management decision rule for a New Zealand rock lobster substock. *Marine and Freshwater Research* 48: 1093-1101.~~

~~Witherall, D., C. Pautzke and D. Fluharty (2000) An ecosystem-based approach for Alaska groundfish fisheries. *ICES Journal of Marine Science* 57:771-7.~~

~~Zhou, S., Y. Shaowu, J.T. Thorson, A.D.M.Smith and M. Fuller (2012) Linking fishing mortality reference points to life history traits: an empirical study. *Canadian Journal of Fisheries and Aquatic Science*. 69:1292-1301.~~

~~Prince, J.D., N.A. Dowling, C. R. Davies , R. A. Campbell and D. S. Kolody (2011) A simple cost-effective and scale-less empirical approach to harvest strategies. *ICES Journal of Marine Science*. 68: 947–960~~).

~~Harvest Strategy (Management) Component~~

~~Background~~

GSA 2.1.1.1 ▲~~The harvest strategy (management) has four PIs. These PIs assess a fishery's ability to manage the impact on target stocks to achieve the outcomes sought by the MSC Principle 1. The overall harvest strategy and the specific management components in PIs 1.2.2-1.2.4 should in combination be capable of achieving the management objectives expressed in the target and limit reference points.~~

It is the MSC intent that any stock proposed for assessment against Principle 1 (P1) cannot be determined to be an Endangered, threatened, or protected (ETP) and out-of-scope (OOS) species (hereafter ETP/OOS). In this context the team needs to provide evidence that decision tree Figure SA3 (and supporting requirements) has been applied to determine the P1 stock.

GSA2.1.3 Subsidies in fishing ▲

The MSC does not name individual subsidy types as harmful or not harmful to fishing. However, some subsidies may~~, however,~~ contribute to overcapacity, which may compromise the ability of a management system to effectively control fishing effort.

GSA2.2 Stock status Performance Indicator (PI 1.1.1) ▲

The terms "likely", and "highly likely" are used to allow scoring by either qualitative or quantitative approaches:

- Examples of qualitative interpretation include:
    - Analogy with similar situations.
    - Plausible argument.
    - Empirical observation of sustainability.
    - Qualitative risk assessment.
- Examples of quantitative interpretation include:
    - The use of measured data from the relevant fishery.
    - Statistical analysis.
    - Quantitative risk assessment.
    - Quantitative modelling.

GSA2.2.1.1 Determination of status with respect to PRI and B_{MSY} ▲

The team should score PI 1.1.1 against the conceptual levels PRI and MSY. Such levels may or may not be used as explicit reference points in a fishery.

When well-managed stocks do not have TRPs or LRPs, or their values are not consistent with the conceptual levels of PRI or MSY, the team will still need to assess the stock in terms of the overall outcome objectives. For example, for SG80 the stock status is "highly likely" to be above the point at which there is an appreciable risk that recruitment is impaired and will be at or around a level consistent with B_{MSY}.

The team should interpret the PRI as the point below which there is an increased risk that recruitment may be substantially impaired. Fisheries should be managed such that the risk of stocks falling below this level is very low. The MSC default proxies for the PRI and MSY are given in GSA2.2.3~~When considering the effectiveness of a management strategy and its ability to meet P1 and P2 outcomes, CABs should take into account any problems that might be caused by fishing overcapacity, or other issues, that can result from subsidies.~~

~~If overcapacity exists as a result of subsidies, the management system should be robust enough to deal with this issue and still deliver a sustainable fishery in accordance with MSC Principle 1 & 2.~~

~~If the management system is not robust enough to deal with overcapacity caused by subsidies, a condition should be set in accordance with against the relevant management PI.~~

~~**Shared and straddling stocks and highly migratory stocks**~~

~~When considering management PIs under P1 in fisheries that target shared stocks, straddling stocks or highly migratory stocks, CABs should consider all national and international management systems that apply to the stock and the capacity of these systems to deliver sustainable outcomes for P1.~~

~~International management systems may include Regional Fisheries Management Organisations (RFMOs), bilateral/multilateral arrangements and other international arrangements with similar intent.~~.

~~GSA2.2 Stock Status PI (PI 1.1.1)~~ GSA2.2.2 Scoring fluctuations around the target MSY level ~~-~~ – scoring issue (b) ▲

~~Scoring issue (b) of PI 1.1.1 requires that the P1 stock (biomass) is fluctuating around a level, B_{MSY}, at which maximum sustainable yield may be achieved, or around a higher level where appropriate.~~

Fluctuation in this context refers to the variability over time around a point, acknowledging that the magnitude of fluctuation will be influenced by the biology of the species, and that short-term trends may be apparent in such fluctuations.

~~In considering PI 1.1.1 scoring issue (b) and , teams should provide a clear rationale by which it is argued that the SG80 or 100 levels are met, including the details of the time period over which this is assessed. Such rationale should take into account the specific biology of the species and the stock status in recent years.~~

Examples of situations that may be regarded as “fluctuating around a level consistent with MSY” and thus able to achieve at least an 80 score for PI 1.1.1 scoring issue (b) are given below. ~~In considering these examples, teams should note that the 90%B_{MSY} figure is given as a hypothetical level that may be appropriate for species types with average levels of fluctuations. Other values may be appropriate for other species types. These examples are thus provided as illustrations of different ways in which rationales may be constructed rather than explicit requirements. Teams should further keep in mind that the rationale should demonstrate fluctuation around a level ‘consistent with B_{SMY}’, not a level consistent with 90%B_{MSY}.~~

The team should note that the 90%B_{MSY} figure in the example below is given as a hypothetical level that may be appropriate for species types with average levels of fluctuations. Other values may be appropriate for other species types.

Examples: 80 score

Examples of situations that may be regarded as “fluctuating around a level consistent with MSY” and thus able to achieve an **80 score** for PI 1.1.1 scoring issues (b~~) are given below:~~):

- An instantaneous estimate of current stock status that is not less than 90%B_{MSY}.
- A recent series of estimates of stock size that has:
  - A median or mean value over the last one generation time that is not less than 90%B_{MSY}. (For a definition of generation time, see GSA2.2.4, Box GSA4~~, and which has~~)

~~SC17~~ ○ A trend that is consistent with an expectation that the future biomass will continue to fluctuate around B_{MSY}. ~~(For definition of 'generation time', see guidance)~~

A consistent downward trend over recent years to levels below B_{MSY} would not be consistent with this expectation, unless accompanied by projections or other information suggesting that the trend will soon be reversed ~~(e.g.,~~; for example, due to incoming strong recruitment or recent reductions in exploitation level~~)~~. The time series may include estimates that are less than 90%B_{MSY}, ~~so~~as long as these are shown to be part of a long-term fluctuation around B_{MSY}.

- A series of estimates showing a steady increase in stock size that has recently returned to a level not less than 90%B_{MSY}, and is expected to continue building to above B_{MSY}, and thereafter to fluctuate around B_{MSY}.

Examples: 100 score

Examples of situations that may achieve the higher **100 score** on PI 1.1.1 scoring issue (b~~) are given below:~~):

- A recent series of estimates of stock size that has a mean or median over the last ~~two~~2 generation times that is not less than 90%B_{MSY}.
- A series of estimates of stock size that have been above B_{MSY} in all years of the last one generation time.

The team should note that, in reviewing fluctuations in stock size, ~~teams should note that~~ a model-derived estimate of stock size from the most recent year will often be more uncertain than a model-derived estimate from earlier years. ~~Teams should take this into account so as~~ To avoid rapid changes in status of MSC certified stocks and consequent changes in certification status, as specified in FCP 7.30~~, which are possibly not~~, the team should consider that model-derived estimates may not be indicative of actual material change in stock status~~, and so avoid unnecessary changes in certification status as specified in .~~. The team should note that a single estimate of stock status unsupported by an estimate of certainty, either derived from a time-series trend or from a statistical model, should only ~~rarely~~ be used to justify a material change in the score.

The MSC has chosen not to define its requirements in relation to the ~~commonly used definitions "overfished" and "~~terms "overfishing" and "overfished". Nevertheless, these terms are commonly used, and are referred to in some guidance as follows:

- "Overfishing~~:~~" is fishing mortality higher than F_{MSY}~~,~~.
    - The fishing mortality level that results, in the long term, in the stock being at ~~maximum sustainable yield~~MSY.
- "Overfished~~:~~": biomass stock size is lower than a limit defined in relation to MSY.
    - The FAO Ecolabelling Guidelines define "overfished" as below a biomass ~~limit reference point.~~LRP. The limit is often taken to be 50%B_{MSY}, which is the default assumption for the point below ~~which recruitment may be impaired (~~the PRI~~)~~ as defined by the MSC. ~~However,~~
    - The term is not commonly used internationally to relate to the PRI, and hence its use in MSC program documents is limited.

GSA2.2.3 ~~Determination of status with respect to PRI and B_{MSY}~~

~~The wording of PI 1.1.1 requires scoring against the conceptual levels PRI and MSY. Such levels may or may not be used as explicit reference points in a fishery. There may be situations where well-managed stocks do not have target reference points or do not have limit reference points, or their values are not consistent with the conceptual levels of PRI or MSY. The stock will still need to be assessed in terms of the overall outcome objectives, i.e., for SG80 that the stock status is highly~~

~~likely to be above the point at which there is an appreciable risk that recruitment is impaired, and will be at or around a level consistent with B_{MSY}.~~

~~All management systems should thus have reference points of some sort, as confirmed in PI 1.2.4 (scoring issue (b)). Where these are not stated explicitly they should be implicit within the decision rules or management procedures, and the fishery should be assessed using these implicit reference points.~~

~~An explicit use of only a target reference point should include some implicit consideration of a limit reference point, and likewise a management system that uses only a limit reference point will have some implicit acknowledgement of targets.~~

~~In requiring that fish stocks are 'likely above the PRI' (SG60 in PI 1.1.1), MSC recognises that fish stocks do not have an exact and constant level below which recruitment will always be impaired. In a Beverton-Holt type stock-recruit relationship, recruitment declines with any reduction in stock size from the unexploited level. The PRI should be interpreted as the point below which there is an increased risk that recruitment may be substantially impaired and Fisheries should be managed such that the risk of stocks falling below this level is very low. Where historical estimates of stock size and resulting recruitment are available, the PRI may be identifiable as the point below which reduced recruitment has been observed in the past, and above which recruitment appears to be more related to environmental factors than to stock size. MSC default proxies for the PRI and MSY are given in the following sub-section.~~

~~GSA2.2.3.1~~ Use of proxy indicators and reference points for PRI and B_{MSY} ▲

Field Code Changed

In this section the term "reference point" is used in relation to determination of status~~, not in relation to harvest control rules (see additional guidance on this distinction in).~~.

Writing the PISGs in terms of biomass and fishing rate metrics ~~creates an appearance~~would suggest that the 'MSC Fisheries ~~Standard~~Standard' is not well suited for ~~other than large industrial~~ fisheries ~~with formalised~~that do not commonly have stock assessments ~~and~~ conducted in which biological reference points for biomass ~~based reference points.~~and/or fishing mortality are estimated. This is not the intent.

~~confirms that teams may allow the use of surrogate or proxy indicators and reference points in scoring both stock biomass and exploitation rate. The terms "likely", and "highly likely" are used to allow scoring by either qualitative or quantitative approaches.~~

~~SC18 Examples of qualitative interpretation include analogy with similar situations, plausible argument, empirical observation of sustainability and qualitative risk assessment.~~

~~SC19 Examples of quantitative interpretation include the use of measured data from the relevant fishery, statistical analysis, quantitative risk assessment and quantitative modelling.~~

Default values for the levels of the PRI and B_{MSY}, as used in scoring the stock status PI 1.1.1, are given below. They are often related to B_0, the ~~stock status~~estimated "unfished biomass" that would be present in the absence of fishing. Stock status is typically expressed as population biomass relative to B_{MSY}, a proxy for B_{MSY}, or a specified management target, but in some cases may instead be expressed relative to B_0.

- In the case where neither B_{MSY} nor the PRI are analytically determined, the following default reference points may be appropriate for measuring stock status depending on the species: ~~B_{MSY}=40%B_0; PRI=20%B_0=½B_{MSY}.~~

  ~~In the case where~~B_{MSY} = 40%B_0.

  PRI = 20%B_0 = ½B_{MSY}.

- If either B_{MSY} or the PRI are analytically determined, the team should preferentially use those values ~~should be used~~ as the reference points for measuring stock status unless additional precaution is sought.
- In the case where B_{MSY} is analytically determined to be greater than 40%B_0, and there is no analytical determination of the PRI, the default PRI should be ½B_{MSY}. This case covers ~~the situation~~situations of low productivity stocks, where higher default PRIs may be justified.

- In the case where B_{MSY} is analytically determined to be lower than $40\%B_0$ ~~(~~, as in some "highly productive" stocks~~)~~, and there is no analytical determination of the PRI, the default PRI should be $20\%B_0$ unless B_{MSY} ~~<~~ < $27\%B_0$, in which case the default PRI should be $75\%B_{MSY}$.
- For stocks with average productivity, where B_{MSY} is not analytically determined but assumed to be $40\%B_0$ and a management ~~trigger reference point~~TRP is set greater than $40\%B_0$ for precautionary reasons, the default PRI should still be set at $20\%B_0$ ~~=½~~ = ½B_{MSY} unless it is analytically determined. This covers situations where the management authority has deliberately chosen a conservative ~~target reference point~~TRP, but where the default PRI is still appropriate.
- In cases where the PRI is set at $20\%B_0$, ~~a~~ the team may assume the default value for the B_{MSY} ~~may be assumed~~ to be ~~2xPRI.~~ 2 x PRI.
- In ~~other~~ cases~~, for instance~~ where the PRI is set at the lowest historical biomass, ~~it~~the team cannot ~~be assumed~~assume that B_{MSY} = ~~2xPRI. Teams shall~~ 2PRI. The team is expected to justify any "reference point" used as a proxy of B_{MSY} in terms of its consistency with B_{MSY}.
- Where historical estimates of stock size and resulting recruitment are available, the PRI may be identifiable as the stock size below which reduced recruitment has been observed, and above which recruitment appears to be more related to environmental factors than to stock size.
- Where a biomass escapement strategy is used, the team should ensure it allows for optimised catches while ensuring that enough spawning biomass remains to avoid recruitment impairment. Typically, an annual escapement of around 40% is considered a pragmatic proxy for MSY.

The default PRI values given above ~~(½~~, ½B_{MSY} or $20\%B_0$~~)~~, apply to stocks with average productivity. Such points are generally consistent with being above the point at which there is an appreciable risk that recruitment is impaired~~, though~~. For some ~~short-lived~~"highly productive" stocks, the actual point at which there is an appreciable risk that recruitment is impaired may be lower than $20\%B_0$ ~~and~~. For some long-lived species, it may be higher than ~~this~~$20\%B_0$.

~~Where~~If management has defined a target range for B_{MSY} rather than a single value, the team should score the stock status PI 1.1.1 against this range. ~~The team should also consider if different reference points are required for different components of the stock in their assessment.~~The application of TRP ranges rather than a single value may be seen in fisheries targeting "highly productive" stocks as a way of dealing with the inherent variability in biomass. A range provides some intrinsic flexibility for determining whether the stock is fluctuating at or around B_{MSY}. The team should:

- ~~Where~~ Provide sufficient rationale to demonstrate how the stock is indeed fluctuating at or around B_{MSY}.
- Consider whether different "reference points" are required for different components of the stock in its assessment.

If proxies are used that are not expressed as percentages of B_0, ~~teams~~the team should generally ensure that:

- Any "reference point" used as a proxy for scoring the PRI is set above the point where there is an appreciable risk of recruitment failure~~; and~~.
- Any "reference point" used as a proxy for the MSY level maintains the stock well above the PRI and at levels of production and stock sizes consistent with B_{MSY} or a similar "highly productive" level.

~~Where~~If proxy "reference points" are defined in this way, ~~teams~~the team should take account of the difference between the "reference point" and the required ~~(~~PRI or MSY~~)~~ levels in ~~their~~its scoring.

~~Particular caution~~The team should be ~~given~~cautious regarding ~~"~~"per-~~recruit'~~recruit" stock assessment approaches that do not include any form of stock-recruit relationship. Levels of $F_{0.1}$ or $F_{40\%SPR}$ (where SPR is spawning potential ration) will usually, for example, provide more reliable proxies of F_{MSY} than F_{max} when a "per-recruit" approach is used.

The team should not assume "reference points" such as precautionary "reference points" for spawning stock biomass (B_{PA}), that are used as a ~~precautionary~~ buffer to reduce the chance of declining to a limit level such as the PRI ~~should also not be assumed~~, to be consistent with B_{MSY}. For example, the team should regard the $B_{MSYtrigger}$ approach (where $B_{MSYtrigger}$ is a biomass "reference point" that triggers a cautious response when stocks fall below a trigger level) used in ICES~~, for~~

~~example, should be regarded~~ as setting a lower limit to the likely range of values that B_{MSY} may take, and not as an estimated value for B_{MSY}.

In ICES assessments, the team may regard fisheries with biomass (B~~>~~) > $B_{MSYtrigger}$ ~~may be regarded~~ as "fluctuating around B_{MSY}" ~~(~~", thereby achieving an 80 score~~)~~.

The team may also use proxy indicators and "reference points ~~or~~" for measuring stock status ~~may also be used~~ where the exact relationship with the PRI, B_{MSY}, and F_{MSY} levels are not known. ~~In these cases, the team must provide justification that these proxies are reasonable for the context in which they are used.~~

Examples: proxies

~~Examples of such proxies~~ and necessary ~~considerations are given below:~~consideration

- ~~Where~~ If empirical values of catch per unit effort (CPUE ~~(~~), not based on an explicit stock assessment~~)~~, are used as reference points for monitoring biomass, ~~teams~~the team could provide rationales that the values adopted are consistent with MSY or a similar "highly productive" level. ~~Checks~~The team may ~~be needed~~need to check to ensure, in this case, that spatial changes in fishing, or changes in the catchability of ~~gears~~gear do not reduce the reliability of the proxy indicators.
- ~~Where~~ If reference points for measuring stock status are based on some historical state, the team should:
  - Consider the position of the stock at that time ~~should be considered~~ relative to the unexploited level ~~and~~.
  - Consider the likely proximity to B_{MSY}. ~~Evidence should be presented~~
  - Provide evidence that the stock was not over-exploited at the historical reference time ~~and~~.
  - Provide evidence that the catch was sustainable and "highly productive~~.~~".
- ~~Where~~ If mean fish sizes are used as reference points for the exploitation level, ~~teams~~the team should provide rationales that the values adopted are consistent with F_{MSY} or similar levels.
- ~~Other examples include~~ In crustacean fisheries that seek to protect from harvest the complete female reproductive capacity in the population (~~i.e.,~~ single sex harvest~~). The~~), reference points ~~used here~~ could relate to metrics such as percent fertilised eggs and/or other female population indicators that are used in evaluating the management system's effectiveness at achieving its goal.
- Biomass escapement strategies are used for a variety of fisheries including those that target stocks that are short-lived, semelparous, exhibit high natural mortality, and/or a weak stock-recruit relationship (e.g. salmon or squid). A target amount or percentage of individuals needed to survive ("escape") is determined that ensures there is sufficient spawning biomass. Escapement can be expressed in absolute or relative terms. Provided the stock can be shown to be fluctuating around a "highly productive" level and is above any point where recruitment could be impaired, these proxies may be seen as being at a level consistent with MSY. The level of escapement can be kept constant, based on average conditions, or be variable to account for differences in year classes (e.g. real-time management).
- For fisheries targeting semelparous species (e.g. cephalopods), some stocks have almost full replacement of the population during each generational cycle. Investigating the spawner-recruitment relationship may help estimate stock size from prior data, and from that, a level of harvest that can maintain productivity consistent with MSY.

~~Where proxy reference points are used in scoring the stock biomass status, higher scores should be assigned where greater confidence is provided by the proxy information (such as with a 'traffic lights' approach to management).~~

Examples: using proxy reference points

Examples of how the ~~60, 80~~team may justify SG60, SG80, and ~~100 SG~~SG100 levels ~~may be justified~~ in these situations ~~are given below~~:

~~At~~ •**SG60**~~:~~ if no decline has been observed in ~~**one**~~**1 proxy** of biomass for at least one generation time of the species and the proxy indicates that the stock is "**likely" above the PRI**.

~~At~~ •**SG80**~~:~~ if no decline has been observed in ~~**two**~~**2 proxies** of biomass for one generation time and at least one proxy indicates that the stock is at a "**highly productive" level**.

~~**At SG 100:**~~• **SG100** if no decline has been observed in ~~three~~**3 proxies** of biomass for one generation time and at least ~~**two**~~2 proxies indicate that the stock is at a "highly productive" level.

In these cases, where higher scores are justified by the use of more than one proxy ~~indicators~~indicator, such proxies should be independent of each other and also reasonably be expected to be proxies of the quantity of interest ~~(~~, such as CPUE in the case of stock biomass~~). The team should present a rationale for how the proxies conform to these principles.~~.

In some cases, ~~it~~the team may ~~reasonably be argued~~argue that ~~one~~1 good proxy is better than ~~two~~2 or more weak proxies.

GSA2.2.3.2 ▲

For example, as with a "traffic lights" approach to management.

GSA2.2.4 Scoring stock status using fishing mortality rate ~~(F)~~ ▲

~~Clause also allows the use of fishing mortality as a means of scoring PI 1.1.1 when biomass information is not available. Obviously, a fishery that is currently at or below the point at which recruitment is impaired will not suddenly be at MSY if fishing mortality is reduced to F_{MSY}.~~

The team should examine the history of ~~fishing mortality should be examined~~F to determine whether the stock biomass could be assumed to be at the required level for each SG. ~~Obviously this depends~~This will depend on the starting status for stock biomass, the trajectory of fishing mortality, and the length of time that fishing mortality has been at a certain level.

~~The following expectations should be applied~~ If the starting biomass is unknown, the team should apply the following expectations:

- At least ~~a **60**~~SG60 score is justified if F is "likely" to have been at or below F_{MSY} for at least ~~**one**~~1 generation time of the species ~~(~~, or for at least ~~two~~2 years, if greater~~)~~.. This level of F is generally expected to be able to recover, or maintain, a population ~~to be~~ "likely" to be above its PRI.
- At least ~~an **80 score**~~SG80 is justified ~~(~~where B is "highly likely" to be above the PRI and at or "fluctuating around B_{MSY}~~)~~, if F is likely to have been at or below F_{MSY} for at least ~~**two**~~2 generation times ~~(~~, or for at least ~~four~~4 years, if greater~~)~~.

~~A **100**~~• SG100 score is justified if F is "highly likely" to have been below F_{MSY} for at least ~~**two**~~2 generation times ~~(~~, or for at least ~~four~~4 years, if greater~~)~~.

~~Clearly these are just~~These guidelines~~,~~ are based on ~~an~~the assumption that fishing mortality will in these cases be at or very closely below F_{MSY}. The lower the fishing mortality has been, the shorter the time interval required for recovery. For instance, while most species require about 2 generation times to recover from the PRI to B_{MSY} when fishing is at F_{MSY}, when F is reduced to 80%F_{MSY} or 60%F_{MSY}, the time for recovery may be halved. ~~CABs~~The team should take these issues into account when scoring.

Box GSA4: Generation time

~~**Definition: Generation time (GT)**~~

The MSC defines a generation time (GT) as the average age of a reproductive individual in an unexploited stock[12]~~, consistent with the definition in Goodyear 1995~~:

$$G = \frac{\sum_{a-1}^{A} aE_aN_a}{\sum_{a-1}^{A} E_aN_a}$$

where a is age, A is the oldest age in an unfished state, E_a is the maturity at age a, and N_a is the number per recruit alive at age a in the absence of fishing~~, i.e.,~~ .

$N_a = N_0 e^{-Ma}$ where M is natural mortality and N_o =1 (per recruit).

~~A~~The equation provided above computes GT with the parameter E_a being "maturity at age a". The original Goodyear formula computes GT with the parameter E_a being "mean fecundity of females at age a", which is estimated based on the product of the fraction of mature females and the average fecundity of mature females. The equation provided above is consistent with the original Goodyear formula but is more accessible because the information required is less onerous. The underlying assumption in the equation above is that fecundity is constant for all ages in the population, so that GT can be computed using the fraction of mature females only, referred to as "maturity". Information about female fecundity, which requires specific equipment and expertise and thus is more expensive than maturity information, is not necessary to compute GT.

Another reasonable approximation for GT, when 0.1 ≤ M ≤ 2 is:

$1/M + A_{m50}$

where A_{m50} is the age at 50% maturity.

The team should use an appropriate formula considering the data available, or peer-reviewed/published material for the target stock.

When several methods can be applied and it is not clear which should be chosen, the team should apply weight of evidence and precautionary approaches for the computation of GT.

[12] Goodyear, C.P. (1995) Red snapper in U.S. waters of the Gulf of Mexico: 1992 assessment update, National Marine Fisheries Service, Southeast Fisheries Science Center, Miami Laboratory. Gulf of Mexico. NMFS/SEFSC. Cited by Restrepo, V.R., Thompson, G.G., Mace, P.M., Gabriel, W.L., Low, L.L., MacCall, A.D., Methot, R.D., Powers, J.E, Taylor, B.L., Wade. P.R., and Witzig, J.F. (1998) in Technical Guidance on the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Technical Memorandum NMFS–F/SPO–31, 17 July 1998.

Box GSA5: Consideration of fishing mortality rate in MSC assessments

~~**Consideration of fishing mortality rate in MSC assessments**~~

The guidance in this section covers ~~the~~a specific situation: where ~~fishing mortality (~~F~~)~~ is being used as an indicator of the status of the stock~~,~~ when actual biomass estimates are not available. ~~In this case, F must have been low enough for long enough for the required biomass levels to have been achieved.~~

~~Guidance is also provided later on~~ The use of fishing mortality information~~, where it is available, in its more normal context as~~ is usually an indicator of the level of exploitation in a fishery. This is particularly relevant in the scoring of the rebuilding PI, 1.1.2, and the ~~harvest control rule (~~HCR~~)~~ PI, 1.2.2. The general expectations in these cases are summarised below:

- **PI 1.1.2** (rebuilding~~): When Biomass ()~~ – when B~~)~~ is below a level at which it could be regarded as ~~'~~"fluctuating around ~~B_{MSY}',~~B_{MSY}", then F should normally be less than F_{MSY}, in order to achieve recovery to such a level.
- **PI 1.2.2** (HCRs~~):~~) – to be regarded as working effectively, HCRs will normally maintain F equal to or less than F_{MSY}.

Only a few exceptions to these general ~~'rules'~~"rules" are allowed~~, as supported by~~. The team should support exceptions with clear justifications, such as the special nature of a stock assessment approach or the availability of other specific information.

For further details, see ~~the guidance sections~~ GSA2.3.4 and GSA2.5.3 ~~(scoring issue (c)). Teams~~.

The team should ~~also~~ note that F should be maintained at lower than MSY levels in key low trophic level (*LTL*) fisheries.

GSA2.2.5–2.2.6 Stock complexes ▲

See comments on multi-stock and mixed stock fisheries and stock complexes in Box GSA3.

Field Code Changed

GSA2.2.7 Consideration of environmental variability ~~(~~, including climate change~~)~~, and human-induced impacts ▲

~~MSC recognises that the~~ Ecosystem productivity ~~of fisheries is affected by a range~~may change naturally over time, for example under conditions of regime shift. Where changes to stock productivity are the result of natural fluctuations in environmental ~~factors, as much as by~~conditions, the ~~levels of fishing and the management of the fishery. The actual~~ values of reference points may ~~thus~~also change ~~over time~~, as reflected in stock assessments~~, and~~. These changes ~~may be allowed for in~~are acceptable when scoring the status of the stock in PI 1.1.1. ~~Section recognises the situation~~

In situations where the productivity of the ~~fishery is reduced~~stock is affected through human-induced impacts, either ~~by~~directly from the UoA (e.g. excessive fishing~~,~~) or ~~by~~from other ~~human-induced impacts (e.g.,~~sources such as pollution or habitat degradation (e.g. the clearance of mangrove swamps affecting fish nursery areas~~). In these cases there is no justification for reducing the~~), reduction of reference points ~~and~~is not justified. The fishery should receive a lower score in PI 1.1.1 until effective management is in place and the stock returns to healthy levels.

~~However,~~ The MSC ~~recognizes~~recognises the multipurpose nature of use patterns, particularly in inland waters. Example uses include:

- Dam construction for water supply and power~~, channelization~~.
- Channelisation for navigation and flood control~~,~~.
- Land drainage ~~and~~ .
- Wetland reclamation for agricultural uses ~~etc.~~ .

Such uses are generally fundamental to the functioning of modern society and outside ~~of~~ the management control of the fishing sector. Where users from other ~~sectors (,~~ non-fishery~~)~~ sectors have impacts on the fishery, management should ~~take into account~~consider these impacts when devising a strategy for achieving management objectives.

Example~~:~~

If water is withdrawn for agriculture and urban supply and this has an adverse impact on fish stocks, the management of the fishery is expected to address this fact~~ (~~, perhaps by reducing fishing or with time/area closures~~)~~.

~~Although~~ Climate change is ~~now generally accepted as~~ a ~~potential '~~human-induced~~'~~ impact on fishery productivity~~, it is~~. However, the impact of climate change is not ~~one that can be~~ easily ~~'~~resolved~~' in the sense required by~~ . Such changes are thus regarded as more similar to ~~the situation with~~those arising from regularly occurring ~~(e.g., decadal)~~ cycles or regime shifts, as covered under SA2.2.7.1. ~~Teams~~The team should note the further guidance on scoring of climate ~~changes~~change in~~ PIs~~:

- PI 1.1.~~1.~~2 (stock rebuilding~~ –~~, see GSA2.3~~),~~).
- PI 1.2.2 (harvest control rules, and the scoring ~~or~~of uncertainty~~), and in~~).
- PI 2.~~5~~4.3 (ecosystem information~~ –~~, see SA3.16.1~~)~~.

~~Consequently, in situations where~~If there is evidence that productivity changes are related to the impacts of long-term climate change, ~~CABs~~the team should note that appropriate adjustments need to be made to reference points~~ and~~. In such instances, the team should use indicators~~ used~~ to determine stock status.

GSA2.2.8 Treatment of key ~~Low Tropic Level (~~LTL~~)~~ stocks ▲

~~The MSC's intent for consideration of trophic level is that the management of all target~~ LTL species ~~should~~, also referred to as forage fish, play a crucial role in ~~some way take into account their trophic level. To date~~marine food webs in many ecosystems. For this reason, the MSC has ~~only~~ defined specific management and outcome ~~performance~~ requirements for key LTL stocks~~, because~~. The intent of the MSC's requirements on the treatment of LTL stocks is focused on limiting the ecosystem impacts caused by the commercial harvest of ~~the highly~~these important ~~role that they play within ecosystems. CABs should also consider whether management needs to be particularly precautionary for very long lived or high trophic level~~ species.~~ For example, generic reference points appropriate for low trophic level, short lifespan, high fecundity species would be those appropriate to such species, rather than those appropriate for high trophic level, long lived, low fecundity species. See guidance above on reference points.~~

Box GSA6: Special management requirements for key ~~Low Trophic Level~~LTL stocks

The ecological importance of LTL species such as sardines, anchovy, and krill and the control they can exert on the rest of the food web is well established[13].

Because of their significant ecological importance, unsustainable exploitation of forage fish populations can impact the marine food web by causing declines in top marine predator, seabird and marine mammal populations, or even threaten food security in some countries by diverting forage fish from human consumption.

A principal distinction within the MSC requirements is the recognition of key LTL stocks as separate from non-key LTL stocks. The intent is that the team should assess all forage fish stocks against their potential ecosystem importance when applying for certification against the MSC Standard, but the specific higher management requirements only apply to those stocks recognised as "key LTL".

A species that feeds predominately on plankton and is found in the diets of many predators will likely be a key LTL stock. The MSC guidance on this topic (GSA2.2.9) provides examples of how these criteria can be met. Following a precautionary approach, if it is not possible to provide a

[13] Cury, P., Bakun, A., Crawford, R.J.M., Jarre, A., Quiñones, R.A., Shannon, L.J., and Verheye, H.M. (2000) Small pelagics in upwelling systems: patterns of interaction and structural changes in ''wasp-waist'' ecosystems. *ICES Journal of Marine Science* 57: 603–618.

justified argument that at least 2 of the criteria are NOT met, the team should treat the stock as key LTL.

The first 2 criteria[14] and the thresholds used relate directly to the levels of ecosystem impact that the depletion of the LTL species would have. If the team determines a species to be key LTL, the removal of this species beyond defined precautionary reference points would likely cause a cascade effect in the wider ecosystem.

The MSC defines the default precautionary reference points for management of key LTL species as:

- A biomass that is 75% of the unexploited level in the system, or
- A target exploitation rate of $0.5F_{MSY}$ or 0.5M, the natural mortality of the species.

In fisheries where there is sufficient understanding of the system, the team can use credible ecosystem models (as defined in SA2.2.14) to adjust these default reference points to specific levels appropriate to the fishery, where these levels are shown not to have adverse ecosystem effects.

The MSC's intent is that the team should evaluate key LTL target stocks scored under PI 1.2.1 scoring issue (a), PI 1.2.2 scoring issue (a), and PI 1.2.4 scoring issue (b) against management objectives in PI 1.1.1A at the SG 80 level and not PI 1.1.1.

If an LTL stock is not key, it is assumed that the impacts of removing it are not of particular importance to the wider ecosystem. The team should assess the stock in PI 1.1.1, using the default requirements.

GSA2.2.9 Identification of key ~~Low Trophic Level (~~LTL~~)~~ stocks ▲

~~Ways of demonstrating~~The team should use the following to demonstrate whether a stock under assessment should be treated as a key LTL stock ~~may include~~:

- The use of qualitative information on the ecosystem~~,~~.
- Diet matrices to construct food webs ~~and/or the use of~~.
- Ecosystem models that demonstrate the connection between species and trophic groups in the ecosystem.

If the team uses ecosystem models ~~are to be used~~, they must be "credible". ~~"Credible"~~The team should ~~be interpreted to mean~~interpret "credible" as:

- Publicly available and well documented~~;~~, such as peer-reviewed scientific papers.
- Fitted to time-series data~~; and~~.
- Comprehensive ~~(~~, dealing with the whole ecosystem, including all trophic levels[15]~~). See also Essington & Plaganyi (2012, MSC Science Series).~~.

[14] Smith, A.D.M., Brown, C.J., Bulman, C.M., Fulton, E.A., Johnson, P., Kaplan, I.C, Lozano-Montes, H., Mackinson, S., Marzloff, M., Shannon, L.J., Yunne-Jai, S., and Tam, J. (2011) Impacts of fishing low-trophic level species on marine ecosystems. *Science* 333, 1147–1150.
Essington, T., and Plágányi, E. (2013) Model and data adequacy for Marine Stewardship Council key low trophic level species designation and criteria and a proposed new assessment index. *Marine Stewardship Council Science Series*. Available at: https://www.msc.org/docs/default-source/default-document-library/what-we-are-doing/research-and-science-series/model-and-data-adequacy-for-msc-key-ltl-species-designation-and-criteria-and-a-proposed-new-assessment-index.pdf

[15] Essington, T., and Plágányi, E. (2013) Model and data adequacy for Marine Stewardship Council key low trophic level species designation and criteria and a proposed new assessment index. *Marine Stewardship Council Science Series*. Available at: https://www.msc.org/docs/default-source/default-document-library/what-we-are-doing/research-and-science-series/model-and-data-adequacy-for-msc-key-ltl-species-designation-and-criteria-and-a-proposed-new-assessment-index.pdf

Where species are aggregated into trophic groups in ecosystem models, the degree of aggregation should adhere to ~~the~~ guidance ~~provided in Fulton et al. (2003)~~[16] that:

- Aggregations do not include serially linked groups ~~(~~; predators and prey~~) and~~.
- ~~That~~ Aggregations are not across species, age classes, or functional groups with rate constants that differ by more than 2~~-to-~~–3-fold. ~~Where~~If possible, the team should base information about trophic connection ~~should be based~~ on empirical evidence of trophic dependence.

The team may also use diet matrices, which characterise the proportion of prey eaten by each predator, in addition to the simple linkages between predators~~, may also be used.~~. If diet matrices are used, ~~they~~the team must ~~also be constructed adhering to~~construct them in adherence with the

Example~~:~~

~~In cases where~~If key LTL stocks are identified by using total catch as a proxy for total biomass of the stock, the team should scale this ~~proxy needs to be scaled~~up to the spatial extent of the stock and its predators. For example, the CAB should interpret a low-volume fishery in a major coastal upwelling system ~~would be interpreted~~ differently ~~than~~to one in a small embayment with several locally -dependent predators.

guidance[17] ~~of Fulton et al (2003).~~.

In determining key LTL status, the team should consider the **spatial scale** of the ecosystem that could be affected, and from which information should be derived~~, needs to be considered.~~. This should generally correspond to the spatial distribution of the stock being fished~~,~~ and could be broader in some instances ~~(~~; for example, if the stock occurs within a well-defined spatial entity such as a gulf or regional sea~~).~~. It will not necessarily correspond to the jurisdictional scale of the fishery. If the spatial scale of the ecosystem is considerably larger than the stock distribution, the team should consider potential impacts ~~on predators~~ of localised depletion ~~would need to be considered~~on predators.

Considering temporal scale, seasonality is not relevant to determining key LTL status. If the stock meets two or more of the sub-criteria in SA2.2.9

~~Where~~ during only part of the year (e.g. during spawning of feeding aggregations but not during the rest of the year when the stock is dispersed or mixed with other stocks) the team should consider the criteria met and designate the stock as key LTL.
If the target stock or stock component under assessment is widely distributed and is present in more than one ecosystem, the ~~assessment of sub-criteria i, ii and iii in paragraph in Annex SA~~team should focus on the ecosystem containing the largest abundance of the species when assessing sub-criteria i, ii and iii in SA2.2.9.a~~.~~.

~~The three sub-criteria in paragraph for identifying "key" LTL stocks follow the description of wasp-waisted ecosystems given by Cury et al. (2000, 2003)[18] as being "typically dominated by only one, or at most a few" LTL species that transfer a very large proportion of the total primary production through the lower part of the food web, that account for the vast majority of predator diets and that control the abundance of both the prey and the predators of these LTL species. Guidance on assessing whether the each of the three sub-criteria are met is provided in the following sub-sections.~~

~~Teams should note that the MSC may, from time to time, modify the list of species in , where analyses indicate the consistency of other species with the criteria in paragraph .~~

[16] Fulton, E.A., Smith, A.D.M., and Johnson, C.R. (2003) Effect of complexity on marine ecosystem models. Marine Ecology Progress Series 253: 1–16.
[17] Fulton, E.A., Smith, A.D.M., and Johnson, C.R. (2003) Effect of complexity on marine ecosystem models. Marine Ecology Progress Series 253: 1–16.
[18] Cury, P., A. Bakun, R.J.M. Crawford. A. Jarre, R.A. Quinones, L.J. Shannon and H.M. Verheye (2000) Small pelagics in upwelling systems: patterns of interaction and structural changes in 'wasp waist' ecosystems. *ICES Journal of Marine Science* 57:603-619.
Cury, P., L. Shannon and Y.-J. Shin (2003) The functioning of marine ecosystems: a fisheries perspective. Pp103- 123 In *Responsible Fisheries in the Marine Ecosystem*, M. Sinclair and G. Valdimarsson (eds). FAO, Rome and CABI, Oxon UK.

~~Key LTL criterion i – Connectivity~~

2.2.9.a.i Key LTL criterion i – connectivity ▲

This sub-criterion requires that the LTL stock is eaten by the majority of predators~~, as stated: "a large proportion of the trophic connections in the ecosystem involve this species, leading to significant predator dependency"~~.

In quantitative terms, food webs can be used to investigate connectance, which can be expressed as unweighted ~~**Proportional Connectance**~~**"proportional connectance"** or the weighted **SURF index**~~(~~, **where SURF is** SUpportive Role to Fishery ecosystems~~)~~. SURF has the advantage that it is ~~relatively insensitive~~less sensitive to the grouping of predator and prey species~~; connectance is highly sensitive to them (Essington and Plaganyi, 2012 – MSC publication series).~~ than connectance[19].

~~SC20 MSC has developed a spreadsheet which will calculate PC and SURF from a diet matrix. Many ecosystems have published diet matrices, including those that have had some basic ecosystem modelling undertaken such as ECOPATH. CABs and clients may request this spreadsheet from MSC.~~

Proportional connectance (PC) is calculated ~~as follows,~~ from a diet matrix that has *n* components, and only requires a knowledge of the interaction between groups, not the proportional diet fraction of each group~~.~~, as follows:

- The total connectance (T) in a diet matrix is the number of all positive ~~(~~, non-zero~~)~~, diet interactions between components (i.e.~~,~~ predator-prey).
- The connectance (C) of a component is the total number of prey interactions plus the total number of predator interactions of that component calculated from the diet matrix.
- Then the proportional connectance of prey *i* is $PC_i = \frac{C_i}{T}$.

SURF is calculated as follows:

- $SURF_i = \frac{\sum_{j=1}^{n}(p_{j,i})^2}{T}$.
- Where p_{ij} is the diet fraction of predator *j* on prey *i* ~~(~~: the proportion of the diet of predator *j* that is made up of prey *i*~~)~~.

Figure GSA2 shows the results, for key and non-key LTL species classified according to the MSC definition ~~(as given in)~~: if, when fishing at B/B_0 ~~=~~ = 40%, no single ecosystem group is reduced by more than 70% of its B_0, and no more than 15% of ecosystem groups are perturbed by more than 40% from their B_0~~)~~ using the data in Smith et al. (2011)[20], of calculating connectance and SURF.

[19] Plaganyi, E.E. and Essington, T.E. (2014) When the SURFs up, forage fish are key. Fisheries Research 159: 68–84.
[20] Smith, A.D.M., Brown, C.J., Bulman, C.M., Fulton, E.A., Johnson, P., Kaplan, I.C, Lozano-Montes, H., Mackinson, S., Marzloff, M., Shannon, L.J., Yunne-Jai, S., and Tam, J. (2011) Impacts of fishing low-trophic level species on marine ecosystems (2011) *Science* 333: 1147–1150.

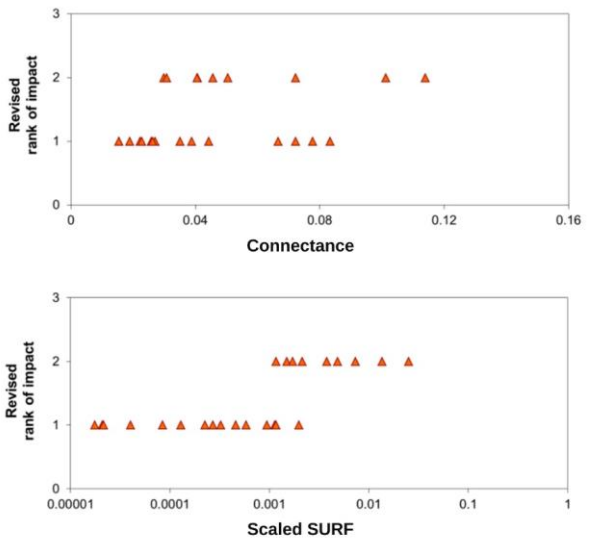
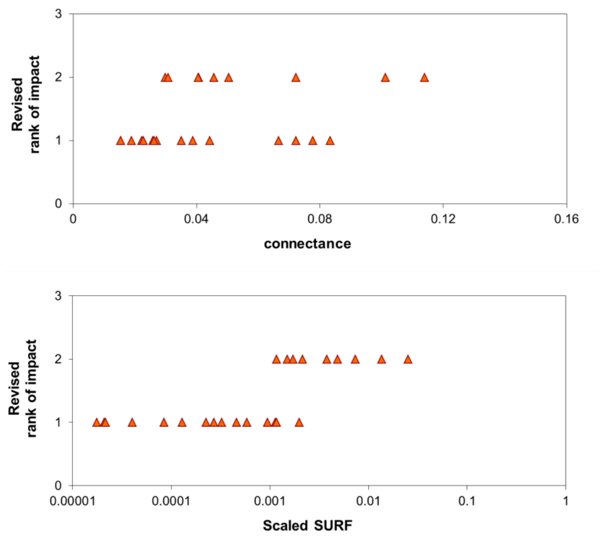


Figure ~~GSA:~~GSA2: PC and SURF scores calculated from Ecopath with Ecosim (EwE) ecosystem models presented in Smith et al. (2011~~),~~)[21], plotted against their impact on the ecosystem: category 1 satisfies SA2.2.~~13a~~14a at B/B_0 = 40% and is classified as non-key LTL; category 2 fails SA2.2.~~13a~~14a and is classified as key ~~-~~LTL



[21] Smith, A.D.M., Brown, C.J., Bulman, C.M., et al. (2011) Impacts of fishing low-trophic level species on marine ecosystems. Science 333, 1147–1150.

The team should assume that based on the analyses illustrated in ~~, the following should be assumed by assessment teams~~Figure GSA2:

- Connectance values of less than 4% ~~would~~will normally indicate a non-key ~~-~~LTL stock~~;~~.
- Connectance values of greater than 8% ~~would~~will indicate a key LTL stock.
- SURF values of less than 0.001 will normally indicate a non-key LTL stock.
- SURF values of greater than 0.~~005~~001 will normally indicate a key ~~-~~LTL stock.

~~In the intermediate zone, where the classification of the stock is uncertain,~~The team may take further qualitative evidence of predator dependency ~~may be taken~~in the intermediate zone into consideration, ~~e.g.:~~where the classification of the stock is uncertain. For example:

- If the stock is important in the diets of many higher predators for much of the year ~~('importance'~~, where "importance" here might be shown by:
    - The species being the preferred diet of a predator, compared to other prey species that also occur in the diet depending on availability~~; or by the species having higher calorific value or other specific fitness, e.g., for the development of juveniles).~~, or
    - The species having higher calorific value or other specific fitness; for example, for the development of juveniles.
- If land-based colonies of predators ~~(~~, including seals, fur seals, sea lions, penguins, and other birds~~)~~, are considered particularly dependent on this LTL stock~~, or~~.
- If large aggregations of other species are known to gather to feed on this LTL stock.

~~In the absence of a~~If there is no credible quantitative model, ~~assessing~~ the ~~percent of connections~~team will require ecosystem-specific understanding of the food web connections in the whole ecosystem ~~based~~in order to assess the percentage of connections. The team should base this understanding on a comprehensive species list that identifies links for major prey and predators, particularly dependent predators of the LTL stock in question, ~~and~~ supported by the considerations presented ~~in paragraphs~~ above.

2.2.9.a.ii Key LTL criterion ii – energy transfer ▲

~~This sub-criterion requires that "a large volume of energy passing between lower and higher trophic levels passes through this stock";~~

~~Argument to~~ The team may determine whether ~~sub-~~this criterion ~~1b~~ is triggered ~~may be~~ based on ~~1)~~:

- Empirical data~~, 2)~~.
- Credible quantitative models~~, and/or 3)~~.
- Information about the relative abundance of the LTL stock in the ecosystem.

- Consumer biomass ratio is calculated as the biomass of the candidate key LTL stock, divided by the biomass of all consumers in the ecosystem ~~(i.e.,~~: all ecosystem components that are not primary producers or detritus~~), i.e.,~~: consumer biomass ratio = $B_{LTL}/B_{consumers}$.
- Model-based results suggest that the team should regard any LTL stock that constitutes more than 5% of the consumer biomass in the ecosystem ~~should be regarded~~ as a key LTL stock.
- The importance of the size of a key LTL stock in determining whether there is a large volume of energy transfer through it will ~~of course~~ depend upon the size of the total energy in the ecosystem, and in the consumer biomass, as defined above.

~~Although~~ The size of the catch of a key ~~-~~LTL stock is not directly indicative of its likely importance in energy transfer~~, nevertheless~~. However, in approximate terms, catch size can be assumed to relate to ecosystem importance ~~and~~. The team may ~~be used~~use catch size to support a plausible argument that ~~a~~an LTL species meets, or does not meet~~,~~ criterion SA2.2.14~~:~~, as follows:

- LTL stocks that are subject to small catches ~~(<~~by small-scale fisheries, where small catches are < 50,~~000 t~~000t average total catch from the stock over the last 5 years~~) by small scale fisheries~~, will not normally be key LTL stocks. Catches ~~less than~~beneath this threshold may still indicate key LTL stocks in cases where they are taken from unusually small ecosystems.

~~The situation with~~ - It is less easy to predict the status of LTL stocks ~~that are~~ subject to large catches~~ (e.g., >~~, where large catches are > 100,~~000 t~~000t total catches from the stock over the last 5 years~~) in respect of key-LTL status is less easy to predict. CABs~~. The CAB should~~, however,~~ not assume that these fisheries are accessing non-key LTL stocks.

2.2.9.a.iii Key LTL criterion iii – ~~Wasp-waisted-ness~~

~~The~~ "wasp-waistedness" ▲~~waisted-ness'~~

This sub-criterion requires that "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"~~.~~.

- Simple food webs will be sufficient to determine whether there are significant other functionally similar species (at a similar trophic level) to the candidate LTL stock.
  - Although for the candidate LTL species, the focus is on the adult component of the stock (SA2.2.9.a, SA2.2.9.b), the ~~consideration of other species at the same trophic level~~team should consider all life stages (including juveniles) of ~~those~~other species at the same trophic level.

~~Examination of~~ - The team may examine catch statistics of other species of the types listed in Box SA1 or SA2.2.9.b within the same ecosystem ~~may also allow determination of~~to determine whether there are few significant catches of other species at this trophic level.
  - In ecosystems where the catches of the candidate LTL stock are less than those of all other species at the same trophic level, the team may regard the ecosystem ~~may be regarded~~ as not "wasp-waisted" and the candidate stock will not normally be a key LTL stock.

Example~~:~~

Sardine would be considered a key LTL species in the southern Benguela current system but not in the northern Humboldt system in its current state~~ (~~, as ~~at~~of 2010~~);~~. If the Humboldt system were to shift to a sardine-based rather than an anchovy-based system, ~~it~~sardine would once again become a key LTL species in that ecosystem.

As with other MSC guidance on ecosystem change~~ (~~, for instance relating to climate change~~,~~ and multi-decadal environmental cycles~~), CABs need~~, the CAB needs to:

- Be aware of changes in ecosystem structure and productivity~~, and assess (~~.
- Assess in surveillance reports, or in assessment~~ / ~~/reassessment~~)~~, the extent to which the fishery has taken these into account~~,~~. For instance:
  - In the case of productivity, by adjusting ~~target/limit reference points, or~~ TRPs and LRPs.
  - In the case of ecosystem regime shifts such as above, by reconsidering the species against the key LTL species definition.

GSA2.2.~~11~~12–GSA2.2.~~16~~15 Scoring stock status for key LTL stocks ▲

Estimates for B_0 referred to in SA2.2.13 and SA2.2.14 can be determined using credible single species or ecosystem models or ~~from~~ robust empirical data (such as fishery independent surveys~~.~~).

See Smith et al~~ (2011)~~.[22] for the justification of ~~the ~~impact levels required in SA2.2.14.b and the use of a default 75%B_0 target level for their achievement.

~~SC21 In , point i addresses broader “ecosystem-level” impacts, and point ii addresses individual species impacts.~~

GSA2.2.~~15~~16 Scoring key LTL stocks based on fishing mortality rate ~~(F)~~ ▲

In the absence of robust estimates for B_0, target ~~fishing mortality rates~~F values that would achieve the appropriate target biomass levels can be adopted. ~~Smith et al (2011) and the Lenfest task force~~Studies[23] have found that exploitation rates of about half MSY rates were required to limit the ecosystem impacts to the same levels obtained at the default 75%B_0.

For key LTL species, the team should modify default expectations provided in GSA2.2.4 ~~(~~for non-key LTL species~~) should be modified~~ to reflect the higher biomass levels expected and the lower ~~fishing mortality rates~~F needed.

At least ~~a **60** score~~SG60 is justified if F is “likely” to have been somewhat below F_{MSY} but not as low as 50%F_{MSY} for at least one generation time of the species~~ (~~, or for at least ~~two~~2 years, if greater~~)~~.

At least ~~an **80** score~~SG80 is justified if F is “likely” to have been at 0.5F_{MSY} or 0.5M for at least ~~two~~2 generation times~~ (~~, or for at least ~~four~~4 years, if greater~~)~~.

~~A **100** score~~SG100 is justified if F is “highly likely” to have been below 0.5F_{MSY} or 0.5M for at least ~~two~~2 generation times~~ (~~, or for at least ~~four~~4 years, if greater~~)~~.

GSA2.2.~~16~~17 Allowing for recruitment variability ▲

Environmental variability is generally high for fisheries based on key LTL species compared to non-LTL fisheries. In some cases, this makes biomass-based reference points meaningless and better justifies the use of F-based management approaches.

GSA2.3 Stock rebuilding PI (PI 1.1.2) ▲

Background

~~Where stocks are not regarded as ‘fluctuating around’ their target levels (B_{MSY} or higher levels for key LTL stocks) and they score less than 80 on PI 1.1.1, stock exploitation levels must be low enough to achieve stock rebuilding back up to the PI 1.1.1 SG80 level. ~~The MSC Fisheries Standard does not refer to “formal recovery plans~~”, as~~”. This is because, in some jurisdictions, this terminology carries specific legislative or regulatory meaning. Fisheries are instead expected to have “recovery strategies”, which may or may not be binding in a statutory context. ~~Such recovery strategies are scored in the management component of Principle 1 (particularly PI 1.2.2). Here in PI 1.1.2, the material concerns are that an appropriate rebuilding timeframe is set, and that the exploitation rate and other factors confirm that rebuilding is likely to be achieved within that timeframe~~This PI is only scored when PI 1.1.1/PI 1.1.1.A does not meet the SG80.

~~If PI 1.1.1 is scored lower than SG80, PI 1.1.2 must be scored. If PI 1.1.1 is rescored at SG80, PI 1.1.2 should be removed from the scoring of P1, regardless of whether any condition on the rebuilding timeframe has yet been met, and in this case such an unmet condition should be considered closed.~~

[22] Smith, A.D.M., Brown, C.J., Bulman, C.M., Fulton, E.A., Johnson, P., Kaplan, I.C, Lozano-Montes, H., Mackinson, S., Marzloff, M., Shannon, L.J., Yunne-Jai, S., and Tam, J. (2011) Impacts of fishing low-trophic level species on marine ecosystems. *Science* 333, 1147–1150.
[23] Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. (2012) Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp.

Scoring issue (a) ~~-~~– rebuilding timeframes ▲

~~Where~~If quantitative stock assessment information is used in scoring this PI, ~~teams~~the team should note that stock rebuilding timeframes required in scoring issue (a) relate to the time required for the stock to recover from the current level to ~~the~~ B_{MSY} ~~level (~~, or a level regarded as ~~'~~"consistent with ~~MSY'~~MSY" where proxies are used~~)~~.

~~The rebuilding timeframe that may be reasonably expected will depend on the life history characteristics of the species, but MSC requires that even very slow growing stocks should have rebuilding plans that aim for a maximum of 20 years.~~ On this basis, it may be impossible for some stocks to ~~achieve~~meet recovery targets in a ~~five~~ 5-year timeframe because of the life-history parameters of the species under assessment~~:~~. Such parameters include:

- Growth rate~~;~~.
- Size or age at maturity or recruitment to the fishery~~;~~.
- Stock size or age composition~~; longevity; and,~~ .
- Longevity.
- Natural mortality~~, among other things. On the other hand~~.

However, some very-fast-growing stocks may recover ~~faster~~in less than ~~one~~1 certification period (5 years~~) and for this reason~~). An extension to 5 years is allowed for these stocks.

As allowed in the scoring of other PIs, ~~CABs~~the CAB should apply the definition of generation time given in Box GSA4~~.~~.

GSA2.3.2~~–~~–GSA2.3.3 Timeframes for achieving conditions ▲

~~Teams~~The team should note that stocks that trigger rebuilding may be allowed ~~one~~1 year to put rebuilding strategies and monitoring in place. ~~In this case, the fishery should not be immediately failed~~This would likely be relevant if the stock status dropped below SG80 for PI 1.1.1/PI .1.1A after certification. If one year is needed in this instance, the team should put a condition on PI 1.1.1 to allow PI 1.1.2 to be scored at the next surveillance. After one year, the team can then rescore PI 1.1.2 and assign conditions as appropriate. Given that the SG60 level would not be met for PI 1.1.2 when the one-year condition is put in place, the team should submit a variation request against FCP v3.0 7.15.7.2.a, 7.15.13, 7.15.14, and 7.16.3~~is not met in this first year~~.

The team may consider allowances of more than 1 year in fisheries where stock assessments and the development of management advice are not an annual event~~, the team may consider allowances of more than one year~~.

If PI 1.1.2 scores less than ~~80~~SG80, due to a lack of evidence for rebuilding, the condition applied to develop such evidence should still be achieved within the normal maximum ~~five~~ 5-year duration of the certificate (as required in SA2.3.3). While the MSC's allowance for "exceptional circumstances" in FCP 7.16.6 may still apply to rebuilding of the stock ~~(~~, which may be constrained by the species biology~~)~~,, it should not apply here to the necessary reduction in exploitation rate ~~(~~, which is regarded as being under the control of management and not constrained by the species biology~~)~~.

The MSC wishes to avoid the situation ~~that~~in which fisheries appear in the upper left corner of a ~~'~~"Kobe ~~plot'~~plot", with high exploitation rates even when stock size is reduced. ~~Teams~~The team should thus consider whether any condition on rebuilding could reasonably be achieved in less than the maximum ~~five~~ 5-year period~~, e.g.,~~; for example, on an ~~'accelerated' two~~ "accelerated" 2-year timescale. The team should expect fisheries in this situation ~~should be expected~~ to begin effective rebuilding ~~(~~, and thereby ~~achieve the~~meet SG80 ~~level~~ for this PI~~)~~, as fast as reasonably possible.

GSA2.3.4 Scoring fishing mortality rate as evidence of rebuilding ▲

~~Teams should note the requirement to explicitly consider levels of fishing mortality rate in this PI, where this information is available ().~~

The MSC's expectation of rebuilding is that, for most stocks, scores of ~~80~~SG80 or ~~100~~SG100 will require ~~fishing mortality~~F to be lower than F_{MSY}, as described in SA2.3.4.a and 2.3.4.b~~2.3.4.2~~. The alternative allowance in SA2.3.5 would apply only in exceptional circumstances where there is real demonstrated recovery in the stock even though F is not less than F_{MSY}. This may still occur in some years~~,~~; for example, in HCRs where F is specifically used as a target rather than a limit, as described in the examples in Box GSA5.

~~It~~The alternative allowance in SA2.3.5 may also be temporarily acceptable following a series of recent high levels of recruitment due to good environmental conditions. In such cases, the "alternative clear evidence that the stocks are rebuilding" should include that the stock has increased in at least the "last ~~two~~2 years~~ (~~", or other period as used in the assessment of the fishery~~)~~. In these cases, the team should not accept evidence of only ~~one~~1 year/period of growth ~~should not be accepted~~ as sufficient~~ evidence in these cases. The~~. In its scoring rationale in these cases, the team should~~ thus~~ include some understanding of why the stock is rebuilding even though F is higher than F_{MSY}.

~~Teams~~The team should ~~give particular consideration to~~consider the level of fishing mortality in cases where environmental variability appears to be affecting the ability of the stock to recover.

In situations where climatic cycles~~ (e.g.,~~, for example decadal~~-scale)~~ cycles, are shown to be reducing the potential of the stock to achieve good recruitment, ~~80~~SG80 or ~~100 scores~~SG100 may still be justified when ~~fishing mortality rate~~F is ~~'likely'~~"likely" or ~~'~~"highly ~~likely'~~likely" below F_{MSY} and the expectation is that good recruitment will be restored when climatic conditions permit. ~~Consideration~~The team should also ~~be given to~~consider the target levels that are expected for rebuilding, consistent with GSA2.2.7.

GSA2.4 Harvest strategy PI (PI 1.2.1)

~~Background~~

~~This PI scores the overall performance of the harvest strategy, particularly the way that the different elements work together to keep the stock at levels consistent with reference points.~~

Scoring issue (a) – harvest strategy design ▲

~~The elements of the harvest strategy need to work together. CABs should therefore consider the overall performance of the harvest strategy, and how its elements contribute to allowing the management system to be responsive to the state of the stock.~~

Key elements of harvest strategies include:

- The control rules and tools in place, including the ability of the management system to control effort, taking into account issues such as overcapacity and its causes~~;~~.
- The information base and monitoring stock status~~ and~~.
- The responsiveness of the management system and fleet to stock status.

~~CABs~~The CAB should also consider whether there are issues that might compromise the effectiveness of the harvest strategy, such as fishing overcapacity caused by subsidies. If overcapacity exists ~~as a result~~because of subsidies, the management system should be robust enough to deal with this issue and still deliver a sustainable fishery in accordance with MSC ~~Principle~~Principles 1 ~~&~~and 2.

The elements of the harvest strategy need to work together. The team should therefore consider:

- The overall performance of the harvest strategy.
- How its elements contribute to allowing the management system to be responsive to the state of the stock.

In terms of being responsive to the state of the stock, the team should provide evidence that the harvest strategy allows an adaptive management system. This could include demonstrating that the harvest strategy allows or has allowed the management authority to respond to issues in a clear, transparent, and consistent manner. This may include prior evidence of action that management has taken when shortcomings in the elements of the harvest strategy have been identified. A responsive harvest strategy should demonstrate that the management agency has acted, when required.

A responsive harvest strategy does not need a "well-defined" HCR for it to be responsive.

For highly fluctuating or dynamic stocks that can have their stock status driven by environmental factors, a responsive harvest strategy should allow management to reduce exploitation to levels that are consistent with the natural environmental fluctuations. In such cases, the harvest strategy should allow management to alter exploitation in an adaptive manner, to levels that are appropriate for the stock to meet the objectives reflected in PI 1.1.1/PI 1.1.1A SG80 under fluctuating environmental conditions.

Additionally, for "highly productive" species such as small pelagic fishes and invertebrates with short generation times (e.g. < 1 year), there can be trade-offs between catch rates, fishery stability, and management and conservation objectives[24]. Because life history can affect such trade-offs[25], the design of the harvest strategy should be appropriate for the species, and scoring should reflect this.

To achieve this, a robust management system may include:

- Use of in-season monitoring and adjustments.
- Consideration of long-term climactic changes such as regime shifts in the harvest strategy[26].
- Maintenance of buffers to account for uncertainty[27].

Assessing informal approaches against PI 1.2.1

~~Assessment of data-deficient fisheries against this indicator should consider how elements of the harvest strategy combine~~ • The team should factor in to ~~manage impact, such that susceptibility is maintained at or below acceptable levels given the productivity of the species.~~

the assessment ~~should factor in~~ the likelihood of changes within the fishery that could ~~potentially~~ lead to an increase in the risk of impact from fishing activity over time.

~~Teams~~• The team should ~~further~~ consider how elements of the strategy are combining to ensure that the fishery is moving in the desired direction or operating at a low risk level ~~and that qualitative or semi-quantitative objectives are being achieved~~.

~~There~~• The team should ~~be~~consider how qualitative or semi-quantitative objectives are being achieved.

- The team should provide evidence that the expected objectives are being ~~achieved. Evidence~~met. The team may ~~be demonstrated~~demonstrate this evidence through local knowledge or research.

~~CABs~~• The team should determine the extent to which there is a feedback and learning mechanism to inform the harvest strategy on an ongoing basis. Depending on the scale of the fishery, this could be through:
  - Informal stakeholder processes that are based on local knowledge of the fishery, or
  - Any other less subjective review process.

[24] Cochrane, K.L., Butterworth, D.S., De Oliveira, J.A.A., Roel, B.A. (1998) Management procedures in a fishery based on highly variable stocks and with conflicting objectives: experiences in the South African pelagic fishery. Reviews in Fish Biology and Fisheries 8: 177–214.
[25] Siple, M., Essington, T, & Plaganyi, E. (2018) Forage fish fisheries management requires a tailored approach to balance trade-offs. Fish and Fisheries. 20.
[26] King, J.R. & McFarlane, G.A.. (2006) A framework for incorporating climate regime shifts into the management of marine resources. Fisheries Management and Ecology.13. 93–102.
[27] Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. (2012) Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp.

GSA2.4.1 Interpretation of terms ▲

As used in ~~SI1~~SI 1.2.1b at the 100 level, an ~~'evaluation'~~"evaluation" may range from a subjective stakeholder process in small-scale/data-deficient (SS/DD) ~~fisheries~~fishery to quantitative management strategy evaluation ~~(MSE)~~ as appropriate to the fishery.

~~'Testing'~~For "tested" at the ~~80~~SG80 level in ~~SI1~~SI 1.2.1b, the team can include:

- The use of experience from analogous fisheries~~,~~.
- Empirical testing ~~(,~~ for example practical experience of performance ~~or~~ .
- Evidence of past performance~~) and~~ .
- Simulation testing ~~(,~~ for instance using computer-intensive modelling such as management strategy evaluation ~~(MSE)). Testing~~.

Teams should only assess that the harvest strategy is 'tested and expected to achieve its objectives', if there hasn't been an update to stock status following the implementation of the harvest strategy. Once there is an update to stock status after the direct implementation of the HS used to score PI 1.2.1, the team should assess if the HS is achieving the objectives of PI 1.1.1/1.1.1A.

For tested and evaluation in scoring issue (b) at the harvest-strategy level, the team should consider the full interactions between different components of the harvest strategy, including:

- The HCRs~~,~~.
- Use of information ~~and the~~ .
- Assessment of stock status. ~~A score of 100~~

SG100 for ~~this SI1~~SI 1.2.1b requires a broader evaluation than that considered in the evaluation of the robustness of HCRs in ~~SI1~~SI 1.2.2b.

GSA2.4.2 Setting conditions ▲

If conditions are set, changes to the HCRs or assessment method may be needed to make these conditions operational.

GSA2.4.3–GSA2.4.4 Shark finning ▲

Background

At its December 2011 meeting, the MSC Board of Trustees resolved that shark finning shall not be undertaken within MSC certified fisheries.

The intent of scoring ~~issues (e)~~ shark finning in PIs 1.2.1, 2.1.2, and 2.2.2 is to ~~provide a mechanism for~~enable scoring ~~a~~the fishery on the CAB's level of certainty that ~~a CAB has that~~ shark finning is not taking place. These scoring issues ~~intend~~are designed as a combination of policies and information thresholds determined by the evidence requirements, to assess the arrangements that are in place to ensure shark finning is not taking place. ~~It is designed as a combination of regulations and external validation.~~

~~Regardless of a fishery's performance against these PIs, the CAB should not certify or maintain the certification of a fishery when there is objective verifiable evidence that indicates shark finning is taking place. Objective verifiable evidence could be any documented statement of fact based on observations, measurements or tests which can be verified.~~

~~GSA2.4.5 – GSA2.4.7~~ Fins naturally attached ~~and fin: carcass ratios~~

~~The MSC considers that a policy requiring the landing of all sharks with~~ A fins naturally attached (FNA) policy, as defined in the MSC-MSCI Vocabulary~~is the most rigorous approach to ensuring that shark finning is not occurring. However, the MSC recognises that in some fisheries this may be practically difficult to achieve when sharks are destined for processing and utilisation, and therefore~~

~~also recognises that landing fins and other shark parts separately, including as meal, may be allowed if adequately regulated and observed.~~

~~Ratios vary within species and fishing fleets. Recent studies on 50 species of shark highlighted a variation of mean species specific fin to carcass ratios of 1.1% to 10.9% (Biery & Pauly, 2012). Accurate ratios for each species are essential for any meaningful monitoring of catches (Cortés & Neer, 2006; Ariz et al., 2008). Ratios should consider cutting practices, wet-fin-mass or dried fin mass to carcass ratio, and whether the carcass is wet weight or dressed (processed) weight. If fins have been dried and the carcass has been dressed at sea, then conversion factors should be used to calculate the ratios. Where there is no scientific consensus or lack of scientific evidence, the CAB should allow use of the ratio approach and require to land fins naturally attached.~~

~~Where~~ , needs to be in place for all retained sharks. Where reference is made to the requirement for ~~fins to be naturally attached (FNA) to the body~~FNA, in order to facilitate freezing and storage, the fishery could partially cut the fins, including for the purposes of draining blood to avoid ~~ammoniation~~ammonisation, and fold them around the carcasses. ~~FNA includes leaving the fins attached by just a small piece of skin so that the sharks can be packed at sea efficiently, and that the fins can be fully removed from the shark at the dock without having to thaw the shark.~~ However, fins should be attached to a substantial part of the shark, not just some vertebrae, allowing the shark to be easily identified to the species level. If fins are removed and then artificially attached to the carcass via ropes or wire or placed into a bag that contains that carcass and fins, this would not constitute FNA.

~~Regulations~~

~~Regulations refer to~~ Non-retention policies

A non-retention policy, including species specific policies, is one where any captured individuals must be released and cannot be landed or retained in whole or in part. If a UoA operates under a non-retention policy, the same level of information accuracy determined through the evidence requirements applies to the implementation of an FNA policy.

FNA policies

FNA policies can be included in regulations governing the management of sharks, including but not limited to prohibiting shark finning, such as:

- Ratified RFMO conservation measures~~,~~.
- National or international ~~MOUs~~memoranda of understanding or agreements~~, implementation~~.
- National plans of ~~NPOAs~~action on sharks~~, national~~ .
- Legislation regulating the management and catch of sharks~~, etc~~.

~~Processing and utilisation~~

~~Processing should involve the transformation and the retention of a substantial part of the shark apart from the fins. Retention of a minor body part, such as teeth, should not be counted as processing. The definition for processing includes "highly utilised", meaning that a major part of the animal is retained during the processing (either on board or once landed).~~

~~External validation~~

~~The MSC Fisheries Standard mention levels external validation by way of indicating the types of confidence that the MSC would require to demonstrate that shark finning is not occurring.~~

~~The assessment team should use their expert judgement concerning the actual validation methods available and their ability to confirm the likelihood that shark finning is not taking place (). However, the following guidance is available:~~

~~SC22~~ ~~At **SG 60** "some external validation" should be understood to indicate a validation level equivalent to a nominal observer coverage of 5% of effort, although the CAB may accept other rates and alternative measures/evidence (e.g., dockside~~

~~monitoring) with sufficient justification that the same scientific outcome (likely confidence that finning is not taking place) is delivered.~~

~~SC23~~ ~~At **SG 80** "good external validation" should be understood to indicate a validation level equivalent to a nominal observer coverage of 20% of effort, although the CAB may accept other rates and alternative measures/evidence with sufficient justification that the same scientific outcome (highly likely confidence that finning is not taking place) is delivered.~~

~~At **SG 100** "comprehensive external validation"~~ • UoA/company level codes of conduct.

If a management agency has a requirement for FNA but it includes exemptions, the UoA should demonstrate that it is adhering to the FNA component. This may be from documented evidence that the UoA has put in place a code of conduct or policy that mandates its vessels operate with FNA.

Evidence of shark finning

~~SC24~~ The team is required~~. This gives consideration of the continuity of data collection, precision and~~ to apply the Evidence Requirements Framework in the 'MSC Fisheries Standard Toolbox' to evaluate the accuracy of information ~~, and any bias, etc, that is capable of supporting the measures in place given the level of precaution that is implicit in the measures and the ability of the measures for detecting any changes.~~

~~In cases where alternative evidence and alternative observer coverage is~~ used~~, the CAB should ensure that it meets the same level of confidence as the default observer coverage. CABs should assess the adequacy of the methods used, particularly with respect to the precision, accuracy and bias (statistical and observational bias) of the method and its ability to~~ to score the shark-finning scoring issue(s). This is to provide ~~externally verifiable data (see also).~~

~~Additional/alternative measures/evidence sufficient to ensure shark finning is not taking place could be effective electronic monitoring (e.g., using VMS-linked video monitoring with a high percentage coverage of fishing activity), dockside verification of catches where bodies and body parts are~~ confidence in the team's determination that an FNA policy is in place. As part of this process, the team is required to ~~be landed together by law, and various combinations of these elements. Dockside monitoring can for instance, validate ratios between shark and the fins at the point of landing.~~:

- Consider any documentation that supports the implementation of an FNA policy in practice.
- Assess the appropriateness of enforcement in the UoA with respect to monitoring compliance with the FNA policy.

If there is objective verifiable evidence that indicates shark finning is taking place in the UoA, the CAB should not certify the UoA unless the client or client group excludes the vessel(s) involved from the UoA for 2 years, following procedures in FCP 7.4.

Objective verifiable evidence could be any documented statement of fact based on observations or measurements, or tests that can be verified.

If there is objective verifiable evidence that indicates shark finning is taking or has taken place on board a vessel that operates in a UoA/Unit of Certification (UoC) within the last two years:

- The fishery client(s) should exclude the vessel from the UoA(s)/UoC(s).
- The vessel should not operate in the UoA(s)/UoC(s).
- The vessel will not be eligible to access any fishery certificate for two years from the date of exclusion.

Guidance to the FCP (GFCP) G7.4.7 provides information on this process.

The date of exclusion is the date an updated vessel list was published on the Track a Fishery website. If fishery clients do not exclude vessels that are involved in shark finning practices, the CAB should not certify or maintain the certification of the fishery.

It does not matter where the vessel was operating, who was operating the vessel or who owned the vessel when the shark-finning incident took place, the MSC's intent is that any vessel involved in the practice of shark finning in the last two years is not eligible to access any MSC fishery certificate, cannot operate within any UoC, and cannot be an "eligible fisher" in any UoA irrespective of ownership or name change.

Fishery clients and CABs should refer to the process for excluding an entity in FCP 7.4.5–7 for details on excluding vessels from the UoA(s)/UoC(s).

Note: the UoA is included in the text above (as well as the UoC). This is because UoAs can include "other eligible fishers" that were considered in the full assessment but are not part of the UoC because they have not entered into a certificate-sharing mechanism. Please refer to FCP 7.5.11 and GFCP 7.5 for more information on "other eligible fishers". It is the MSC's intent that vessels identified as "other eligible fishers" that have engaged in shark finning are excluded from accessing the certificate via the certificate-sharing mechanism. In order to implement this intent, the CAB and client should not list these vessels as "other eligible fishers".

Scenario 1: Evidence of shark finning is identified during a full assessment

If, during a fishery assessment, the team identifies objective verifiable evidence that indicates shark finning is taking place on board vessels that operate in the UoA, the vessel(s) engaged in the shark finning should be excluded from the UoA.

Scenario 2: Evidence of shark finning is identified during a surveillance audit

At each surveillance audit the team should review observer data, and other sources of information, in order to detect whether shark finning has taken place on board vessels that operate in the UoA(s)/UoC(s) in the last two years or since the last surveillance audit. If the CAB identifies objective verifiable evidence that shark finning is taking place on board vessels that operate in the UoA(s)/UoC(s), they should immediately inform the fishery client. The fishery client should exclude those vessels from those UoA(s)/UoC(s) and ensure the vessels do not have access to the certificate.

Scenario 3: Evidence of shark finning is identified between surveillance audits

Fishery clients may regularly review observer data, and other sources of information, between surveillance audits in order to detect whether shark finning is taking place on board vessels that operate in their UoA(s)/UoC(s). Fishery clients may receive information from other fishery clients or stakeholders that indicates shark finning is taking place on board vessels that operate in their UoA(s)/UoC(s). As soon as fishery clients become aware that shark finning is taking place on board vessels that operate in their UoA(s)/UoC(s), they should:

- Exclude those vessels from those UoA(s)/UoC(s).
- Ensure the vessels do not have access to the fishery certificate.
- Inform their CAB immediately.

The MSC's intent is that if fishery clients are aware that shark finning is taking place on board vessels that operate in their UoA(s)/UoC(s), they should not wait until a surveillance audit before taking action and informing their CAB. This would contravene the MSC's position that shark finning is not to be undertaken within MSC certified fisheries. If a fishery client has not excluded vessels involved in shark finning from their UoA(s)/UoC(s), the MSC's intent is clearly stated in the MCS Fisheries Standard
1.1.6~~The percentage of on board observer coverage generally refers to coverage of total fishing effort of all vessels in the UoA. CABs may accept other expressions of the percentage coverage but should ensure in any case that the sampling strategy provides a reasonable representation of the catches of the UoA as a whole. In order to establish whether observer data or other monitoring mechanisms are representative of the activity of the UoA during a year, and can be relied upon to have detected representative encounters with sharks, CABs could seek evidence for the management system having examined the on board observer data, or other data, for consistency with the reported/landed/etc. catches of sharks.' This could be done, for example, by comparing the on board observer reports to the logbooks.~~

~~When sharks are processed on board the number of animals taken should be recorded as specified in the reporting template. Given that after processing sharks are no longer whole, the CAB can use a 'conversion factor', to calculate the equivalent live weight based on the dressed (processed) weight.~~

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GSA2.5 Harvest control rules ~~&~~and tools PI (PI 1.2.2) ▲

~~Background~~

~~This PI assesses the harvest control rules (HCRs) and actions that management takes in response to changes in the fishery and/or changes in status in relation to reference points.~~

~~HCRs are the arrangements by which a fishery expects to achieve the stock status outcomes expressed in PI 1.1.1. They are defined as the pre-agreed rules and management actions that will be taken in response to changes in indicators of stock status with respect to explicit or implicit reference points, and MSC expects these elements to be part of HCRs. The values adopted for such reference points are critical to the performance of the HCR, and CABs should ensure that the interaction between the rules of the HCR and the reference points is part of their assessment.~~

~~With the removal of the reference points PI in the MSC Fisheries Standard v2.0, parts of the guidance originally applied to the Reference Points PI 1.1.2 in CR v1.3 have now been moved and adapted to more clearly apply in this PI.~~

~~For low trophic level species the target and limit reference points~~For LTL species, for the fishery to score 60 or above under PI 1.1.1A, the TRPs and LRPs need to take into account the ecological role of the stock for the fishery~~ to score 60 or above under PI 1.1.1.~~. The harvest strategy, control rules, information requirements, and assessment ~~also~~ need to be consistent with this distinction~~ for low trophic level species~~. When PI 1.1.1A is scored, the team should interpret references to PI 1.1.1 in the guidance below as PI 1.1.1A and the objectives required therein.

There ~~are~~may be conceptual differences in the reference points ~~that may be involved in~~when scoring PI ~~1.~~1.1~~ and PI~~ .1.~~2~~ and PI 1.2.2. This is because fisheries may use different reference points for measuring stock status ~~(outcome),~~ and as triggers in the HCRs[28]~~. Dowling et al (2011a, b)~~ ~~[29] provide examples of such different types of reference points within the conceptual framework of HCRs and harvest strategies used by the MSC.~~ . For example, a fishery that uses an explicit B_{MSY} reference point as a target for the fishery biomass may~~, for example~~ have ~~trigger reference points~~TRPs for adjusting F at values of biomass either at B_{MSY}, or above or below B_{MSY}. ~~Other examples are available in Dowling et al (2011) and in some MSC fisheries (e.g., see Tristan da Cunha and Maine lobster).~~ The focus in this PI is thus on the reference points used in a fishery to trigger changes in management actions, and how they work in combination to achieve the outcomes required in PI 1.1.1.

Scoring issue (a) – HCR design and application ▲

~~This scoring issue focuses on the assessment of the design and plausibility of HCRs and management tools to control exploitation of the whole stock(s) under assessment.~~

~~HCRs and/or management tools should be based on plausible hypotheses about resource dynamics and be reasonable and practical, meaning that those measures possess a substantial likelihood of success.~~ The team should consider the basis for plausibility and practicality of design ~~should be considered~~ in relation to the scale and intensity of the fishery~~,~~; for ~~instance utilising~~ example, using:

- Empirical information~~;~~ .
- Relevant science~~; or model~~ .

[28] Dowling, N.A., Dichmont, C.M, Haddon, M., Smith, D.C., Smith, A.D.M., Sainsbury, K. (2015) Guidelines for developing harvest strategies for data-poor species and fisheries. Fisheries Research 171 pp 130–140. Dowling, N.A., Haddon, M., Smith, D.C., Dichmont, C.M., and Smith, A.D.M. *Harvest Strategies for Data-Poor Fisheries: A Brief Review of the Literature*. CSIRO.
[29] Dowling, N.A., Dichmont, C.M, Smith, A.D.M. Smith, D.C. and Haddon, M., 2011a. *Guidelines on developing harvest strategies for data-poor fisheries*. CSIRO.
Dowling, NA., Haddon, M., Smith, D.C., Dichmont, C.M. and Smith, A.D.M., 2011b. *Harvest Strategies for Data-Poor Fisheries: A Brief Review of the Literature*. CSIRO.

- Model-based approaches, such as ~~MP~~management procedures and ~~MSE~~management strategy evaluation.

The ~~HCRs~~team should ~~be scored~~score HCRs against their ability to deliver the levels expressed in scoring issue (a~~) (consistent with the actual outcomes measured in PI 1.1.1~~).

- At ~~the **60 level**~~SG**60**, HCRs should be "likely" to ensure that stocks will be maintained above the PRI.
- At ~~the **80 level**~~SG**80**, HCRs should also ensure that the stock is "likely" to fluctuate around a B_{MSY} level. Testing may show that this is achieved by the inclusion of a B_{MSY} consistent reference point as a trigger in the HCRs~~ (~~, such as an inflection in a ~~'~~"hockey ~~stick'~~stick" form~~)~~, at a point that would deliver B_{MSY} in the long term.
- At ~~the **100 level**~~SG**100**, greater certainty is required. The team should regard fisheries with HCRs that target stock levels above B_{MSY} ~~(e.g.,~~ , for example a biomass that maximises net economic returns (B_{MEY}~~) should also be regarded~~), as at least meeting the 80 level~~ and~~. Projections in the fishery may show that the HCR would "likely" achieve the higher ~~100~~SG100 score by fluctuating more above than around B_{MSY}.

HCRs will usually include some form of dynamic rule, requiring that a change of some sort will be made in response to a fishery indicator moving above or below one of the ~~trigger reference points.~~TRPs. In lightly exploited fisheries, it may be that some reference points are set to trigger changes in data collection or assessment approaches, as certain thresholds are reached[30] ~~(see Dowling et al, 2011a).~~.

HCRs are often applied on a frequent basis, such as with the annual setting of ~~TACs~~total allowable catch (TAC) or effort restrictions.

- Such HCRs respond dynamically to the monitoring data from the fishery with regular adjustments to input/output-type management measures.
- In data-poor fisheries ~~which~~that are managed without such input/output controls, management may comprise only technical measures, such as size limits, gear restrictions, closed seasons, and closed areas.
  - In these cases, the specific terms of the technical measures are usually set and fixed for a relatively long period of time~~ (~~, several years~~)~~, based on occasional strategic stock assessments~~,~~ that are shown to deliver defined ~~target and/~~TRPs or ~~limit reference points.~~LRPs.
  - The team may regard such an arrangement ~~may be regarded~~ as equivalent to a dynamic HCR operating over a longer time scale in cases where some indicators are monitored to confirm that the HCRs are delivering the intended targets for the stock.

~~At~~
- For "highly productive" species, the ~~80 level~~design of the HCR should consider life history, as this can affect performance of the control rule. Given the propensity for changes in productivity with these species, adaptive and responsive control rules are key to assist with detecting and responding to changes in biomass[31].

At SG80 in scoring issue (a), ~~'~~the team should expect "well-~~defined' HCRs in these cases would be expected~~defined" HCRs to explicitly include the conditions under which the technical measures in the fishery would be expected to be revised in the future.

Example~~:~~

Relatively sedentary bivalves often have fishery management trigger points based on population densities collected through systematic surveys, where these index densities are established based

[30] Dowling, N.A., Dichmont, C.M, Smith, A.D.M. Smith, D.C., and Haddon, M. *Guidelines on developing harvest strategies for data-poor fisheries.* CSIRO.

[31] Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. (2012). *Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs*. Lenfest Ocean Program. Washington, DC. 108 pp.

on the species population dynamics and the inherent productivity of the habitat and environmental conditions.

There may be no formal stock assessment, but yield is calculated on a proportion of the observed biomass, and the harvested fraction determined on empirical evidence from historical catches and their consequences.

The team should note that, while such arrangements can work, ~~teams should note that~~ HCRs based on taking a constant percentage of the year's estimated biomass should not be regarded as meeting the requirement of avoiding the PRI, unless some lower threshold is defined.

The CAB should not always interpret the requirement that an HCR reduces exploitation rates as the ~~limit reference point~~LRP is approached ~~should not always be interpreted~~ as requiring the control rule to deliver an exploitation rate that is a monotonically decreasing function of stock size:

- Any exploitation rate function may be acceptable ~~so long as~~if it acts to keep the stock above ~~a limit reference point~~an LRP that avoids possible recruitment failure and attempts to maintain the stock at a ~~target reference point~~TRP that is consistent with B_{MSY} or a similar "highly productive" level.
- This outcome includes the requirement that the HCR should act to cause stocks to rebuild to the ~~target reference point~~TRP when they are below it; maintenance of a stock at a level just above the ~~limit reference point~~LRP would not be acceptable.
- A reduction of exploitation rate may not always mean that the control rule requires a reduction in "total" exploitation rate, but instead could ~~for instance~~ involve reducing exploitation rate on parts of the stock ~~(e.g.,~~; for example, by age or sex~~)~~.
- The team should assume that reductions in exploitation rate ~~are assumed to~~ refer primarily ~~refer~~ to reductions in catches and effort, and not to gear modifications, unless these have the effect of reducing catches/effort.

As noted in the guidance on PI 1.1.1, HCRs may include both explicit and implicit reference points.

~~**Examples:**~~

Example

If a management strategy is based solely around a ~~target reference point~~TRP, the HCR, when combined with ~~the target reference point~~TRP, should ensure that the stock remains well above the PRI ~~and~~. This should ensure that the exploitation rate is reduced as this point is approached. This is an implied ~~limit reference point.~~LRP.

Equally, a management strategy based solely around ~~a limit reference point~~an LRP should imply that there is a ~~target reference point~~TRP close to or at B_{MSY} ~~(~~, or some other measure or surrogate that maintains the stock at high productivity~~)~~, and at a level that is well above the ~~limit reference point~~LRP.

GSA2.5.2 "Generally ~~understood'~~understood" HCRs at SG60 vs "well-~~defined'~~defined" HCRs at SG80

~~HCRs should be regarded as 'well-defined' in the sense required to achieve an 80 score when they exist in some written form that has been agreed by the management agency, ideally with stakeholders, and clearly state what actions will be taken at what specific trigger reference point levels.~~

~~HCRs should be regarded as only 'generally understood' as required to achieve a 60 score in cases where they can be shown to have been applied in some way in the past, but have not been explicitly defined or agreed.~~

~~GSA2.5.2 – 2.5.5 Scoring 'available' HCRs at SG60~~ ▲

For "generally understood" and in-place HCRs, there should be at least some implicit agreement supported by past management actions that demonstrates that "generally understood" rules exist. There should be the expectation that management will continue to follow such "generally understood" rules in future and act when changes in explicit or implicit reference points are identified.

When determining whether a "generally understood" HCR is in place in the fishery under assessment, the team needs to determine whether the fishery will take appropriate management action in line with what they perceive as the "generally understood" rule. The team should consider evidence of positive action being taken in the past as evidence that there is a "generally understood" rule in place. The team should provide clear reference to documents or other evidence that actions were taken on specific dates.

The team should provide evidence and examples of the positive actions taken in response to generally understood HCRs for the target stock when they are in place.

The team should apply a precautionary approach to scoring when there is uncertainty over whether an HCR meets the requirements of "generally understood", and whether there is sufficient evidence to support this. Note, the full definition for HCRs in the MSC-MSCI Vocabulary~~In scoring issue (a), and the requirements given in to , the expectation is that 'available' HCRs may meet the SG60 level in cases where stock biomass has not previously been reduced below the B_{MSY} level or has been above it for a sufficiently long recent time, and it is 'expected' that the management authority will introduce HCRs for this species in the future if needed.~~

~~Under , teams may provide a rationale that this could reasonably be 'expected' for the target species in cases where HCRs are currently being 'effectively' used by the same management agency on at least one other species of similar importance (i.e., of a similar average catch levels and value).~~

~~As an alternative, teams may provide a rationale under in cases where there is some sort of arrangement in place that clearly requires that management will put HCRs in place as and when the fishery reaches some pre-defined trigger level within the vicinity of B_{MSY}. Such arrangements would normally relate to lightly exploited fisheries that are still in the development stage, but should be explicit in requiring action at some defined point. Although potentially driven by information and triggers, such arrangements are different to the actual HCRs as they relate to the development of the **HCRs** themselves while the HCRs define how **management measures** will be adjusted in response to changes in fishery status.~~

~~In all cases, there should be a real confidence backed up by 'evidence' (as reported against SI1.2.2c) that the management agency can and will act effectively and in a timely fashion when needed (such evidence being as described in).~~

~~In cases where the stock has not yet been reduced and 'available' HCRs are scored as meeting the 60 level, the condition assigned to this PI may allow longer than the normal five year time period for delivery. While there will be advantages in designing and putting into place a 'well-defined' HCR during the certification period, it may also be acceptable to do this over a longer time period, for example if other conditions are being delivered first. This allowance is made on the basis that the stock remains abundant and the criteria given in are still met. As soon as these criteria are no longer met, the fishery will need to have at least 'generally understood' HCRs in place to score 60.~~

~~Stocks that change status and thereby fail to meet the criteria during the course of a certificate will need to put HCRs in place (in either a 'generally understood' sense or 'well defined'). Given the specific timeframes indicated in , HCRs (either 'generally understood' or 'well defined') should be in place before a stock declines below B_{MSY}. Similar to the situation with the rebuilding PI (section) fisheries should be allowed one year to put HCRs in place, so that the fishery need not be immediately failed if the SG60 level is not met in this first year. If such fisheries fail to put in place either 'generally understood' or 'well defined' HCRs within one year, they should be suspended by the CAB as not meeting the SG60 level.~~

~~Scoring Issue (b) – Scoring uncertainty in the HCRs~~

~~In scoring issue (b), teams must assess how well the HCRs are likely to function when the unexpected happens~~ should only apply at the SG80 level, given the term 'well-defined' is used in this definition.

The team should not consider the following as evidence that an HCR is in place:

- A poorly defined commitment such as "we agree to implement an HCR sometime in the future".
- General regulations, such as convention texts or references to the Fish Stocks Agreement.
  - However, binding commitments such as those in national law may be used as evidence, if supported by evidence of management action.
- Scientific recommendations on HCRs or reference points that have not yet been adopted by the actual management agency.

The team should not expect that "in place" arrangements require formal indefinite binding agreement. For example, CMMs approved by RFMO Commissions are regarded as "active" resolutions and may thus be accepted as in place even though they may be overturned in the future.

Scoring issue (b) – scoring uncertainty in the HCRs ▲~~. The scoring guideposts~~

The SGs reflect the degree of confidence there is in the HCR performance in relation to risks~~,~~ caused by ~~both~~ known and unknown factors.

Known factors include:

- Observation and process errors ~~which~~that are often accounted for in stock assessments.

Unknown factors ~~may~~ include:

- Unpredictable effects from climate~~,~~.
- Environmental or anthropogenic non-fishery related factors, which could, for example, lead to periods of low recruitment or growth~~,~~.
- High natural mortality ~~or migration.~~ .
- Migration.

These and other changes to the population dynamics may not have been fully accounted for in the stock assessment or projections. Another important reason ~~why there may be~~for limited confidence in ~~a~~an HCR is ~~where~~that it has not been fully agreed by stakeholders, and it is uncertain whether the fishing community will comply with the HCR. This last issue is important to ensure HCRs are not only theoretical rules on paper~~,~~ but are ~~actually~~ applied in practice.

The team can use testing to support the requirement that the control rules and/or management actions are designed to take into account uncertainty ~~can be supported by testing. Testing can include the use of experience from analogous fisheries, empirical testing (for example practical experience of performance or evidence of past performance) and simulation testing (for instance using computer-intensive modelling such as MSE).~~. Testing can include:

~~Although~~

- The use of experience from analogous fisheries.
- Empirical testing; for example, practical experience of performance or evidence of past performance.
- Simulation testing, for instance using computer-intensive modelling such as management strategy evaluation.

It may generally be the case that ~~limit reference points~~LRPs are set at the point that reproductive capacity starts to be appreciably impaired~~,~~ for some fisheries, especially those for small pelagic species and annual species where ~~there~~ the stock recruit relationship is very steep. However, management may choose to set ~~a limit reference point~~an LRP above this level. Maintaining a buffer can allow for adaptability to changes in production[32]. Where this results in more precautionary management, it may assist the fishery in ~~achieving the 80~~meeting SG80 or ~~100 level~~SG100 for scoring issue (b).

HCRs in small-scale fisheries may still achieve high scores if uncertainties are well considered. The team may thus score simple HCRs linked to reliable indices of stock status ~~may thus score~~ highly on this issue without management strategy evaluations.

~~Scoring Issue (c) –~~

GSA2.5.3 Evaluating the effectiveness of HCRs ~~(SA2.5.6 – SA2.5.7)~~

~~In the third~~ PI1.2.2 scoring issue (c) ▲~~, teams must~~

In this scoring issue, the team is required review the ability of the tools associated with the HCRs to achieve the exploitation levels. Such tools ~~would~~ include:

- Management measures like ~~total allowable catches (~~TACs~~)~~ and fishing limits~~, and~~.
- Arrangements for sharing TACs between participants in the fishery, including between states in shared stock fisheries. ~~The examination here may consider the overall history of effectiveness of the tools used in the fishery (i.e., their ability to achieve the desired exploitation rates and biomass levels) as well as the current status.~~

~~Section~~ For this examination, the team may consider the overall history of effectiveness of the tools used in the fishery, in terms of their ability to achieve the desired exploitation rates and biomass levels, and the current status.

SA2.5.3 requires that ~~teams~~the team examine the current exploitation levels in the fishery, as part of the evidence that the HCRs are working~~.~~, for example through evidence that current F is equal to or less than F_{MSY} ~~should usually be taken as evidence that the HCR is effective.~~. The team may also accept current F levels greater than F_{MSY} ~~may also sometimes be accepted~~ in cases where ~~stock biomass is currently higher than B_{MSY} or where stock assessment information is comprehensive, and it is appropriate to treat F_{MSY} is a target reference point (see).~~ :

- Stock biomass is currently higher than B_{MSY}, or
- Stock assessment information is comprehensive and it is appropriate to treat F_{MSY} as a TRP (see Box GSA5

~~Teams should be confident in these cases that any such higher levels of F are not likely to lead to overcapacity in the fishery or to create a situation where B is likely to fall below a level at which it is regarded as 'fluctuating around B_{MSY}'. Lower levels of F should be expected when biomass is reduced, consistent with the scoring of the rebuilding PI. In any case, teams should justify how the current levels of fishing mortality are consistent with maintaining the stock fluctuating around a target level consistent with (or above) B_{MSY}. Teams~~).

However, the team should not use F < F_{MSY} as the sole evidence for the existence of an effective HCR. F could, for example, be lower than F_{MSY} just because effort is currently low, even though there has been no management commitment or attempts to actually control effort at a level that would constrain F to F_{MSY} by the HCR. However, if F has been constrained at F < F_{MSY} by the tools, the team could accept this as part of the evidence that the HCRs are being effective. Evidence for the effectiveness of an HCR should in fact require the consistent achievement of the target exploitation level, which may be well below F_{MSY} if stocks are currently below B_{MSY}. The team should take particular care when assessing the effectiveness of capacity limitation measures in fisheries, for example in comparison to well-monitored effort controls and catch limits, in terms of their likely ability to meet management goals and target exploitation levels.

To avoid severe socio-economic impacts in a fishery, the team may also make allowance for the gradual adjustment of ~~fishing mortality rates~~F down to appropriate levels in cases where the pace of change is limited ~~to avoid severe socio-economic impacts in a fishery~~. In these cases, projections of

[32] Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. (2012) Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp.

stock status should confirm that the expected future adjustments in F will still lead to fluctuations around MSY levels within a reasonable timescale.

~~Where~~If proxy indicators and reference points are used in the fishery instead of explicit estimates of F and F_{MSY} (as allowed in SA2.2.3~~),~~), the team should assign higher scores ~~should be assigned~~ where greater confidence is provided by the proxy information, similar to the scoring of PI 1.1.1. Where higher scores are justified by the use of ~~two~~2 or more proxy indicators, they should be independent of each other and ~~also reasonably~~ be expected to be proxies of the quantity of interest ~~(~~, such as mean fish size in the case of exploitation rates~~)~~. The team should present a rationale for how the proxies conform to these principles.

As with the case of using proxies for scoring stock biomass in PI 1.1.1, it may sometimes be argued that ~~one~~1 good proxy is better than ~~two~~2 or more weak proxies.

Examples: ~~60, 80~~SG60, SG80, and ~~100 SG~~SG100 levels

Examples of how the ~~60, 80~~team may justify SG60, SG80, and ~~100 SG levels may be justified~~SG100 in these situations ~~are given below:~~:

- At least ~~a **60 score** may be~~ SG60 is justified if ~~**one**~~1 proxy indicates that "overfishing" is not occurring~~;~~.
- At least ~~an **80 score** may be~~SG80 is justified if ~~**one**~~1 or more proxies indicate that it is "likely" that "overfishing" is not occurring. In this case, the extra confidence may be due to the availability of a second proxy indicator, or ~~when~~may arise because a minimum 70% probability level can be assigned to the single indicator used ~~(~~, as compared to the SG60 level where this probability level may not be demonstrated~~); and~~.
- ~~A **100 score** may be~~ SG100 is justified if ~~**two**~~2 or more proxies indicate it is "highly likely" that "overfishing" is not occurring.

Assessing informal approaches to HCRs

In informally managed fisheries, ~~CABs~~the CAB should assess the extent to which there are management tools and measures in place that are consistent with ensuring that susceptibility of the target species to removal is no higher than that which would cause the risk to the target species to be above an acceptable risk range. Measures could be spatial, temporal, or changes to gear overlap.

~~Assessments~~The team should also consider measures in place to respond to changes in the fishery, for example~~,~~ by reducing the susceptibility of target species when the fishery is not heading in the direction of its objectives.

~~Metapopulations~~

~~Scoring issues (b) and (c) require that teams assess whether or not the selection and design of harvest control rules takes into account the main / wide range of~~Metapopulations

The team should address uncertainties~~.~~

~~Uncertainties~~ relating to the metapopulation structure ~~should be specifically addressed by the assessment team. Teams~~. The team should note the descriptions of different types of ~~metapopulations~~metapopulation in GFCP G7.5~~.~~.

GSA2.6 Information monitoring PI (PI 1.2.3)

~~Background~~

~~This PI addresses the information base for the management of the target stocks. The information and monitoring required for the management of stocks should only include that which is needed to inform the harvest strategy, HCRs and control tools.~~

~~The intent of SG60 is that while only a limited amount of information may be available and regularly monitored this would normally be considered sufficient to support the HCR under the most likely stock hypothesis.~~

~~Information is required:~~

~~SC25 To undertake assessment of stock status;~~

~~SC26 To inform the design of a harvest strategy and effective HCRs;~~

~~SC27 For the effective operation of harvest control tools.~~

GSA2.6.~~1~~3 Information categories

Field Code Changed

~~The following guidance is offered on information categories:~~

Stock structure could incorporate information describing:

- The distribution and geographical range of the stock~~,~~.
- The relationship of the geographical range to the harvest control~~, and~~.
- The age, size, sex, and genetic structure of the stock.

Stock productivity could incorporate ~~maturity, growth,~~:

- Maturity.
- Growth.
- Natural mortality~~, density~~.
- Density-dependent processes~~,~~.
- The stock-recruit relationship ~~and~~.
- Fecundity.

Fleet composition could incorporate information on associated effort by gear type/method of capture, including fleet characteristics in both targeted and non-targeted fisheries taking the species. ~~The general assumption is that~~ Information is required for the whole stock ~~as a whole~~, but better information would usually be expected from the fishery unit ~~that is being assessed~~under assessment.

Stock abundance could incorporate information relating to absolute or relative abundance indices including ~~recruitment, age, size, sex and~~:

- Recruitment.
- Age.
- Size.
- Sex.
- Genetic structure of the stock.
    - Reflecting the guidance on surrogate measures under PI 1.1.1, the team may meet the requirement for ~~"~~"stock ~~abundance'~~abundance" information at SG60 and SG80 ~~may be met~~ by ~~the use of~~using surrogate indicators that provide an adequate proxy for stock abundance.

Fishery removals could incorporate information describing:

- The level, size, age, sex, and genetic structure of landings~~, discards,~~.
- Discards.
- Illegal, unreported, unregulated, recreational, customary, and incidental mortality of the target stock by location and method of capture.

Information is required for the whole stock ~~as a whole~~, but better information would usually be expected from the fishery being assessed.

Other data may include environmental information such as temperature, weather, and other factors that may influence fish populations and fishing.

~~See clause for more guidance on information PIs and discards data collection methods.~~

~~The intent behind the consideration in SG100 that additional information should be available that may not be directly relevant to the current harvest strategy, is that the information monitoring system should take into account information relevant to a wider set of possible stock hypotheses than addressed by the current harvest strategy. This is essentially "future proofing" the management system against alternative hypotheses and changes in the system.~~

Scoring issues (b) and (c) – scoring fishery removals ▲

The distinction between scoring issues (b) and (c) for PI 1.2.3 at SG80 relates to the relative amount or quality of information required on fishery removals.

Scoring issue (b) relates to fishery removals specifically by those vessels covered under the ~~unit of assessment~~UoA, which need to be regularly monitored and have a level of accuracy and coverage consistent with the ~~harvest control rule~~HCR. For example, where depletion methods are used, they should be tested against catch and effort data at a determined frequency consistent with the HCR; for example, weekly, or monthly.

The reference to ~~'other'~~"other" fishery removals in scoring issue (c) relates to vessels outside or not covered by the ~~unit of assessment~~UoA. These require good information but not necessarily to the same level of accuracy or coverage as that covered by ~~the second~~ scoring issue~~.~~ (b).

Metapopulations

~~Metapopulations~~

Understanding dispersal pathways and population connectivity is important for devising effective harvest strategies ~~and therefore~~. The team should specifically address information related to the metapopulation structure ~~should be specifically addressed by the assessment team~~.

Information that could be relevant to the assessment ~~would include~~includes:

- The life cycle of the species, including its spatial distribution and temporal distribution.
- Identification of local populations and the extent to which they are connected~~,~~ and function as either sinks or sources, reflecting the dispersal of both larvae and adult.
- The role of oceanographic features or any other mechanisms in controlling larval dispersal and connectivity.

~~existence of~~
- Genetic studies comparing local populations.
- Variations in population structure ~~and~~.
- Variations in demographic parameters between sources and sinks.

GSA2.7 Assessment of stock status PI (PI 1.2.4) ▲

Background

~~This PI considers how the fishery assesses information to provide an understanding of stock status and the effectiveness of the harvest strategy. Some harvest strategies assess stock status using empirical indicators and do not require use of quantitative assessment models. In such cases, the assessment PI will be scored relative to the robustness of that indicator (which may also have contributed to the score for the Information PI).~~

This PI refers to stock assessments, but in some circumstances, particularly under SG100, ~~it~~the team may ~~be~~find it useful to consider ~~if MP/MSE~~whether management procedure / management strategy evaluation approaches were used to test the robustness of the stock assessment to uncertainty and alternative hypotheses.

For some harvest strategies, stock assessment methods may not be model-based but based on stock status relative to empirical reference points~~ (e.g.,~~; for example, catch rate~~,~~ and density~~,~~. Survey abundance, ~~among other things),~~ and decision rules may ~~be constructed of~~ comprise rules using these indices rather than stock status estimates from analytical assessments. Other harvest strategies may ~~utilise~~use complex analytical models.

The “default” reference points described in GSA2.2.4 are equivalent to the “generic” reference points referred to in PI 1.2.4.

For example, when scoring PI 1.2.4b at SG60, an assessment might use the B_{MSY} = 40%B_0 and/or PRI = 20%B_0 values. While at SG80, the fishery may have estimated its own B_{MSY} for the stock (e.g. 35%B_0). Note the expectation that these levels may be adjusted for different types of stock (mainly whether they are long-lived/slow-growing, or short-lived/fast growing).

Short-lived species

Assessment of cephalopods can prove challenging because of aspects of their life history and because there are fewer analytical stock assessments available than for finfish. As such, application of assessment methods may be successful for some stocks but not others. For example, some species may experience complete replacement of the population at every generational cycle, causing there to be few or no other cohorts. For these stocks, sequential analysis of cohorts may then not be a suitable form of assessment. The team needs to consider:

- The nature of the stock.
- Whether the assessment method is appropriate and able to model any rapid changes.

Metapopulations

~~Metapopulations~~Where several or many local populations exist within a metapopulation, it is unlikely that full stock assessments would be ~~done~~completed annually for each local population. The degree of self-recruitment and demographic connectivity among sub-populations should dictate the specific assessment required to allow for responsible and sustainable harvest.

~~Assessment teams~~The team should ~~specifically take into consideration~~consider the appropriateness of the stock assessment in relation to the metapopulation structure.

~~Teams~~The team should also assess whether ~~or not~~ the stock assessment identifies and ~~takes into account~~considers major sources of ~~uncertainties~~uncertainty related to the metapopulation structure.

GSA3 Principle 2

~~GSA3.1 General requirements for Principle 2~~ ▲

Background

The Principle 2 assessment is divided into ~~five~~four components~~;~~, which are considered to cover the range of potential impacts of the UoA on the ecosystem ~~elements that may be impacted by a fishery (See below).~~.

Table ~~GSA:~~GSA1: Components of Principle 2

Component	Description~~Intent~~
~~Primary~~In-scope species	~~Managed, in-~~Species within scope ~~(e.g.,~~ of the MSC program (fish and ~~shellfish)~~invertebrates) that are not covered under Principle 1 and are not ETP/OOS species. ~~Primary species will usually be species of commercial value to either the UoA or fisheries outside the UoA, with management tools controlling exploitation as well as known reference points in place. In addition, the institution or arrangement that manages the species (or its local stock, see below) will usually have some overlap in jurisdiction with the fishery in the UoA.~~
~~Secondary~~ETP/OOS species	~~Secondary species include fish and shellfish species that are not managed according to reference points and birds/mammals/reptiles/amphibians (all species that are out of scope of the standard) that are not ETP species. These types of species could in some cases be landed intentionally to be used either as bait or as food for the crew or for other subsistence uses, but may also in some cases represent incidental catches that are undesired but somewhat unavoidable in the fishery. Given the often unmanaged status of these species, there are unlikely to be reference points for biomass or fishing mortality in place, as well as a general lack of data availability.~~Endangered, threatened, or protected (ETP) species and species out of scope (OOS) of the MSC program (birds, mammals, amphibians, and reptiles).
Habitats	The chemical and bio-physical environment, including biogenic structures, where fishing takes place.
Ecosystem	Broader ecosystem elements such as trophic structure and function, community composition, and biological diversity.

~~In general terms, the impacts of the fishery on the different P2 components are assessed as below:~~

~~SC28 Primary species, secondary species and habitats are assessed for the direct impacts of fishing.~~

~~SC29 ETP species are assessed for both direct and indirect impacts.~~

~~SC30 The Ecosystem component is assessed for indirect impacts.~~

~~Direct impacts in this context include the actual capture of a species by fishing, and other types of direct mortality, such as following discarding or interactions with the fishing gear. Indirect impacts include situations where the removal of the target species reduces its availability as prey for a predator species, and a range of ecosystem level changes as described in section .~~

GSA3.1~~.1 – 3.1.4 Designation of P2 species~~ General requirements for Principle 2 ▲

In Principle 2, the MSC ~~use~~uses the term ~~'species'~~"species" in scoring issues and requirements ~~within primary, secondary and ETP PIs. As in Principle 1 (see), it is the MSC's intent that~~. The term ~~'species' as used in Principle 2~~ could mean an entire species, or ~~only~~ a stock or population of a species, as appropriate to the species and the context of the fishery in assessment. ~~As an example, a large pelagic fishery in the Atlantic that takes a P2 catch of a certain tuna species would only include a P2 assessment on the Atlantic tuna stock, and need not consider any clearly separate Pacific stock. Assessment teams may thus score the primary, secondary and ETP PIs either as species or as stocks depending on their overlap with the fishery.~~

~~The decision tree outlined in provides an overview of the intent of the separation between primary, secondary and ETP species. Teams may use the decision tree as a guide on the designation of P2 species, but should primarily be guided by the definitions of 'primary', 'secondary', 'ETP' and 'less resilient' in the Standard and Guidance to the Standard.~~

~~Figure GSA: Decision tree to assist teams in the designation of P2 species components~~

~~Examples: Primary species~~

~~SC31 A species with a full analytical stock assessment in place that is managed as a whole stock according to a scientifically established TAC.~~

~~SC32 A species that does not have a full analytical stock assessment, but where established proxies for the PRI are in place and all fisheries impacting that stock are managed to maintain the stock above that proxy reference point.~~

~~SC33 A species with a multi-jurisdictional distribution that is recognized to be below a scientifically established limit reference point, but only one jurisdiction has set up a recovery strategy which all fisheries operating in that area have to adhere to. The UoA targeting that species is subject to a different management authority, which has no management measures in place, but since the species distribution overlaps with an area that would classify that species as primary, the UoA also has to classify it as a primary species.~~

~~Examples: Secondary species~~

~~SC34 A species managed according to a precautionary TAC that has no analytical or empirically derived stock assessment in place and the stock status in relation to the PRI is unknown.~~

~~SC35 A species with some scientific advice on stock status indicating a limit reference point as well as a recommended TAC, but where this advice has not yet been adopted and operationalized by the relevant management authorities (when implemented by the authorities, such species would instead be a primary species).~~

~~SC36 A species classified as out of scope (bird, reptile, amphibian, mammal) that is not recognized by national or international authorities as an ETP species.~~

~~Example: ETP species~~

~~SC37 A species listed on CITES Appendix I, even though the national management authority does not recognize it as an ETP species (note also GSA3.1.5).~~

GSA3.1.1.f

~~GSA3.1.5 ETP~~

~~The team should consider all ETP species that are vulnerable to being impacted by the fishery in the assessment area.~~

~~In situations where data on interactions with ETP species is are limited, the assessment team should take a more inclusive approach (i.e., all ETP species in the geographic area).~~

~~GSA3.1.5.2 Binding International Agreements~~

~~When referring to international agreements, by "binding" the MSC means that the international legislation is binding on the parties to the agreement. Neither the flag state of the UoA, nor the state in which fishing takes place, need be a signatory to this agreement for it to be applicable to MSC certified UoAs.~~

~~Species listed under CITES Appendix 1 shall be considered ETP species, unless it can be shown that the particular stock of the CITES listed species impacted by the fishery under assessment is not endangered.~~

> ~~**Example:**~~
> ~~For example, if a species is listed in CITES Appendix 1 because it is endangered in the Pacific, and the fishery under assessment is catching the Atlantic stock which is not endangered, then the stock does not have to be assessed under the ETP component.~~

~~Several of the Agreements listed in have been developed under the aegis of the Convention of Migratory Species (CMS). The CMS is an intergovernmental treaty under which legally binding global or regional Agreements can be developed. Parties to the CMS are required to 'endeavour to provide immediate protection for migratory species included in Appendix I of the CMS' and to 'endeavour to conclude Agreements covering the conservation and management of migratory species included in Appendix II'.~~

~~Agreements are adopted to reflect the direct conservation needs of species and the requirements of regions (Sant et al, 2012). Species listed in any of these shall be classified as ETP for the purposes of an MSC assessment. Given that the Agreements have a limited and well-defined scope, both in terms of the number of species included as well as the geographic region covered, there is therefore no 'unless it can be shown…' clause here as there is for those species classified as ETP by their inclusion in Appendix 1 of CITES.~~

~~GSA3.1.6~~ Unwanted Catch ▲

Where a UoA has a management plan, some species and sizes may be considered and designated to be 'unwanted catch' (including through using terms such as 'non-target', 'bycatch' or 'discards' in the plan). If not designated, unwanted catch of species are those that are not covered under the plan. Unwanted catches of species may also be designated as catch that is prohibited in that fishery.

Unwanted catch may also include the part of the catch that has been thrown away or slipped where the components of that catch may not survive after release.

See GSA3.1.6.1 for a further description of unwanted catch.

GSA3.1.2–3.1.7 Designation of P2 species ▲

Principle 2 species are species impacted by the UoA and not under assessment in Principle 1. The decision tree outlined in Figure GSA3 provides an overview of the intent of the separation between in-scope and ETP/OOS species components. This should be reviewed in conjunction with the decision tree outlined in Figure SA3 for determining ETP/OOS species.

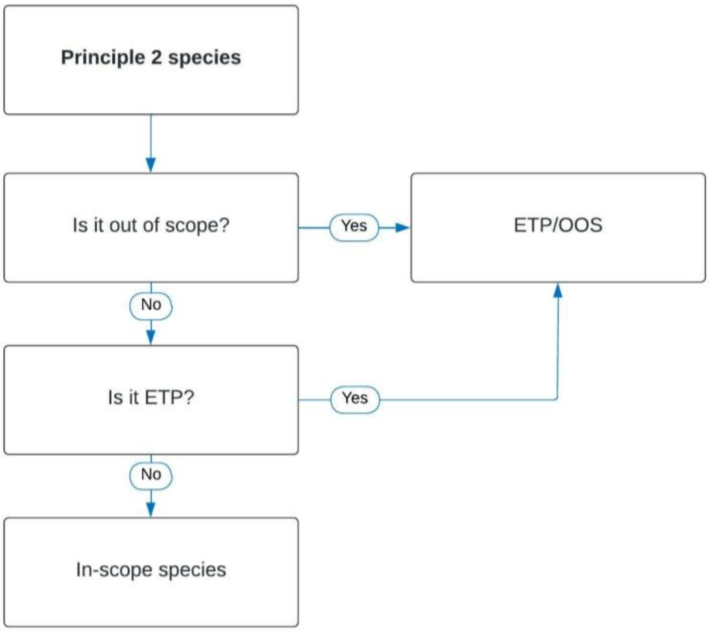

Figure GSA3: High level overview of Principle 2 species designations

Where a fishery assessment has more than one UoA, for species assessed and scored as meeting the Principle 1 requirements, the team does not need to score the same species under Principle 2 for another UoA. It is assumed that if the species meets the Principle 1 requirements in UoA1 there is no need to score the same species under P2 in UoA2, and vice versa.

GSA3.1.4.b National ETP legislation ▲

The MSC's intent in specifying this designation criterion is that these species have been identified under any relevant national legislative frameworks in response to their ETP status. This legislation may take many forms but examples of this could include:

- Primary legislation[33] – this legislation usually outlines general principles and provides powers for further regulation. The term describes the main laws passed by the legislative bodies of a country. Examples can include an "Act" or "Bill".
- Secondary legislation[34] – this legislation usually consists of more detailed provisions covering a particular subject. The term describes laws created under powers granted through primary legislation. An example can include a "Statutory Instrument".

Where teams are unsure whether a species is listed within "National ETP legislation" as described within SA3.1.4.b, the precautionary principle should be applied.

GSA3.1.4.2 ETP/OOS list modification for Chondrichthyan species ▲

The MSC's intent is specifying modifications for all Chondrichthyan species rather than just those shark species identified in the shark-finning requirements, i.e. only those within the Selachimorpha and Rhinopristiphormes. The difference is intentional as there is a greater risk of shark finning in the

[33] https://www.parliament.uk/site-information/glossary/
[34] https://www.parliament.uk/site-information/glossary/

Selachimorpha and Rhinopristiphormes, but all Chondrichthyans are relevant for the ETP/OOS listing criteria.

GSA3.1.4.4 Applying modifications to ETP/OOS list at scope extension ▲

The MSC's intent is that modifications to the ETP/OOS list are only applied once per certification cycle. However, if an ETP/OOS species is removed from any of the lists under SA3.1.4.b, or the status or management changes such that modifications applied under SA3.1.4.1–3.1.4.3 mean that an ETP species is eligible to be scored under Principle 1, the modifications may be reviewed as part of the scope extension process to move the species to Principle 1.

GSA3.1.5.c Bait ▲~~8~~

Bait is always assessed as a scoring element within the in-scope species component since use of ETP/OOS species is not consistent with the MSC's intent. Wild-caught bait, whether caught within the fishery or purchased from elsewhere, needs to be considered in an assessment because all aspects of the fishery need to be sustainable, including those relating to the stocks of the bait species. Therefore, the team should present rationale that even purchased bait comes from well-managed and healthy stocks.

Bait from sources other than wild-caught, such as terrestrial origin products or aquaculture by-products are beyond the MSC's bait requirements. Sources of such products do not need to be considered as scoring elements in the in-scope species PIs. However, when scoring the ecosystem PIs, the team may consider the impact on the ecosystem of using these products.

GSA3.1.6.1 Unobserved Mortality ▲

The total impact of the fishery on all components in P2 needs to include observed and unobserved fishing mortality:

Observed mortality includes:

- Catches~~;~~.
- Catches that are thrown away, including slippage.

Unobserved mortality can include, but is not limited to:

- Illegal fishing and/or unregulated catches~~;~~.
- Animals that are injured and subsequently die as result of coming in contact with fishing gear~~;~~.
- Animals that are stressed and die as a result of attempting to avoid being caught by fishing gear.

~~SC38~~ • Ghost fishing (GSA3.6.3-4~~Ghost fishing (mortality of free living or benthic organisms arising from entanglement in lost fishing gear; see below):~~

~~**Box GSA: MSC Intent: "Ghost fishing" and impacts from gear loss**~~

~~**MSC Intent: "Ghost fishing" and impacts from gear loss**~~

~~The Food and Agriculture Organisation of the UN (FAO) define ghost fishing as the term used for lost or abandoned fishing gear that continues to catch fish~~[35]~~.~~

~~The MSC Principles and Criteria for Sustainable Fishing include Criteria that relate to ghost fishing and gear loss, including that the fishing operation shall:~~

~~SC39 Make use of fishing gear and practices designed to avoid the capture of non-target species and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive (3.B.12);~~

~~SC40 Implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas (3.B.13); and~~

~~SC41 Minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc. (3.B.15).~~

~~These Criteria are operationalised in the MSC standard (default tree) throughout Principle 2. For example, when determining the fishing operation's impact on primary, secondary and ETP species, assessment teams are required to consider unobserved, in addition to observed fishing mortality and impacts (SA3.1.8). The guidance associated with this clause stipulates that unobserved fishing mortality can include (but is not limited to) ghost fishing (GSA3.1.8). In the MSC Fisheries Standard, assessment teams are required to consider whether fisheries review measures to minimise mortality of unwanted catch. This also includes consideration of unobserved mortality, such as that caused by ghost fishing.~~

~~The impacts of gear loss on habitats are considered under the Habitats components. In particular, there is Guidance on the Habitats Management PI (2.4.2) that indicates that in order for a fishery to score a 100, a management strategy should be in place even for gears that do not regularly contact benthic habitats since gear loss or unexpected seafloor impacts could occur (GSA3.15). An example is provided on what would be expected of a management strategy for a pelagic longline fishery where gear loss is considered (Table GSA8).~~

~~In addition, in the Ecosystem PIs, the team need to consider how the fishery impacts the wider ecosystem structure and function. Indirect effects of lost gear and other operational waste that are not considered directly under the primary, secondary and ETP PIs are considered here.~~

~~GSA3.1.9 Terms and interpretation~~

~~Throughout the P2 section a number of keywords and phrases are used. The aim is to provide further guidance to . Specifics relating to application of these terms and probability levels in relation to each component are further discussed under the different PIs for each component.~~

~~**Table GSA: Further explanation and examples of Principle 2 Phrases (see Table SA8)**~~

~~Term~~	~~Definition and discussion~~
~~**Biologically based limits**~~	~~The PRI is commonly used as a single-species biologically based limit, but many proxies are also acceptable to this level, depending on the~~

[35] http://www.fao.org/fishery/topic/14798/en

~~Term~~	~~Definition and discussion~~
	~~information that is available and the nature of the ecosystem feature of concern (for example, percent of an area impacted by the UoA).~~ ~~The wider role of the component in the ecosystem is important in identifying biologically based limits, which may for example be modified so as to avoid excessive depletion of dependent predators.~~ ~~Alternative concepts to defining biologically based limits include determining a minimum viable population size (MVP), which is the number of individuals required to have a specified probability of persistence over a given period of time (Shaffer, 1987). This method is used in the IUCN Red List for small and range-restricted populations.~~ ~~Another concept relating fishery-induced mortality to an indication of stock/population status, developed for use with cetaceans (Wade, 1998) and subsequently adapted for seabirds (Dillingham & Fletcher, 2011; Richard & Abraham, 2013), is Potential Biological Removal (PBR). PBR is defined by NOAA as the maximum number of animals, not including natural mortalities that may be removed from stock while allowing that stock to reach or maintain its optimum sustainable population.~~
~~Broadly understood~~	~~Primary, secondary and ETP species' status are broadly understood when there is general knowledge of the impact of the type of UoA on a species/species group, although it may not be specific to the unit of assessment (UoA).~~ ~~Habitat distribution is broadly understood when there is basic knowledge of the types and locations of habitats.~~ ~~The key elements of the ecosystem are broadly understood when the main features of the ecosystem and their major inter-relationships can be specified.~~
~~Does not hinder~~	~~This should be interpreted as not materially or significantly impeding recovery or rebuilding, and relates to the potential impact of the UoA rather than an observed change in the absolute status of the component.~~ • ~~If there is a formally planned recovery then the management of the UoA(s) should be consistent with that plan and should not prevent the planned recovery from being achieved in the intended timeframe.~~ • ~~If there is no formally planned recovery then the UoA(s) would permit recovery on a timeframe that is consistent with the natural dynamics of the species.~~ ~~Sometimes a species is depleted or otherwise experiencing very low productivity for reasons that are unrelated to the impacts of the UoA (e.g., highly unfavourable environmental conditions, effects of contaminants on reproduction, etc.). Due to such factors, there is never a guarantee that a species will recover promptly, even in the absence of fishing. The key concern is thus whether or not the UoA could prevent a potential recovery from occurring. Hence it is appropriate to evaluate this component relative to the impact of the UoA on the species (or all MSC UoAs where appropriate), but not actually require evidence that the status of the species is improving. This is different to the treatment of target species in P1, where low status would preclude certification irrespective of the cause of that low status~~

~~Term~~	~~Definition and discussion~~
~~**If necessary**~~	~~"If necessary" is inserted in some Management PI scoring issues to indicate that if the UoA does not have any impact on a certain component (e.g., species), then no specific rationale need be given in order to achieve the relevant SG level. For example, if there are no "main" primary species, then a management strategy would not be required at SG60 or SG80. "If necessary" does not appear in the Management PI scoring issue (a) at SG100, meaning that in order to score 100 a management strategy should be in place even if there is no interaction of the UoA with that component.~~
~~**Information is adequate**~~	~~Information is adequate if, given consideration of the continuity of data collection, precision of estimates, comprehensiveness of information and any bias, etc. it is:~~ • ~~Capable of supporting an outcome score with relevant confidence levels, or~~ • ~~Capable of supporting the management strategy given the level of precaution that is implicit in the strategy and the requirements of the strategy for detecting changes in either impact or outcome status of affected components (e.g., species).~~
~~**Measures / Partial Strategy/ Strategy/ Comprehensive Strategy**~~	~~"**Measures**" could include the closure of an area that was primarily been put in place to avoid the catch of juvenile target species and enhance target species sustainability, but also has a beneficial effect on the unwanted catch of sensitive species such as other juvenile finfish.~~ ~~For a "**partial strategy**", specific measures may not have been designed to manage the impact on that component specifically, but if such a measure/ measures are effective in assisting the UoA to achieve the SG80 level for the primary or secondary species Outcome PI then this could be considered as a management measure under the primary or secondary species Management Strategy PI.~~ ~~A "**strategy**" could include voluntary or customary arrangements, agreements or practices, codes of practice (if they can be demonstrated to be working).~~ ~~For a "**comprehensive strategy**" to be achieved information is required to ensure and continue to confirm that the UoA has no impact upon that component.~~
~~**MSC UoAs and the assessment of cumulative impacts**~~	~~To ensure that the cumulative impact of all MSC fisheries is within sustainable limits, a UoA assessed against the MSC Fisheries Standard v2.0 may need to consider the combined impact of itself and other overlapping UoAs. This determination will include other UoAs assessed against earlier versions of the CR (e.g., v1.3).~~ ~~UoAs assessed using default trees prior to the MSC Fisheries Standard v2.0 would not have to make this evaluation.~~ ~~Teams should refer to FCP Annex GPB for additional guidance on the harmonisation of cumulative impacts of MSC UoAs, particularly noting the language on flexibility in the setting of milestones for a condition and avoiding the creation of unrealistic conditions.~~ ~~Teams should note that the 'overlapping UoAs' are assessed at different levels depending on which PI is evaluated. For P2 primary species, teams need to evaluate whether the cumulative impact of overlapping MSC UoAs hinders the recovery of 'main' primary species.~~

~~Term~~	~~Definition and discussion~~
	~~For secondary species, cumulative impacts only need to be considered in cases where two or more UoAs have 'main' catches that are 'considerable', defined as a species being 10% or more or the total catch. For ETP species, the combined impacts of MSC UoAs needs to be evaluated, but only in cases where either national and/or international requirements set catch limits for ETP species.~~ ~~All of the requirements for cumulative impacts for species are applicable to their respective Outcome PIs. For habitats, in contrast, cumulative impacts are evaluated in the management PI (2.4.2). The requirements here aim to ensure that vulnerable marine ecosystems (VMEs) are managed such that the impact of all MSC UoAs does not cause serious and irreversible harm to VMEs.~~
~~Objective basis for confidence~~	~~At the SG60 level in the P2 Management PIs, expert knowledge can be acquired from diverse sources, including studies that may have been conducted in the area although not for the purpose of certification, studies of the same or similar species or ecosystems in other places, established ecological theory and modelling, and community or experiential knowledge.~~ ~~At the SG80 level, an "objective basis of confidence" may exist where information augmenting the expert knowledge has been collected in a sound manner, but might be opportunistically collected rather than collected as part of a systematic monitoring program or a research project targeted on the specific component. How extensive the more specific information is may vary, but it should be appropriate to the scale and intensity of the UoA.~~ ~~At the SG100 level, information should come from systematic monitoring and/or research. This does not mean that information exists on everything, particularly for the Habitats and Ecosystem components, but information is reliable and complete for all the major points of interaction between the UoA and component, to a level of detail appropriate to the scale and intensity of the UoA.~~
~~Serious and irreversible harm to "structure and function"~~	~~Serious or irreversible harm to habitat includes changes in the structure and/or function (e.g., biological diversity), abundance, and disruption leading to regime shifts that imply that recovery to 80% of the unimpacted level may not automatically occur even in the absence of fishing. This includes the loss or extinction of habitat, depletion of key habitat-forming species or associated species to the extent that they meet criteria for high risk of extinction, and significant habitat alteration that causes major change in the structure, function, and/or diversity of the associated species assemblages.~~ ~~Although the intent of the MSC is that biological diversity be included in this definition, we recognise that current limitations to the methods available for measuring biological diversity mean that surrogates are often used such as species diversity (including parameters commonly used to measure this, like species richness and evenness) and abundance.~~ ~~Serious or irreversible harm to the ecosystem includes many of the concepts presented for habitats (which are usually also ecosystems) but additionally includes trophic cascade, depletion of top predators and key prey species in 'wasp-waisted' food webs, severely truncated size composition of the ecological community to the extent that recovery would be very slow due to the increased predation of intermediate-sized predators, permanent changes in the species diversity of the ecological community caused by direct or indirect effects of fishing, and~~

~~Term~~	~~Definition and discussion~~
	~~change in genetic diversity of species caused by selective fishing and resulting in genetically determined change in demographic parameters.~~

).

GSA3.2

~~GSA3.~~2 General requirements for outcome PIs

~~Background~~

The outcome PIs assess the ~~current~~ status of each component and whether the fishery is posing a risk of serious or irreversible harm to the component or hindering its recovery.

~~Explicit targets may not be appropriate or available for all of the components, in some cases, because there is no scientific or general consensus on appropriate targets. While performance can sometimes be scored in relation to targets, the generic performance requirements relate to the increasing confidence and safety margins by which serious or irreversible harm may be avoided, including through the management tools, measures and strategies that are in place.~~

~~shows MSC's intent for the maintenance of each P2 component in relation to sustainability levels.~~

Field Code Changed

~~**Table GSA: MSC outcome expectations for each P2 component**~~

~~Component~~	~~Outcome expectation~~
~~Primary~~	~~The intent of the SGs is that a fishery is managed such that the stock biomass is maintained above the point at which recruitment could be impaired (PRI). This reflects the language used for PI 1.1.1.~~
~~Secondary~~	~~The SGs refer to being 'within' biologically based limits. These limits are equivalent to the PRI concept used for P1 and primary species, but may take many forms and may be expressed as upper or lower limits in relation to the index that is being measured.~~
~~ETP~~	~~The intent is that ETP populations and stocks are 'within' national and international limits and not creating unacceptable impacts.~~
~~Habitats~~	~~The SGs refer to the changes caused by the UoA that fundamentally alter the capacity of the habitat to maintain its ecological structure and function or to recover from the impact.~~
~~Ecosystem~~	~~Changes caused by the fishery that fundamentally alter the capacity of the ecosystem to maintain its key structure and function or to recover from the impact. This may also be interpreted as seriously reducing the ecosystem services provided by the component to the fishery, to other fisheries and human uses.~~

~~The components of P2 may be subject to human impact from sources other than the assessed fishery. For example primary or secondary species may be target species in other fisheries, while habitats and ecosystem processes may be impacted by coastal zone or other development or introduced species.~~

~~If the component status is low, for whatever reason, then the operative issue for the majority of the SGs in P2 assessments is then whether the UoA is hindering recovery as defined in and . The assessment in these cases is based on the 'marginal contribution' that the UoA makes to the status or recovery of the component under consideration. If the UoA is not the root cause of human impacts on the component then actions of the UoA cannot redress the situation. However in any event the UoA is required not to hinder recovery or rebuilding.~~

~~For primary, secondary and ETP species, the language above applies to all scoring issues at the SG 60 level. However, at the SG80 level, the team needs to consider the cumulative impact of any other MSC UoAs where applicable. Please see under 'MSC UoAs and the assessment of cumulative impacts' for an overview of how each species PI is evaluated differently in this regard. Please also see and for more guidance on how to evaluate the cumulative impact of primary/secondary species and ETP species respectively.~~

GSA3.2.~~3~~1 Interpretation of likelihood levels ▲

Field Code Changed

The team may interpret terms in Table SA8 ~~may be interpretable~~ either:

~~qualitatively (e.g.,~~
- Qualitatively, for example, through analogy with similar situations, plausible argument, empirical observation of sustainability and qualitative risk assessment~~)~~, or~~,~~

~~quantitatively (e.g.,~~
- Quantitatively, for example, through measured data from the relevant fishery, statistical analysis, quantitative risk assessment and quantitative modelling~~)~~.

Table ~~The specific language on what level of information needs to be available to meet the associated probability at each scoring issue will be addressed in the information PIs for each component. The team should also look to the guidance on the information adequacy for each PI for a further overview on the levels of information required in order to determine the probabilities listed in in . For example, the guidance on information adequacy for primary species can be found in .~~

~~GSA3.3~~GSA2 shows the MSC's intent for the maintenance of each P2 component in relation to sustainability levels.

Table GSA2: MSC outcome expectations for each P2 component

Term	Definition and discussion
In-scope (2.1.1)	The intent of the SGs is that a fishery is managed such that the stock biomass is maintained above the PRI. This reflects the language used for PI 1.1.1. Where the PRI is not defined by management, other biologically based limits (BBL) or proxies can be used to score this PI (see GSA2.2.3 on proxies).
ETP/OOS (2.2.1)	The intent is that the UoA does not hinder the recovery of ETP/OOS populations to favourable conservation status.
Habitats (2.3.1)	The SGs refer to the changes caused by the UoA that fundamentally alter the capacity of the habitat to maintain its ecological structure and function or recover from the impact.
Ecosystem (2.4.1)	Changes caused by the fishery that fundamentally alter the capacity of the ecosystem to maintain its key structure and function or recover from the impact. The team may interpret this to mean changes that seriously reduce the ecosystem services provided by the component to the fishery, to other fisheries, and human uses.

The components of P2 may be subject to human impact from sources other than the UoA. For example, in-scope species may be target species in other fisheries, while habitats and ecosystem processes may be impacted by coastal-zone or other developments or introduced species.

If the component status is low, for whatever reason, the operative issue for the majority of the SGs in P2 assessments is whether the UoA is hindering recovery. In these cases, the team should base the assessment on the marginal contribution that the UoA makes to the status or recovery of the component under consideration. If the UoA is not the root cause of human impacts on the component, actions of the UoA cannot redress the situation. In any event, the UoA is required not to hinder recovery or rebuilding.

GSA3.3 General requirements for ~~Information~~management PIs ▲

Field Code Changed

~~Background~~

~~The requirements in the information PIs are framed in terms of information adequacy. The information used by the assessment team to score the UoA may come in many forms (e.g., written, verbal, photographs, first-hand accounts) and come from different, potentially competing sources (e.g., the client, fishers, community members, non-governmental organisations, government agencies).~~

~~The team will need to exercise their expert judgement about these different forms and sources of information and should investigate whether or not they can be supported by credible independent sources.~~

~~For some forms of information, support can be derived from published scientific literature that refers directly or indirectly to the subject of interest, and further support may be obtained from the client or stakeholders or by first-hand observations. The assessment team will need to be satisfied that information is objective, has been generated through acceptable scientific methods, and can be independently verified.~~

~~When presented with information that may not be verifiable, the team may find it useful to "triangulate opinions" (see also), cross-checking statements made by people against other opinions and perspectives held by other stakeholders. A range of triangulated opinions will offer different perspectives, highlight diverse views, or potentially reveal vested interests. These opinions can also help to verify or authenticate information, or challenge others' assumptions or biases. Triangulation may not reveal the one true answer; it may simply yield a fuller, more complete understanding when~~

~~all the information is brought together. Ultimately, the team will need to use its expert judgement and make decisions based on the best available information, independent of its source.~~

~~In addition to the terms defined in and the examples in , throughout the P2 Information PIs, certain statistical terms are used, including: precision, coefficient of variance (CV), bias (statistical), variance, accurate, qualitative data and quantitative data. These terms have been added to the , appended to this document.~~

~~GSA3.4 Primary Species Outcome PI (PI 2.1.1)~~

~~GSA3.4.1 Approach to the assessment of main and minor species~~

~~The MSC requirements in P2 apply particularly to those species that are defined as 'main' species, according to their importance in the fishery, or by virtue of their low resilience. Requirements are specified for such 'main' species at each of the 60, 80 and 100 SG levels. Additional separate requirements are specified for the remaining 'minor' species, but only at the 100 level. Similar arrangements are specified both for primary and secondary species and for habitats, and for the Outcome, Management and Information PIs for each component. No such distinction is made for the ETP component, where all species are scored at 60, 80 and 100.~~

~~GSA3.4.2 Designation of 'main' species~~

~~When considering species for designation as 'main'; in addition to the listed requirements in the CR, teams should also give consideration to the temporal trend in catches and use a precautionary approach to determine whether species shall count as 'main'.~~

~~This should include taking into account the variability of the catch composition over the last five years or fishing seasons and recognizing that some species might be 'main' some years but not in others. Depending on data availability, teams may choose a different length of the time series, but a rationale should be provided in all cases of the method chosen. The overall intent when designating 'main' species, is that there should be a good understanding of the long-term average catch composition of P2 species of the UoA before the PCDR is released; and further, that teams are confident that the species compositions, as well as their respective catch volumes, are unlikely to change over the lifetime of the certificate.~~

~~In all cases teams may still designate species as main, even though it falls under the designated weight thresholds of 5% or 2%, as long as a plausible argument is provided as to why the species should warrant that consideration.~~

~~For example, a stock might be in such a poor state, that all impact by the UoA is important enough to consider, even in cases where the catch proportion is so low that it would normally be classified as a minor species (also see below).~~

~~The mortality of unwanted catch should be incorporated into the determination of main/minor categories and the assessment of Outcome and Management PIs, irrespective of the fact that it is unwanted.~~

~~Bait species should be subject to the same Main filters as other species. When bait species are purchased from outside the UoA, the calculation of Main is still in relation to the volumes of total catch of the UoA, not the volumes of total weight from the fishery that the bait is purchased from. The latter volumes could, however, be used as part of the rationale as to whether or not the amount of bait purchased by the UoA is hindering/not hindering recovery of the bait-stock. This also means that if bait is purchased and it is main, teams need to assess the management and information PIs for the bait fishery for all scoring issues at the SG 60 and 80 levels. Although this might present a challenge in some cases, the MSC~~

~~expectations are that all aspects of the fishery need to be sustainable, which include bait. Therefore, rationale needs to be presented that even purchased bait comes from well-managed and healthy stocks.~~

~~Main primary species should also include any LTL species that are currently in a low abundance regime and not regarded as 'key' but may be expected to increase again in future to the point of becoming a key LTL species.~~

~~Shark fins are considered to have high commercial value. Thus, when a fishery trades shark fins, the shark should be considered a main species, even when sharks comprise less than 5% of the catch.~~

~~In cases where the catch percentages are unknown or too uncertain to make a determination on which species are main, a qualitative information-gathering process should be used and documented to determine whether the catch of the species by the UoA comprises more than 2%, 5% or 10% of all species by the UoA. Teams should be precautionary in their classification of main and minor species. This implies that more species might be considered main unless the team provides rationale to justify otherwise. This might for instance be the case for fisheries that need to use the RBF methodology and/or have very low sample sizes so that the standard deviation is really high.~~

~~GSA3.4.2.2 Designating less resilient species as 'main' at 2%~~

~~The 'Main' threshold for less resilient species is set at a lower 2% of the total catch of the UoA by weight, because the risk of overfishing these species is inherently greater.~~

~~Teams should note that less resilient species should be assessed as such based on their life history characteristics and the risk to the stock from anthropogenic activities, not the actual impact of the UoA on the stock. The latter is assessed instead under the respective Outcome PIs.~~

~~As the levels of credible information needed to assess the intrinsic resilience of a species will be of varying quality and consistency, a wide range of source materials may be used. Scientific literature and other sources of material specific to the species and region under assessment are normally the most applicable.~~

~~In addition, the productivity part of the PSA may be used as both a precautionary and robust method of quickly determining the intrinsic resilience of a species, in cases where it scores either low or medium productivity ().~~

~~In cases where the intrinsic resilience is high but the species is still at risk for other reasons, investigating species declines, population size, and extrinsic threats could here be considered.~~

~~For instance, the current abundance of the population may affect natural resilience if depensation effects are apparent and impair natural reproductive ability.~~

~~The parameters used in determining a Productivity score can be found on FishBase.org for most fish species. See for full details on the PSA analysis.~~

~~The assessment team may also consider the spatial distribution of the species as well as the degree of spatial overlap with commercial fishing operations to determine:~~

~~SC42 Whether the species is at risk of being locally depleted in the assessment area or;~~

~~SC43 If the species has only a limited distribution, so that it is likely to be more severely affected by fishing pressure or;~~

~~SC44 If the species is part of a widely distributed and highly migratory population, the cumulative impacts on the population may be greater as well as more difficult to account for.~~

~~GSA3.4.3 Post Capture mortality~~

~~Teams should interpret very low post capture mortality as no less than a 90% survival rate. This should be proven by scientific evidence, independent observer coverage, tagging studies or similar information.~~

~~In cases where scientific evidence is not available for the particular fishery, but there are studies pertaining to similar fisheries, these can also be used, with appropriate rationales provided. In this regard the following document might be helpful: http:/nsrac.org/wp-content/uploads/2012/08/EU-discard-survival-short-study-version-001.pdf.~~

~~GSA 3.4.4 Exceptionally large catches and main species~~

~~In considering whether a species should be treated as 'main', CABs should take account of the relative catches of both target and the P2 species and determine whether the risk to the population of the impacted P2 species is significant enough to warrant a designation as 'main'. In the absence of full information, CABs should regard a catch by the UoA of 400,000mt of the target species as being 'exceptionally large'.~~

~~GSA3.4.6 MSC UoAs collectively not hindering recovery~~

~~If a species is below the point where recruitment might be impaired, the second part of the clause in scoring issue (a) 'the UoA does not hinder recovery':~~

~~SC45 At **SG 60** refers only to actions that the UoA can take in order to ensure that this outcome is met.~~

~~SC46 At **SG 80**, in contrast, the impact of all MSC UoAs with that species as main needs to be considered, to ensure that recovery of the stock is not being hindered.~~

~~Teams should note at SG80 that the recovery of a species in P2 that is below a PRI or a biologically based limit is only required to levels above the PRI or biologically based limit, and not to the MSY or equivalent target levels required in P1 (as specifically referred to in PI 1.1.2 on stock rebuilding). P1 and P2 set critically different bars in this regard.~~

~~The text in this clause and its associated scoring issues require teams to evaluate whether a species below the PRI is actually recovering or if either the over-arching management strategy or a specific strategy employed by UoA(s) allows for a species to recover, even in the absence of recovery at the time of assessment. Although this determination can be reached using a combination of factors as outlined in SA3.4.6, teams may find it useful to first evaluate whether recovery of a species below the PRI is actually happening on a stock level, as evidenced by a demonstrably increasing trend in biomass. Where direct evidence from time series estimates of stock status is not available, proxy approaches may be used, including reference to fishing mortality levels and the use of simulation studies. In a very general sense, if fishing mortality for the entire stock – **not** just the marginal fishing mortality of the UoA – is less than F_{MSY} (the fishing mortality that would deliver maximum sustainable yield) the recovery of the stock can reasonably be expected to not be hindered. Although this determination will hold true in most cases, the extent to which total F is below F_{MSY} may in some cases need further consideration to ensure that rebuilding objectives are likely to be achieved. Simulation studies which combine information on recent and expected F levels, stock size and recruitment etc. may also be used to confirm that the stock is expected to recover, and thus that the strategy can be regarded as 'demonstrably effective'.~~

~~If a species below the PRI has an overarching recovery strategy in place, with effort controls set on total fishing mortality that are adhered to, an 80 score may also be achieved where evidence exists~~

~~that the fishing mortality caused by all MSC UoAs is within the limits set by the recovery strategy in place for the species. This intent is also reflected in under the definition of "does not hinder".~~

~~If there is no evidence of recovery as outlined above, by either evaluating stock biomass or total fishing mortality, SA3.4.6d allows an 80 score in cases where the proportion of combined catch by all relevant MSC UoAs is effectively not hindering recovery. In other words, in cases where total fishing mortality is **not** below F_{MSY}, teams need to evaluate whether the marginal fishing mortality caused only by the relevant MSC UoAs is material to the stock's ability to recover. This could be determined in a practical way by examining likely population trajectories if all the other fisheries reduced their catches to zero (i.e., the only catches were being taken by the fishery under assessment). Since this will often be difficult to determine, MSC allows that the UoA's catch in proportion to the total catch of a stock may be used as a reasonable proxy of whether that UoA on its own or cumulatively with other UoAs, could be considered to be hindering recovery.~~

~~To illustrate this approach, even if the total catch of a species is clearly hindering recovery, UoA catches of less than 30% of the total catch of a species may not normally be influential in hindering a recovery in a marginal sense, i.e., nothing the UoA does would be likely to change the situation. On the other hand, catches of more than 30% might be influential, such that if the UoA took action to reduce its catches, the stock might well start to recover. A judgement on whether the UoA is hindering recovery will depend not only on the proportion of catch, but on the overall level of F that is causing the problem. In some cases, it might be more useful to simply assess the marginal F by the UoA in terms of the weight of catch removed in relation to the overall abundance of the stock, rather than in relation to the total catches. In this regard, investigating if the UoA's impact is more pronounced on certain size classes of the stock, e.g., only juveniles may also be warranted, as the actual impact of the UoA on the biomass of the population might then be different as opposed to if only mature adults were targeted. In making the overall evaluation on whether the UoA's stock removals are hindering recovery, teams may also find it useful to evaluate the overall resilience of the species as outlined in SA and , taking into account the spatial distribution and evaluating e.g., if the species is at risk of being locally depleted etc. (see).~~

~~Teams should note that the impact of a UoA should here be assessed in terms of stock removals and the marginal F of the UoA and the percentages listed here should therefore not be confused with the percentages used to designate 'main' species, which are based on the proportion of a species as part of the total catch of the UoA ().~~

~~Although SG80 only makes reference to being above a point of recruitment impairment, there is a requirement at SG100 that primary species are at biomass levels consistent with MSY. Primary species will often be taken in multi-species complexes. In a multi-species fishery context, the target levels of biomass or fishing mortality for some species that would be acceptable at SG100 may be different from that usually applied to a single species, although in all cases should result in primary species having a low risk of serious or irreversible harm.~~

~~Teams should also refer to Annex GPB for additional guidance on the harmonisation of scores and conditions when evaluating the cumulative impacts of MSC UoAs.~~

~~Determining the point of recruitment impairment (PRI) and the use of proxies~~

~~Teams should refer to the Principle 1 guidance in relating to the point of recruitment impairment (PRI) for additional help on the interpretation of this term, including the use of proxy reference points.~~

~~Recovery strategies differing between UoA jurisdictions~~

~~There may be instances where stocks below the PRI have a distribution across multi-jurisdictional boundaries (shared, straddling, HMS, high seas non-HMS stocks) but there are no comprehensive management efforts in place set to manage and recover the majority of the stock complex across all boundaries. Instead separate parts of the stocks may only be governed through regional management measures and separate UoAs impacting the same stock may thus have to comply with separate strategies for their respective jurisdiction.~~

~~In these cases and other applicable situations, where a demonstrably effective strategy between MSC UoAs needs to be in place, the different jurisdictional strategies do not have to be aligned and harmonized between UoAs in order to meet this requirement at SG80, but the intent is instead to evaluate whether the separate strategies together achieve the outcome that recovery of the species is not hindered by those MSC UoAs. If not, teams should require some alignment of mitigation processes between UoAs.~~

> **~~Examples: UoAs in different jurisdictions~~**
>
> ~~Examples of such a case would be where separate jurisdictions set different landing limits on the same depleted species, where e.g., one UoA would have to comply with a requirement to release all catches alive and another might have an allowance to only land a small amount each year. Teams would here have to evaluate the validity of each separate strategy, calculate the combined mortality caused by each UoA as described in the language on 'do not hinder' and make a determination on whether these two strategies combined sufficiently constitute a demonstrably effective strategy to not hinder recovery".~~

~~GSA3.4.7 Consideration of efforts to minimise the mortality of unwanted catches~~
Management arrangements

The intent of ~~this clause is to clarify that where there is unwanted catch as defined in SA3.1.6 and associated Guidance (), the efforts of the UoA to minimise the mortality of this catch are taken into account by the team in the Outcome, Management and Information PIs (see).~~

~~The team should also take into account any changes or lack of changes to the status of the unwanted species when alternative measures are not implemented. For example, if a fishery does not implement alternative measures because there are none or because they are cost prohibitive, the team should still note whether the catch or mortality of unwanted catches decreases, stays the same or increases. Such consideration may occur either at full assessment, or at surveillances depending on the timing of reviews and the implementation of mitigation measures in the fishery.~~

> **~~Example:~~**
>
> ~~For example, a UoA undertakes a review of measures to minimise the mortality of the unwanted catch for a species. Based on this review (it is shown that the measures have been effective in similar fisheries and the costs are not prohibitive), the UoA implements the measures. The existence of this review and the implementation of the measures are scored in the Management PI using SA3.5.3 and its sub-clauses.~~

~~The adequacy of information to evaluate the effectiveness of the measures, including any reduction of unwanted catch, e.g., lower catch rate, is scored in the Information PI, using and associated guidance.~~

~~This information on the reduced catch rate of the species may improve certainty that a species is above the PRI/biologically based limits or, if below PRI/biologically based limits, form part of a strategy to ensure that the MSC UoAs do not collectively hinder recovery of this species. It is this that the team should consider when scoring SI (a) of the Outcome PI. A statement describing any improvements and whether they change the degree of certainty or prevent the UoA from hindering recovery of a species should be included in the scoring rationale.~~

~~GSA3.5 Primary Species Management Strategy PI (PI 2.1.2)~~

~~Background~~

~~The intent of the P2 Species Management PIs (2.1.2, 2.2.2, 2.3.2)~~the management PIs is to assess the arrangements in place to manage the impact that the UoA has on the P2 ~~species~~components to ensure that it does not pose a risk of serious or irreversible harm to ~~them (or, in the case of ETP, that the UoA complies with any national or international requirements for protection of the species).~~the components of the ecosystem. The SGs contain a mixture of requirements for either measures or strategies to be in place. In addition to the definitions provided in SA3.3.1, the team should use Table GSA3 ~~(see and Section). Also, it is to encourage the development and implementation of technologies and operational methods that minimise mortality of unwanted catch where it occurs~~, which provides a summary of requirements at each SG when assessing management arrangements.

Table GSA3: Guidance to interpreting management arrangements required at each scoring guidepost

	Measures	**Partial Strategy**	**Strategy**
Scope	UoA or wider		UoA *and* wider
Objective	Limiting impact / not hindering recovery SG60 outcome status	Limiting impact / not hindering recovery SG80 outcome status	Defined management target
Design	Either designed for component, or incidental (having been designed to manage impacts elsewhere)		Designed for component
Linkages	Unlinked	Some cohesive links	Strategically linked
Responsiveness	Non-responsive	Response where shown to be ineffective	Fully responsive
Cumulative	UoA only	UoA and other MSC UoAs	All fisheries
Direct indirect impacts	Direct only		Direct and Indirect
Monitoring		Some	Full

Measures could include the closure of an area that was primarily put in place to avoid the catch of juvenile target species and enhance target species sustainability, but also has a beneficial effect on other species caught by the UoA, such as other juvenile finfish.

A partial strategy may not have been designed to manage the impact on that component specifically. However, if such measures are effective in assisting the UoA to achieve the SG80 level for the outcome PI, this could be considered as sufficient in meeting the criteria for partial strategy.

A **strategy** could include voluntary or customary arrangements, agreements, or practices, and/or codes of practice where they can be demonstrated to be working by achieving the corresponding outcome PI at SG80 or higher.

A **comprehensive strategy**, only used in the ETP/OOS management PIs, requires that the management ensures and continues to confirm that the UoA achieves the corresponding outcome requirements.

"Alternative measures"

The Management PIs also assess "alternative measures" to minimise the impact of the UoA on species and habitats. Fisheries need to review "alternative measures" that are shown to minimise mortality of the species or species group in question as well as "alternative measures" to reduce impacts on habitats.

Box GSA7: The MSC's intent on reducing the impact of fisheries on unwanted catch and on habitats

The FAO states that:

Selective and environmentally safe fishing gear and practices should be further developed and applied, to the extent practicable, to maintain biodiversity and to conserve the population structure and aquatic ecosystems and protect fish quality. Where proper selective and environmentally safe fishing gear and practices exist, they should be recognized and accorded a priority in establishing conservation and management measures for fisheries[36].

- Fisheries should take account of the potential for both positive and negative impacts of "alternative measures" on species and habitats (refer to GSA3.6.1.1) when considering whether such measures should be implemented.

"Alternative measures" should avoid capture of the species in the first place or increase its survivability if released. Alternatively, in the case of in-scope species, measures could use the unwanted catch in some way so that it would no longer be "unwanted". If there are no "unwanted" species, the team does not need to score the issue on reviewing "alternative measures" in that PI.

The language used in the scoring issue is based on that used by the FAO[37]. The FAO also provides management planning guidelines for all significant sources of fishing mortality in a fishery and requirements for management actions pertaining to bycatch and discards[38], including:

- Reviewing effectiveness of existing initiatives to address bycatch and discard problems.
- Reviewing potential effectiveness of alternative methods to address the bycatch/discard problem.

The MSC's intent is that the team should, in the outcome and information PIs, consider the efforts of the UoA to minimise the mortality of this "unwanted" catch. The team should score information on the effectiveness of the measures, including any reduction of unwanted catch, for example, lower catch rate, in the information PI. This information on the reduced catch rate of the species may improve certainty that a species is above the PRI/biologically based limits or, if below PRI/biologically based limits, form part of a strategy to ensure that the MSC UoAs do not collectively hinder recovery of this species. The team should also consider this when scoring the outcome PI.

The arrangements in place to manage impacts on the species may include measures to address both wanted and unwanted catch (see Box GSA7 ~~and below)~~). With respect to unwanted catch, measures may include ~~(FAO, 2011):~~:

- Input and/or output controls~~;~~.
- Improvements of the design and use of fishing gear and unwanted catch-mitigation devices~~;~~.
- Spatial and temporal measures~~;~~.
- Limits and/or quotas on unwanted ~~catches;~~catch.
- Bans on throwing away or slipping catch that create an incentive to reduce unwanted catch, provided that the unwanted catch cannot be released alive~~;~~.

[36] FAO (1995) *Code of Conduct for Responsible Fisheries*. Rome: FAO.
[37] FAO (1995) *Code of Conduct for Responsible Fisheries*. Rome: FAO.
[38] FAO (2011) *International Guidelines on bycatch management and reduction of discards*. Rome: FAO.

- Measures to increase survivorship of unwanted catch that is thrown away or slipped~~;~~.
- Incentives for fishers to comply with measures to manage and/or reduce mortality of unwanted catch.

In these PIs, ~~CABs~~the team should also consider incentives that might compromise the effectiveness of the management strategy meeting P2 outcomes, such as fishing overcapacity caused by subsidies. If overcapacity exists ~~as a result of~~due to subsidies, the management system should be robust enough to deal with this issue and still deliver a sustainable fishery in accordance with MSC Principle 2. ~~If the management system is not robust enough to deal with overcapacity caused by subsidies, a condition should be set in accordance with against the relevant management PI (see for consideration of incentives in P1).~~

GSA3.4 General requirements for information PIs ▲

The requirements in the information PIs are framed in terms of information adequacy. The team may use many forms of information in order to score the UoA; for example, written, verbal, photographs, and first-hand accounts. This information may come from different, potentially competing sources; for example, the client, fishers, community members, non-governmental organisations, and government agencies.

It is expected that the team will apply either the Evidence Requirements Framework in the MSC Toolbox, where required, or use its expert judgement to decide whether the available information is adequate in the context of the outcome and management PIs.

For some forms of information, support can be derived from published scientific literature that refers directly or indirectly to the subject of interest, from the client or stakeholders, or from first-hand observations. The team will need to be satisfied that information:

- Is objective.
- Has been generated through acceptable scientific methods.
- Can be independently verified.

When presented with information that may not be verifiable, the team may find it useful to "triangulate opinions". The team can do this by cross-checking statements made by people against other opinions and perspectives held by other stakeholders. A range of triangulated opinions will:

- Offer different perspectives, highlight diverse views, or potentially reveal vested interests.
- Help verify or authenticate information.
- Challenge the assumptions or biases of others.

Triangulation may not reveal the one true answer; it may simply yield a fuller, more complete understanding when all the information is brought together. Ultimately, the team will need to use its expert judgement and make decisions based on the best available information, independent of its source.

~~Box GSA: MSC intent on unwanted~~GSA3.5 In-scope species outcome PI (PI 2.1.1)

GSA3.5.1 Determining the point of recruitment impairment and ~~habitats~~the use of proxies ▲

For additional help on the interpretation of this term, including the use of proxy reference points, the team should refer to the Principle 1 guidance in GSA2.2.3.

GSA3.5.2 Designation of "main" and "minor" species ▲

When considering species for designation as "main", the team should use a precautionary approach. The overall intent when designating "main" species is that the team should have a good understanding of the long-term average catch composition of P2 species of the UoA before it releases the Public Comment Draft Report. In addition, the team should be confident that the species compositions, as well as their respective catch volumes, are unlikely to change over the lifetime of the certificate.

Considering the variability of the catch composition over the last 5 years or fishing seasons, the team should recognise that some species might be "main" in some years but not in others. Depending on data availability, the team may choose a different length of the time series. However, the team should provide a rationale for the duration chosen.

If catch percentages are unknown or too uncertain to enable determination of which species are "main", the team should use and document a qualitative information-gathering process to determine whether the catch of the species by the UoA comprises more than 2% or 5% of all species caught by the UoA. The team should be precautionary in its classification of "main" and "minor species". This implies that more species might be considered "main" unless the team provides rationale to justify otherwise. This might be the case for fisheries that need to use the Risk-Based Framework (RBF) methodology (the MSC Fisheries Standard Toolbox Section A) and/or have very low sample sizes so that the standard deviation is very high.

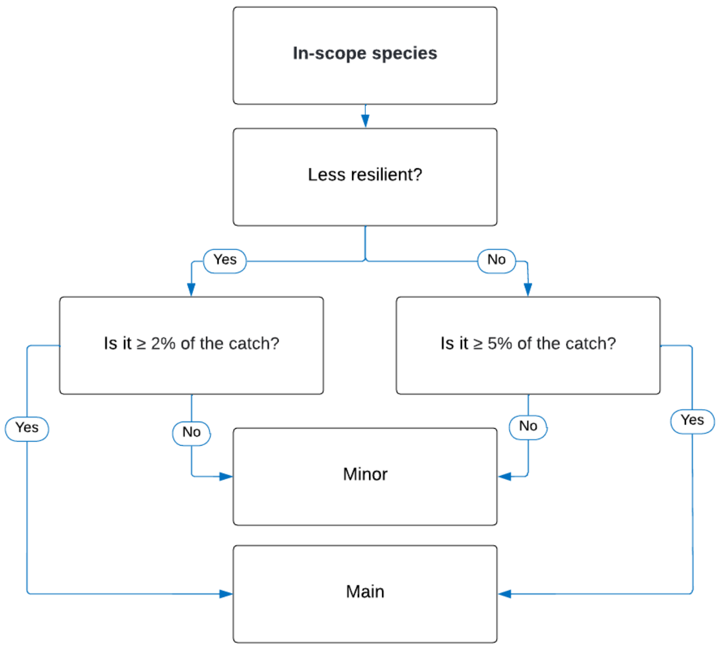

Figure GSA4: Decision tree for determining "main" and "minor" species in the in-scope species component

Sharks

Shark fins are considered to have high commercial value. Thus, when a fishery trades shark fins, the team should consider shark to be a main species, even when sharks comprise less than 5% of the catch.

GSA3.5.2.1.b Designating less-resilient species as "main" at 2% ▲

Resilience here is based on the species life-history characteristics and the risk to the stock from anthropogenic activities, not the actual impact of the UoA on the stock. The team should assess the actual impact of the UoA on the stock under the outcome PI.

The team may use the productivity part of the Productivity Susceptibility Analysis (PSA) as a precautionary and robust method of quickly determining the intrinsic resilience of a species, in cases where it scores either low or medium productivity (SA3.5.2.1.b.i.A). The team may take an overall average productivity score of ≥ 2 to indicate that the species has a life-history equivalent to medium or lower productivity. Using this threshold would be a precautionary way of designating a species as "less resilient". See of the MSC Fisheries Standard Toolbox Tool A for full details on the PSA analysis.

However, the team should note that the productivity score is not the only method available to help designate species as "less resilient". A wide variety of other sources of information can also be used, either apart from or in combination with the productivity score. For example, Fishbase provides designations for some species as being either of low, medium or high resilience/productivity.

If the intrinsic resilience is high but the species is still at risk for other reasons, the team could consider investigating species declines, population size, and extrinsic threats. For example, the current abundance of the population may affect natural resilience if depensation effects are apparent and impair natural reproductive ability.

The team may also consider the spatial distribution of the species and the degree of spatial overlap with commercial fishing operations to determine 1 of the following:

- Whether the species is at risk of being locally depleted in the assessment area.
- Whether the species has only a limited distribution, so is likely to be more severely affected by fishing pressure.

Whether the species is part of a widely distributed and highly migratory population, in which case the cumulative impacts on the population may be greater and more difficult to account for.

GSA3.5.2.2 Exceptionally large catch ▲

If the UoA takes an influential proportion of the stock, the team may still designate a species as "main" if it falls under the designated weight thresholds of 5% or 2%.

For example, a stock might be in such a poor state that all impact by the UoA is important enough to consider, even in cases where the catch proportion is so low that it would normally be classified as a "minor" species.

Another example is where the relative catches of both target and the P2 species are exceptionally large such that the risk to the population of the impacted P2 species is significant enough to warrant a designation as "main". Exceptionally large catch of the P2 species can either be relative to the impacted stock size, or in the absence of full information, a catch by the UoA of 400,000mt of the target species.

GSA3.5.5 Species below the PRI ▲

The team should note, at SG80, that the recovery of a species in P2 that is below the PRI (or other limit with similar intent and outcome) is only required to levels above the PRI or biologically based limit, and not to the MSY or equivalent target levels required in P1, as specifically referred to in PI 1.1.2 on stock rebuilding. P1 and P2 set critically different bars in this regard.

The team may find it useful to first evaluate whether recovery of a species below the PRI is happening on a stock level, as evidenced by a demonstrably increasing trend in biomass. If direct evidence from time-series estimates of stock status is not available, the team may use proxy approaches, including reference to fishing mortality levels and the use of simulation studies.

Generally, if fishing mortality for the entire stock, not just the marginal fishing mortality of the UoA, is less than F_{MSY}, the team can reasonably expect that recovery of the stock is not hindered. This determination will hold true in most cases. However, in some cases, to ensure that rebuilding objectives are likely to be met, the team may need to consider the extent to which total F is below F_{MSY}.

If there is no evidence of recovery as outlined above, by either evaluating stock biomass or total fishing mortality, SA3.5.5.d allows an SG80 score in cases where the proportion of catch by the UoA is effectively not hindering recovery. In other words, if total fishing mortality is not below F_{MSY}, the team needs to evaluate whether the marginal fishing mortality caused by the UoA is material to the stock's ability to recover. The team could determine this in a practical way by examining likely population trajectories if all the other fisheries reduced their catches to zero, in which case the only catches are being taken by the fishery under assessment. Since this will often be difficult to determine, the MSC allows that the team may use the UoA's catch in proportion to the total catch of a stock as a reasonable proxy of whether that UoA, on its own, could be hindering recovery.

The team's judgement on whether the UoA is hindering recovery will depend on the proportion of catch and the overall level of F that is causing the problem. In some cases, the team might find it more useful simply to assess the marginal F by the UoA in terms of the weight of catch removed in relation to the overall abundance of the stock, rather than in relation to the total catch. In this case, the team may need to investigate whether the UoA has greater impact on certain size classes of the stock, such as juveniles, as the actual impact of the UoA on the population biomass could be different if only mature adults are targeted. In evaluating whether the UoA's stock removals are hindering recovery, the team may also find it useful to evaluate the overall resilience of the species and/or the spatial distribution of the species and evaluate, for example, whether the species is at risk of being locally depleted.

The team should note that:

- The impact of a UoA should here be assessed in terms of stock removals and the marginal F of the UoA.
- The percentages listed here should therefore not be confused with the percentages used to designate "main" species, which are based on the proportion of a species as part of the total catch of the UoA.

In a multi-species fishery context, the target levels of biomass or fishing mortality for some species that would be acceptable at SG100 may be different from those usually applied to a single species. However, in all cases, target levels of biomass or fishing mortality should result in low risk of serious or irreversible harm to in-scope species.

The team should refer to GFCP Annex GPB1.5.1.b–c for additional guidance on the harmonisation of scores and conditions when evaluating the cumulative impacts of MSC UoAs.

GSA3.6 In-scope species management strategy PI (PI 2.1.2) ▲

Scoring issue (a) "if necessary" ▲~~The MSC intent on reducing fisheries' impacts on unwanted species and on habitats~~

~~Prior to the release of the Fisheries Standard v2.0, the MSC Principles & Criteria (Ps&Cs) were not adequately take into account in relation to bycatch, namely that fisheries should "make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive" (Criterion 3B.12).~~

~~In addition, FAO (1995), states that "selective and environmentally safe fishing gear and practices should be further developed and applied, to the extent practicable, in order to maintain biodiversity and to conserve the population structure and aquatic ecosystems and protect fish quality. Where proper selective and environmentally safe fishing gear and practices exist, they should be recognized and accorded a priority in establishing conservation and management measures for fisheries."~~

~~Because there are currently no internationally-accepted definitions of bycatch and discards (FAO, 2011), the MSC has used the term 'unwanted' catch of species. The MSC definition of unwanted catch has been adapted from part of the description of 'bycatch' in FAO (2011); it is the part of the catch that a fisher did not intend to catch but could not avoid, and did not want or chose not to use.~~

~~In order to operationalise the intent of criterion 3B.12 in the MSC Ps&Cs and the statement from FAO (1995), changes in the P2 Species PIs in the MSC Fisheries Standard v2.0 have been made with the following intent:~~

~~i. To motivate fishers to continually "think smart" about their impact on the environment (species and habitats); both in delivering the sustainable impact most efficiently, and continuing to reduce their impact beyond that~~

~~j. To balance this desire with efficiency by not spending a lot of money and time generating only marginal improvements.~~

~~To achieve this for species, a new scoring issue has been added to the P1 Harvest Strategy (PI 1.2.1) and P2 Species Management PIs (PI 2.1.2, 2.2.2, 2.3.2) requiring fisheries to continually review alternative measures to encourage the development and implementation of technologies and operational methods that minimise mortality of unwanted catch or ETP species, taking into account the practicality of the measures, their potential impact on other species and habitats and on the overall cost of implementing the measures.~~

~~Fisheries need to either review alternative measures that are shown to minimise mortality of the species or species group in question (SA3.5.3). Fisheries need also to consider alternative measures to reduce impacts on habitats. Fisheries should take account of the potential for both positive and negative impacts of alternative measures on species and habitats (refer to GSA3.14.2) when considering whether such measures should be implemented.~~

~~Alternative measures should avoid capture of the species in the first place or increase its survivability if released. Alternatively, in the case of in-scope species, they could utilise the unwanted catch in some way so that it would no longer be 'unwanted'. If there are no unwanted species, the scoring issue on reviewing alternative measures does not need to be scored in that PI.~~

~~The language used in the scoring issue is based on FAO (2011), which provides management planning guidelines for all significant sources of fishing mortality in a fishery, and FAO (1995). FAO (2011) presents requirements for management actions pertaining to bycatch and discards, which include:~~

~~SC47 Reviewing effectiveness of existing initiatives to address bycatch and discard problems~~

~~SC48 Reviewing potential effectiveness of alternative methods to address the bycatch/discard problem~~

~~In addition, the MSC's intent is that the efforts of the UoA to minimise the mortality of this unwanted catch are taken into account by the team in the Outcome and Information PIs. Information on the effectiveness of the measures, including any reduction of unwanted catch, e.g., lower catch rate, should be scored in the Information PI (GSA3.6.4). This information on the reduced catch rate of the species may improve certainty that a species is above the PRI/biologically based limits or, if below PRI/biologically based limits, form part of a strategy to ensure that the MSC UoAs do not collectively hinder recovery of this species. Teams are required to consider this when scoring the Outcome PI (SA3.4.7).~~

~~References~~

~~FAO.1995. *Code of Conduct for Responsible Fisheries*. Rome: FAO.~~

~~FAO.2011. *International Guidelines on bycatch management and reduction of discards*. Rome: FAO.~~

~~Scoring issue (a)~~

If the UoA has no, or negligible (see SA3.1.1.e) impact on this component, the team does not need to score scoring issue (a) for SG60 and SG80.

However, there is no "if necessary" clause in SG100. For the team to score SG100 on this component, a management strategy should be in place for the UoA for P2 species.

Scoring issue (a) MSC UoAs collectively not hindering recovery ▲

If a species is below the point where recruitment might be impaired, the second part of the clause in scoring issue (a) "demonstrably effective strategy" is scored and the impact of all MSC UoAs with that species as "main" needs to be considered.

To determine whether a strategy is "demonstrably effective", the team may use:

- Direct evidence that the proportion of combined catch by all MSC UoAs relative to the total catch of the stock does not hinder recovery, or
- Simulation studies that combine information on recent and expected F levels, stock size, and recruitment, etc. to confirm that the stock is expected to recover.

Even if the total catch of a species is clearly hindering recovery (e.g. total fishing mortality is not below F_{MSY}), the team may still determine a strategy is demonstrably effective between all MSC UoAs if the proportion of combined catch by the UoAs is effectively not hindering recovery. The team needs to evaluate whether the marginal fishing mortality caused by the UoAs is material to the stock's ability to recover. For example,

- Combined catches of all MSC UoAs of less than 30% of the total catch of a species may not be influential in hindering a recovery in a marginal sense and nothing the UoA does would be likely to change the situation.
- UoA catches of more than 30% might be influential, such that if the UoA took action to reduce its catches, the stock might well start to recover.

If a species below the PRI has an overarching recovery strategy in place, with effort controls set on total fishing mortality that are adhered to, an SG80 score may also be achieved where evidence exists that the fishing mortality caused by all MSC UoAs is within the limits set by the recovery strategy in place for the species.

Recovery strategies differing between UoA jurisdictions

~~The different types of management arrangement (measures, partial strategy, strategy) referred to in this scoring issue (and referenced in scoring issues (b) and (c)) are clarified in Table SA7 and of this document, and relate to the management undertaken by the UoA.~~

~~Scoring issue (c) Management strategy implementation~~

~~Scoring issue (c) on management strategy and implementation should also take into consideration any alternative measures that have been implemented by the UoA if it meets SG80 or 100 under scoring issue (e) (see &).~~

~~GSA3.5.1 Scoring issue (d) Shark finning~~

~~Scoring issue (d) is only scored where the primary species is a shark, regardless of whether it is wanted or unwanted catch. See , guidance on PI 1.2.1 to score SI (e) related to shark finning.~~

~~Scoring issue (e) Review of alternative measures~~

~~When assessing this scoring issue, CABs are expected to review evidence to determine whether the client (UoA) has undertaken a review of the potential effectiveness and practicality of alternative measures to minimise mortality of unwanted catch of main species, in order to achieve the SG60 level. This evidence could be, for example, a summary document listing information and measures reviewed along with an analysis of the measures and their appropriateness for the UoA, or the minutes of a meeting which has considered alternative measures.~~

~~GSA3.5.1 'If necessary'~~

~~If the UoA has no (or negligible: see below) impact on this component, scoring issue (a) does not need to be scored for SG60 and SG80 (see definition of 'if necessary' in Table SA3 and).~~

~~However, there is no 'if necessary' clause in SG100 so that in order to score a 100 on this component, a management strategy should be in place for the UoA for P2 species, since gear loss or other incidental impacts could still occur.~~

~~GSA3.5.3~~There may be instances where stocks below the PRI have a distribution across multi-jurisdictional boundaries, such as shared, straddling, highly migratory species (HMS), and high seas non-HMS stocks, but there are no comprehensive management efforts in place set to manage and recover most of the stock complex across all boundaries. Instead, separate parts of the stocks may only be governed through regional management measures. Separate UoAs impacting the same stock may thus have to comply with separate strategies for their respective jurisdiction.

In these cases, and other applicable situations, where a demonstrably effective strategy between the MSC UoAs needs to be in place, the different jurisdictional strategies do not have to be aligned and harmonised between UoAs in order to meet this requirement at SG80 The intent is instead to evaluate whether the separate strategies together achieve the outcome that recovery of the species is not hindered by those MSC UoAs. If not, the team should require some alignment of mitigation processes between UoAs.

Examples: UoAs in different jurisdictions

When separate jurisdictions have set different landing limits on the same depleted species, one UoA would have to comply with a requirement to release all catches alive and another might have an allowance to land only a small amount each year. In such cases, the team would have to:

- Evaluate the validity of each separate strategy.
- Calculate the combined mortality caused by each UoA.
- Determine whether these 2 strategies combined constitute a demonstrably effective strategy to "not hinder recovery".

GSA3.6.1 Reviewing measures for reducing unwanted catch, scoring issue (c) ▲

The team should assess as unwanted catch any non-negligible proportion of the catch that meets the unwanted definition ~~(see SA3.1.6 and~~ (SA3.1.1.f) for a particular species ~~should be assessed as unwanted catch~~.

~~However, in cases where~~ If there is "negligible" (as defined in SA3.1.1.e) unwanted catch of a species, the team may use ~~their~~its discretion as to whether the scoring issue ~~would~~will be scored~~, but the decision~~. The team should ~~be made in accordance with~~use a precautionary approach~~.~~ when determining what is ~~'negligible' the MSC does not specify~~"negligible". When determining whether a ~~set cut-off;~~catch is negligible, the team may consider the significance of the catch in relation to ~~things like~~, for example:

- The proportion of the unwanted catch ~~as part of the total catch or~~ as part of the total catch.
- The proportion of the unwanted catch as part of the total amount of unwanted catch~~, as well as~~.
- The regularity of the catch occurring ~~when deciding whether it is negligible~~.

~~If there is no unwanted catch of primary species, or no primary species at all, then the 'Review of alternative measures' scoring issue (e) is not scored.~~

~~**Example 1:**~~

~~In a North Sea groundfish UoA, a percentage of the catch includes gurnard, all of which are thrown back dead. In this case the gurnard would be unwanted and this scoring issue should be scored for this catch. However, if all or almost all of the gurnard were to be kept for crew consumption or landed and sold, etc., the catch would no longer be considered unwanted and scoring issue (e) would not be scored.~~

~~**Example 2:**~~

~~In a longline UoA where a percentage of the catch includes a skate species, the skate species is immediately cut from the line rather than being landed. In this case the skate should be considered unwanted catch and the alternative measures reviewed should reflect the need to minimise the mortality of the species, with the expectation that released skate will have high survivability, or avoid capture in the first place.~~

~~**Example 3:**~~

~~In a developing world mixed species UoA, all species are landed and consumed or sold, so there is no unwanted catch and scoring issue (e) is not scored.~~

~~**Example: Review of alternative measures**~~

~~The management body for a fishery has investigated a number of measures that could be used to minimise the catch of Species A, a species that is discarded with poor survivability. They selected four potential measures that have been used in similar gears in other fisheries or to minimise mortality of this species. They do not have quantitative estimates of the exact levels that the potential measures might reduce the catch of Species A through their own field testing, but they have considered studies that have been done that show that implementing three of these measures would have no or little effect on reducing the catch of this species. The fourth measure, however, is estimated to reduce catch of this species by 80%. The measure is not expensive to implement (i.e., will not require replacing of current gear) and will not affect crew safety or significantly add time to vessel operations. It slightly reduces the catch of the target species, but not significantly so. It does not cause increased catches of other P2 'unwanted' or ETP species, nor does it negatively impact habitat. The management body recommends use of this measure but has not yet required it in legislation, nor has the fishery chosen to adopt it. This fishery has clearly reviewed alternative measures but has not yet implemented them. It would meet the SG60 level.~~

~~If the fishery were to adopt the use of this measure and it was being used at the time of the site visit, but there were no plans to undertake another review of measures, it would still only meet the SG60 level.~~

~~If the fishery were to adopt the use of this measure and it was being used at the time of the site visit, and another review was scheduled to take place in three years' time, it would meet the SG80 level. If the plan was that alternative measures would be reviewed every two years, it would meet the SG100 level.~~

Example 1

In a North Sea groundfish UoA, a percentage of the catch includes gurnard, all of which are thrown back dead. In this case, the gurnard would be unwanted. The team should score this scoring issue for this catch.

However, if all or almost all of the gurnards were to be kept for crew consumption or, for example, landed and sold, the catch would no longer be considered unwanted. In this case, the team should not score scoring issue (c).

Example 2

In a longline UoA where a percentage of the catch includes a skate species, the skate species is immediately cut from the line rather than being landed. In this case, the team should consider the skate to be unwanted catch. The team's review of "alternative measures" should reflect the need to minimise the mortality of the species, with the expectation that released skate will have high survivability or avoid capture in the first place.

Example 3

In a mixed-species UoA, all species are landed and consumed or sold, so there is no unwanted catch. In this case, the team should not score scoring issue (c).

Example: review of "alternative measures"

The management body for a fishery has investigated several measures that could be used to minimise the catch of species A, a species that is discarded with poor survivability.

The management body selected 4 potential measures that have been used in similar gear in other fisheries or to minimise mortality of this species. The management body does not have quantitative estimates of the levels by which the potential measures might reduce the catch of species A through their own field testing, but they have considered other studies indicating that implementing 3 of these measures would have no or little effect on reducing the catch of this species.

However, the 4th measure is estimated to reduce catch of this species by 80%. The measure:

- Is not expensive to implement.
- Will not require replacing of current gear.
- Will not affect crew safety or significantly add time to vessel operations.
- Slightly reduces the catch of the target species, but not significantly.
- Does not cause increased catches of other P2 "unwanted" or ETP/OOS species.
- Does not have a negative impact on habitat.

The management body recommends use of measure 4 but has not yet required it in legislation, nor has the fishery chosen to adopt it. This fishery has clearly reviewed "alternative measures" but has not yet implemented them.

This fishery would meet SG60 if it:

- Has clearly reviewed "alternative measures" but has not yet implemented them.
- Were to adopt the use of this measure and it was being used at the time of the site visit.
- Has no plans to conduct another review of measures.

This fishery would meet SG80 if:

- It were to adopt the use of this measure.
- The measure was being used at the time of the site visit.
- Another review was scheduled to take place in 3 years' time.

This fishery would meet SG100 if:

- It were to adopt the use of this measure.
- The measure was being used at the time of the site visit.
- It planned to review "alternative measures" every 2 years.

GSA3.~~5.3~~6.1.1 "Alternative measures" ▲

The ~~assessment~~ team should ~~also~~ consider:

- How the "alternative measures" for review have been selected ~~and~~.

- Whether appropriate ~~gears~~gear and practices have been considered as part of the review.

The review~~.~~

~~The requirement is that the measures selected for review are those that have been shown to reduce unwanted catch levels to the 'lowest achievable levels.'~~

~~Where~~ may consider "best practice" measures in a gear/species/region that have been established as achieving the lowest achievable levels~~ –~~, and therefore ~~meeting~~meet the FAO's description of "proper selective and environmentally safe fishing gear" (see Box GSA7~~) – these measures should be included in the review.~~).

~~Where~~ If "best practice" has not been established, or it is not clear which measures reduce catch to the lowest achievable levels, the~~ assessment~~ team should assess whether the review considers measures that are expected or known to minimise mortality of the unwanted species.

The gear and practices selected for review may be from a number of sources, including those that have been shown to be effective in similar fisheries or regions, or those presented as ~~'~~"best ~~practice'~~practice" in international fora.

~~Some~~The list below highlights some repositories of expertise for mitigation methods but is not an exhaustive list. International fora with information and/or expertise on reducing unwanted catches include~~ [Note: this list is provided to highlight some repositories of expertise for mitigation methods – it is not intended to be an exhaustive list]:~~:

- Bycatch Reduction Techniques Database, Consortium for Wildlife Bycatch Reduction[39].
- Agreement on the Conservation of Albatrosses and Petrels (ACAP)[40].
- Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS)[41].
- Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC-Sea Turtles)[42].
- International Union for Conservation of Nature (IUCN)[43].
- UNEP-CMS (United Nations Environment Programme – Convention on Migratory Species)[44].

In addition, many national bodies and ~~regional fishery management organisations (~~RFMOs~~)~~ have developed policies and procedures to reduce unwanted catch, ~~e.g.,~~ for example:

- The US NOAA Bycatch Reduction Engineering Program (BREP~~) and the~~).
- Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).
- The Western and Central Pacific Fisheries Commission, which also maintains a bycatch mitigation information system[45] for that region.

Where the P2 components are required to be harmonised with other MSC certified fisheries, ~~teams~~the team should consider whether the UoA under assessment has considered the gear and practices used in these fisheries as part of their list of ~~'~~"alternative ~~measures',~~measures", if they have been shown to minimise unwanted ~~catches~~catch.

In situations where the proposed alternative mitigation measures are cost prohibitive or impractical for the fishery to implement, other lower cost "alternative measures" may be considered, ~~such as~~for example, improved education for fisheries regarding "best practice" approaches. This is not meant to be a means to avoid the costs associated with implementation of gear modifications or other measures~~,~~ but ~~as~~is an alternative to achieve minimisation when other measures would render the fishery economically unviable.

39 http://www.bycatch.org
40 http://www.acap.aq
41 http://www.ascobans.org
42 http://www.iacseaturtle.org
43 https://www.iucn.org
44 http://www.cms.int
45 https://www.wcpfc.int/bycatch-mitigation-information-system-bmis

GSA3.~~5.3~~6.1.2 Review of "alternative measures" ▲

~~This clause requires that a regular review occurs at a minimum at least once every 5 years, which is at least once per certification cycle.~~ Some fisheries may need to review "alternative measures" more frequently, depending on the extent and nature of the unwanted catch ~~(e.g., due to~~ ; for example, as a result of changes in stock size~~)~~. The team may determine that a review should occur more frequently if information becomes available indicating that the existing measures are ineffective~~, i.e.,~~ and do not lead to any reductions in mortalities of unwanted species ~~(e.g., at~~; for example, as determined during a surveillance audit~~), the assessment team may determine that a review should occur more frequently~~.

~~The 'regular review' at SG80 may be met if at least one review of alternative measures has been undertaken, that measures are implemented as appropriate, and there is a commitment from the client or the management body to have another review within the 5 year window.~~

~~GSA3.5.3.3 Evidence of implementation~~

GSA3.6.1.3 Implemented as appropriate ▲

At SG80, the "alternative measures" may be implemented either within the UoA or in the wider fishery as part of a sub-strategy or code of conduct, etc. on unwanted catch ~~(which~~. This could be ~~either~~ species-specific or ~~covering~~cover all unwanted catch~~)~~.

Evidence of implementation may ~~, for example,~~ include:

- The development and use of codes of conduct ~~or~~ .
- A description of appropriate ways of handling gear and catch on board vessels and in crew training records~~, and evidence from the fleet or observers that measures are being implemented by fishers~~.

~~The alternative measures should be implemented 'on the water' in order to achieve the SG80 or SG100 scores, unless any of the 'as appropriate' clauses under GSA3.5.3.3 are triggered.~~

> ~~**Example:**~~
>
> ~~Alternative measures were reviewed and decided on in 2008 and implemented in 2009. An assessment undertaken after the measures were implemented in 2009, and where another review of measures is scheduled within the next five years, should meet SG80 for this scoring issue. If, however, the assessment were undertaken in 2008 before the measures were implemented, this scoring issue should not yet meet the SG80.~~

~~Decisions surrounding implementation~~

~~Overall, the UoA should ensure that they balance the benefits of implementing a measure for one species against the likely impacts on another species or on habitats, and against the practical and economic consequences of implementation.~~

~~If measures reviewed are all equally effective at minimsing the mortality of the unwanted species, and the practicality and costs are also similar, the UoA should choose the measure that might also lead to the minimisation of impacts on other species and/or habitats.~~

~~Where~~

- Evidence from the fleet or observers that measures are being implemented by fishers.
- A summary document listing information and measures reviewed along with an analysis of the measures and their appropriateness for the UoA.
- The minutes of a meeting that has considered "alternative measures".

If the measures reviewed are shown to be more effective at minimising unwanted catch, but the measures are not implemented, the ~~assessment~~ team should review the reasons for this, which can be:

- Evidence that the practicality ~~(e.g., crew safety, target catch, vessel operations)~~ would be adversely affected by implementing the measures reviewed~~;~~. Examples of such practicalities include crew safety, target catch, and vessel operations.
- Evidence that the UoA has assessed the economic costs and benefits of implementing the measure and determined that the potential costs would ~~adversely~~have an adverse impact on the economic viability of the fishery~~, or~~.
- Evidence that the UoA has considered the implications of relevant solutions on other species and habitats and found that there are negative consequences for ~~species (e.g., causing them to fall below the PRI or outside biologically based limits or hindering their recovery from such a state) or habitats (e.g., causing serious or irreversible harm to the habitat), such that the measures should not be implemented.~~:
    - Species, causing them to fall below the PRI or outside biologically based limits, or hindering their recovery from such a state.
    - Habitats, causing serious or irreversible harm to the habitat, such that the measures should not be implemented.

The FAO (2011)[46] ~~recognizes~~ recognises that there are ~~both~~ costs and benefits to implementing ~~different~~ measures that include direct and indirect costs, such as:

- Cost of the gear~~,~~.
- Impact on revenue from catch volumes or quality~~,~~.
- Operational efficiency ~~and~~.
- Access or restriction to fishing opportunities.

~~In addition,~~ Costs can be mitigated through the application of grants/loans and preferential treatment on duties and taxes for investment in new technologies. The team's judgement of whether costs are prohibitive should take ~~into~~ these issues into account together with the size and scale of a fishery.

Example: prohibitive costs ▲

The management body of a small-scale UoA in a developing country reviews potential mitigation measures on a regular basis. One ~~measure~~ reviewed measure has been shown ~~in similar fisheries~~ to reduce mortality of unwanted catch in similar fisheries but does not affect target catch efficiency or crew safety. However, the UoA vessels decide not to implement the measure because they determine that there would be a 10% increase in costs arising from greater length of time for setting gear ~~that – even when offset with potential benefits – would significantly impact their economic viability. In this case the assessment team would review evidence that the costs would be projected to increase by 10% (e.g., based on projected cost of purchasing measure and loss/gain in target species catches/quality) and that this increase would have a significant impact on the economic viability of the UoA (e.g., based on comparison to profit and loss, or turnover). If the assessment team concludes that implementing this measure would be cost prohibitive for the UoA and that the measure review was not implemented on this basis, the UoA could still meet SG80 for this scoring Issue (e).~~. This cost increase would significantly impact their economic viability, even when offset by potential benefits.

~~On the other hand, if~~ In this ~~UoA,~~ case, the team would review evidence that the costs would be projected to increase by 10%, based on projected cost of purchasing measure and loss/gain in target species catches/quality, and that this increase would have a significant impact on the economic viability of the UoA; for example, based on comparison to profit and loss, or turnover.

[46] FAO (2011) International Guidelines on Bycatch Management and Reduction of Discards. Rome/Roma, FAO. 2011. 73 pp.

The UoA could still meet SG80 for this scoring issue (c) if the team concludes that:

- Implementing this measure would be cost prohibitive for the UoA.
- The measure review was not implemented on this basis.

The UoA could meet SG80 or higher if:

- The cost of implementation in this UoA was partially covered by a donation for the purpose from a funding body and ~~an~~ a non-governmental organisation (NGO~~,~~), so that the increased cost to the UoA was not prohibitive~~ to them, and~~.
- All other criteria ~~were~~have been met.

The MSC has purposely not been prescriptive about determining what is cost effective or safe, recognising that what could be unsafe or economically unviable in one fishery might be safe and economically viable in another. The team will need to use its expert judgement to assess this. GSA3.6.1.3 indicates that there should be evidence that the fishery assessed the costs and benefits of “alternative measures”. It does not stipulate whether this needs to be a fully quantitative cost/benefit analysis or whether a qualitative indication considering costs of implementing measures versus fishery profits would be enough. The MSC does not want to unduly burden the fishery clients, so size and scale of the fishery could be a factor in determining the extent to which they assess costs and benefits of “alternative measures”. Thus, an industrial fishery with large profit margins indicating they did not implement a measure because it was too expensive would need to provide a more detailed indication that the costs would impact their viability than would a small-scale fishery with slim profit margins, which might be able to simply indicate the cost of any measures compared with profit. In both cases there should be some evidence that the fishery or management body investigated the costs of implementing the gear; for example, by contacting a supplier for a quote or referring to a catalogue.

To determine the point at which a measure becomes cost prohibitive, the team should consider~~ that the measures would need to be implemented to achieve an SG80 score or higher.~~:

- The point at which the potential costs would adversely impact the economic viability of the fishery (this may constitute the point at which the measure becomes cost prohibitive).
- That size and scale of the fishery.
- Opportunities to mitigate costs (e.g. through grants/funding).

GSA3.6 ~~Primary species information PI (PI 2.1.3)~~

~~Background~~

~~The P2 species information PIs (, ,) address the information base for the~~ –4 Ghost gear management ~~of the primary, secondary and ETP species respectively. The information and monitoring required in these PIs is intended to include that which is needed to determine the risk posed by the UoA and the effectiveness of the~~ strategy ~~to manage these species.~~

~~For each scoring element in each component, it is expected that the assessment team will use their expert judgement to decide whether the information provided is adequate to estimate the stock status in the Outcome PI and to evaluate methods and measures in the Management PI.~~

~~If the management approach is very precautionary or the status of the species is very high or the catches and impact of those catches are very low, information with low precision may be adequate for both the estimation of current status and the performance of the management strategy. Conversely, where the status is unknown or based on limited information, CABs would be expected to be more precautionary in their assessment of information adequacy to support the Outcome or Management PIs.~~

scoring issue ~~(a) Information adequacy for assessment of impact on main species~~

▲

~~In scoring issue (a), information is needed at the stock level in order to assess the impact of the UoA on the stock as a whole in relation to the point at which recruitment would be impaired.~~

~~Scoring issue (b) Information adequacy for assessment of impact on minor species~~

~~For scoring issue (b), the guidance on adequacy for information to assess impacts of main species (and sub-clauses) also applies to minor species, with the exception that minor species are only assessed at the SG100 level, noting that this level is equivalent to the SG80 level for main species.~~

~~GSA3.6.3 Scoring the adequacy of information~~

~~At SG60~~

~~At SG60, to determine adequacy, CABs are required to assess the validity of the qualitative information used.~~

~~This may involve the review of a number of different sources of information (data triangulation). For example:~~

~~SC49 The assessment team could start by identifying different stakeholder groups. Interviews could then be conducted with each of these groups and feedback from these groups could be compared to determine areas of agreement and areas of divergence.~~

~~SC50 Another form of triangulation that could be used is methodological triangulation, involving the use of multiple qualitative methods to investigate an issue – for example, results from surveys, focus groups and interviews could be compared to see if similar trends are found. If conclusions from each are the same then validity is established (Guion et al, 2011).~~

~~In addition, benchmarks may be used to evaluate whether or not catch rates and magnitudes are low enough to be sustainable and avoid serious harm, and qualitative advice may be adequate to assess this (DFO, 2012).~~

The following definitions (adapted from FAO Voluntary Guidelines on the Marking of Fishing Gear[47]) are to be used when considering ghost gear and its impacts:

- **Ghost fishing**: the capture and/or entanglement of target, non-target, and ETP/OOS species by ghost gear.
- **Ghost fishing mortality**: the mortality of organisms arising from the entrapment, entanglement, or other physical interactions with ghost gear.
- **Ghost gear:** fishing gear or parts thereof (including fish aggregating devices) that are abandoned, lost, or discarded at sea. This is more formally referred to as "Abandoned, Lost, or Discarded Fishing Gear" (ALDFG).
- **Abandoned fishing gear:** fishing gear over which that operator/owner has control and that could be retrieved by the owner/operator but that is deliberately left at sea due to force majeure or other unforeseen reasons.
- **Discarded fishing gear**: fishing gear that is deliberately released at sea without any attempt for further control or recovery by the owner/operator.
- **Lost fishing gear:** fishing gear over which the owner/operator has accidentally lost control and that cannot be located and/or retrieved by the owner/operator.
- **Ghost gear impact**: environmental impacts resulting from ghost gear, including ghost fishing and/or its physical impact on habitats.
- **Fish aggregating device (FAD):** a permanent, semi-permanent or temporary object, structure, or device of any material, man-made or natural, that is deployed, and/or tracked, and used to aggregate fish for subsequent capture. A FAD can be either an anchored FAD (aFAD) or a drifting FAD (dFAD). In MSC assessments, FADs are not considered a gear type as such because they do not capture fish, but merely facilitate subsequent capture. FADs therefore may be included as a functional part of certain fishing gear types (e.g. purse seine, handline) as they are sometimes used to facilitate the capture efficiency of these gears.
- **Fishing gear:** a tool with which living aquatic resources are captured. This refers to any physical device, or part thereof, or combination of items, that may be placed on or in the water or on the seabed, with the intended purpose of capturing or facilitating the capture, or harvesting of marine organisms, in accordance with MARPOL Annex V[48;49].

Whilst it is recognised that it is challenging to completely eliminate some ghost gear (e.g. gear loss from severe storms), it is the MSC's intent that fisheries aim to minimise ghost gear and its impact on marine ecosystems as much as possible.

Various approaches can be taken to manage ghost gear and its impacts. As proposed by McFadyen et al. (2009)[50], interventions can be broadly divided between measures that:

- Prevent (by avoiding the occurrence of ghost gear in the environment).
- Mitigate (by reducing the impact of ghost gear in the environment).
- Remediate (by removing ghost gear from the environment).

These include but are not limited to those listed in Table GSA4.

[47] FAO (2019) Voluntary Guidelines on the Marking of Fishing Gear. Directives volontaires sur le marquage des engins de pêche. Directrices voluntarias sobre el marcado de las artes de pesca. Rome/Roma. 88 pp. Licence/Licencia: CC BY-NC-SA 3.0 IGO.
[48] IMO (1973) International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL).
[49] IMO (2006) Guidelines on Annex V of MARPOL Regulation for the Prevention of Pollution by Garbage from Ships.
[50] McFadyen, G., Huntington, T., and Cappell, R. (2009) Abandoned, lost, or otherwise discarded fishing gear. UNEP Regional Seas Reports and Studies, No. 185; FAO Fisheries and Aquaculture Technical Paper, No. 523. Rome, UNEP/FAO. 2009. 115pp.

Table GSA4 Example of ghost gear management measures

Type of intervention	Example of measures
Prevention	~~**Example:**~~ ~~If only life history information is known (i.e., no fisheries-independent survey data) methods for assessing mortality of unwanted species could include: indirect methods for estimating natural mortality (if only size or age or length-at-age data are available) or unstructured demographic approaches (if data on reproduction, natural mortality, age at maturity and lifespan are available) (DFO, 2012).~~ • Marking and identification of fishing gear. • Spatial and/or temporal measures to reduce gear conflict. • Fishing input controls to limit gear use (e.g. limits on soak time for passive gear types). • Gear design to reduce whole or partial loss of the fishing gear (including technology to track gear position). • Vessel design to reduce discarding of gear and other aquatic litter. • Use of end-of-life fishing gear disposal facilities. • Fisher education and awareness on preventing gear loss.
Mitigation	• Gear design to reduce the incidence and duration of ghost fishing.
Remediation	• Lost gear reporting, locating, and recovery initiatives.

Inserted Cells

It is widely accepted that prevention is better than mitigation or remediation of ghost gear impacts. It is the MSC's intent to promote effective management strategies to avoid gear loss. Therefore, it is expected that measures should include 1 or more preventative measures at SG60. It is expected that a partial strategy should include at least 2 measures that work together to prevent ghost fishing by the UoA. A strategy may also include mitigation and remedial measures to address ghost fishing by the UoA.

When considering approaches to managing ghost gear and its impacts, the assessment team should consider current "best practice", referring to:

- FAO (2009) for basic principles[51].
- FAO (2019) 'Voluntary Guidelines on the Marking of Fishing Gear'[52].
- The revised 2021 Global Ghost Gear Initiative (GGGI) 'Best Practice Framework for the Management of Fishing Gear'[53].

[51] McFadyen, G., Huntington, T., and Cappell, R. (2009) Abandoned, lost, or otherwise discarded fishing gear. UNEP Regional Seas Reports and Studies, No. 185; FAO Fisheries and Aquaculture Technical Paper, No. 523. Rome, UNEP/FAO. 2009. 115pp.
[52] FAO (2019) Voluntary Guidelines on the Marking of Fishing Gear. Directives volontaires sur le marquage des engins de pêche. Directrices voluntarias sobre el marcado de las artes de pesca. Rome/Roma. 88 pp. Licence/Licencia: CC BY-NC-SA 3.0 IGO.
[53] Global Ghost Gear Initiative (2021) Best Practice Framework for the Management of Fishing Gear: June 2021 Update. Prepared by Huntington, T. of Poseidon Aquatic Resources Management Ltd. 94 pp plus appendices.

- 2019 International Seafood Sustainability Foundation (ISSF) 'Recommended Best Practices for FAD Management in Tropical Tuna purse seine fisheries'[54], for examples of "best practices" with respect to mitigating ghost gear impacts from lost or discarded FADs.

Note that this list of reference documents presented here are not exhaustive: there may be more suitable examples of best practice measures to apply in specific fishery scenarios.

GSA3.6.3.a "If necessary"

~~**At SG80**~~

~~At SG80, the information adequacy required for the estimation of the impact of the UoA on the outcome of the species should be balanced against the likely impact on that particular species.~~

~~The likelihood that the UoA impacts the species is set out in the Outcome PI (likely, highly likely, high degree of certainty) in a probabilistic context (70%, 80%, 90% for primary and ETP species; 60%, 70%, 80% for secondary species), see . In order to meet this scoring guidepost, some quantitative information needs to be available in addition to the qualitative information required at SG60. The data triangulation method described at SG60 above would also apply to this SG.~~

~~Generally, having only one form of data collection with a high level of potential bias or other limitation (e.g., logbooks or interviews with fishermen) by itself should not be enough to meet SG80 – additional information sources that compensate for the limitations would also need to be provided and assessed (see examples of information sources and how they could be combined in).~~

~~**At SG100**~~

~~At SG100 the scoring issue requires that estimates of catch and UoA-related mortality of all species are quantitative and available with a 'high degree of certainty'.~~

~~This should be equivalent to greater than or equal to the 90th percentile in the distribution (for primary and ETP species) or 80th percentile in the distribution (for secondary species).~~

~~It is intended that this information builds on the qualitative and quantitative information included at SG60 and SG80.~~

~~Observer programmes~~

~~With regard to observer programmes, teams may consider factors such as how representative the sampling is, whether observer coverage is based on the total effort or number of trips, any spatial or temporal limitations on data collected, definition and rigour of data collection protocols, what training observers have had in terms of species identification, and the priorities for observer time on the vessel (Bravington et al, 2003; DFO, 2012; Wolfaardt, 2011).~~

~~The level of observer coverage required to assess the impact of the UoA on outcome status depends on factors such as the frequency of capture/mortality, the variability in rates of capture/mortality, a desired CV and/or information required to show that upper confidence limit on mortality for a species is below a pre-defined sustainability threshold (Bravington et al, 2003; Wolfaardt, 2011). There is not a single optimum level of observer coverage that covers all fisheries and species caught/killed. Generally, for species that are highly variable, clumped in distribution and/or relatively rare, higher levels of observer coverage are needed (Wolfaardt, 2011). For more normal species, observer coverage rates above 20% provide only diminishing returns and small incremental improvements in the CV of catch estimates (Lawson, 2006).~~

[54] Restrepo, V., Koehler, H., Moreno, G., and Murua, H. (2019) Recommended Best Practices for FAD. management in Tropical Tuna Purse Seine Fisheries. ISSF Technical Report: 2019–11. International Seafood Sustainability Foundation, Washington, D.C., USA.

~~GSA3.6.3.1~~

~~The catch of a species may be estimated using a variety of methods and each can have certain advantages and/or disadvantages associated with them. It is up to the assessment team to use their expert judgement to assess the adequacy of the methods used, particularly with respect to the precision and bias (statistical and observational bias) of the method and its ability to provide externally verifiable data. For instance, the observational bias of logbook data is generally regarded as being much higher than electronic or observer monitoring, but may still be adequate if e.g., triangulated with other data sources that compensate for this bias or otherwise provide reassurance.~~

~~Where limited information is available, teams should be more precautionary in their assessment of information adequacy to support an Outcome PI score.~~

~~Some examples of data collection methods include (but are not limited to) those specified in . Column A contains data collection methods that have higher validity as they are less subject to bias than those in Column B.~~

~~**Table GSA: Examples of data collection methods according to their level of verifiability**~~

This clause is used to exempt fisheries from requiring ghost gear management strategies in scenarios where it can be demonstrated that the risk of ghost gear impacts or ghost fishing on the relevant component is negligible (or demonstrably absent). Examples may include fisheries characterised by an absence of fishing gear such as those involving hand collection (e.g. “hand-dived scallops” or “hand dredging”). In this scenario the SI would receive a score of SG100.

Example of scoring 2.3.2 (d) – Habitats ghost gear management strategy

The fishery context: a purse seine fishery using dFADs operating within the WCPFC region. No net loss is reported however net panels are known to be lost from time to time. There is some information on the number of dFADs released annually but an absence of information on numbers lost or retrieved. Whilst dFADs are marked, there is a lack of information on the fate of majority of dFADs deployed. The dFADs deployed are characterised by “non-entangling” design.

Scoring considerations: The team have identified a number of “more sensitive” habitat scoring elements (e.g. coral aggregations) within the region at risk from ghost gear impact. Key ghost gear impacts include the smothering and physical abrasion of biogenic habitat features. The team consider impact from the net loss on scoring habitats elements to be relatively minor. This conclusion is based on information on scale of loss, location of gear deployment relative to habitats and data analysed on ocean current conditions/patterns. The team consider that dFAD impact is unclear. Whilst dFADs are marked and the quantities deployed are known, there is a lack of validated information on lost dFADs or prevalence/location of dFADs beaching.

The team considers dFAD marking an example of ghost gear preventative measures (as per Table GSA4) so consider that SG60 is met. Whilst the dFAD design is “non-entangling”, the team don’t consider a ghost gear mitigation measure in the context of habitat impact specifically (i.e. ghost fishing mitigation is more relevant for ETP/OOS component and considered there).

In order to score SG80 (partial strategy) or SG100 (strategy), the team consider further preventative measures are required, with an understanding of they work together to minimise habitat impact. Examples of these may include reducing dFAD use, implementation of dFAD tracking and retrieval measures, providing better information on prevalence and location of lost dFADs, and improved dFAD design to mitigate ghost gear impact on habitats (e.g. biodegradable components).

GSA3.7 In-scope species information PI (PI 2.1.3)

GSA3.7.3 ▲

The team should use information that is adequate to support understanding of the effectiveness and practicality of measures used by the UoA and potential "alternative measures", if:

- There is unwanted catch, and
- Scoring issue (c) on the "review" of "alternative measures" is scored in the management PI 2.1.2.

GSA3.8 ETP/OOS species outcome PI (PI 2.2.1)

Defining ETP/OOS unit ▲

~~At the SG80 and 100 level in scoring issue (a), where a species is close to or below its limit or its status is uncertain, the team should expect that the UoA uses at least one method from Column A or an equivalent data source, and one or more from Column B to collect information to support the Outcome score for that species. However, where there is a high level of certainty that a species is well above its limit, less precaution is necessary and only two or more methods from Column B could be acceptable.~~

~~Some methods of recording data that are inherently open to bias, such as logbooks, are also less likely to provide accurate data on non-fish species, and therefore when considering the need for accurate information on interactions with out of scope species CABs should seek higher quality data sources (column A of the table).~~

The identification of the appropriate ETP/OOS unit(s) is essential for assessing the impact of the UoA (or MSC UoAs) on ETP and OOS species. The MSC recognises that there are a variety of ways that this has been approached across taxa and in different management contexts.

The MSC's intent is that the team indicates which ETP/OOS unit(s) has been selected, and that the ETP/OOS unit(s) is appropriate to the species and the context of the fishery in assessment. The selection should also be precautionary. The ETP/OOS unit(s) may be a species, a population, a stock, or another category.

Organisations responsible for assessing the status of species may have already identified an ETP/OOS unit based on:

- Biological attributes.
- Impacts of the UoA on that unit, in terms of scale and intensity.
- Geopolitical boundaries.

In such cases, these units would normally be used by the team. However, if the organisation responsible for assessing status has not selected the most appropriate and precautionary unit based on the criteria above, the team will need to select a different ETP/OOS unit.

Organisations responsible for assessing the status of species may include relevant management authorities associated with the UoA but also international organisations, such as the International Whaling Commission (IWC), and Instruments associated with the Convention on Migratory Species; for example, ASCOBANS and ACAP.

The team will need to determine the appropriate ETP/OOS unit(s) and provide a justification for this choice, if:

- An ETP/OOS unit(s) has not already been identified by the organisations responsible for assessing status of species, or
- A unit appropriate for assessing impact of the UoA has not been identified by the organisations responsible, or

- The organisations responsible differ in how they identify a unit.

The selection of the unit(s) may be a compromise between using the ETP/OOS unit(s) that best reflects the subset of individuals that are impacted by the UoA, whilst also ensuring that mortalities can still be attributed to the ETP/OOS unit(s) in question. However, the team should also be precautionary when determining the unit(s).

For example, where multiple populations of the same species overlap so that it is not possible to determine from which population an individual mortality came from, the team should select a higher taxonomic level (e.g. species) as the ETP/OOS unit(s), provided the individual populations are likely to have the same status. However, in the situation described above, if the individual populations have different status, the team should be more precautionary and select the more vulnerable population as the ETP/OOS unit(s). Where there is evidence that the fishery overlaps geographically with only (or mainly) one population, the team should consider the impact of fishing mortalities on that population as the ETP/OOS unit(s).

The team should note that uncertainty in population structure (i.e. whether the fishery is impacting single or multiple units) can make defining an ETP/OOS unit(s) particularly challenging. Ideally, the degree of connectivity and self-recruitment will determine the most appropriate ETP/OOS unit(s). For example, where a single population is completely isolated and there is no or little connectivity or geographic overlap with other populations, this single population is likely to be the most appropriate ETP/OOS unit. However, where there is high level of connectivity between metapopulations, the wider metapopulation is likely to be the most appropriate ETP/OOS unit. Where little is known about connectivity, approaches that consider the ability to identify impacts and implement management measures may be more appropriate. In this case, selecting the ETP/OOS unit at the smallest scale that is practical makes it harder to falsely conclude that the population is at a higher level than it really is.

To help illustrate the intent of these requirements, examples of how identifying ETP/OOS units of assessment in different contexts are provided below.

Example~~:~~

~~During the assessment of a developing world, small scale gillnet UoA, it became clear that there is some evidence that local fisheries in general are having an impact on the endangered Ruby Dolphin as a local NGO interview reveals that they have approximately 10 sightings per year of stranded individuals with signs of gear interactions reported (Column B-type information source). However, it is not clear whether these interactions have come from the UoA or another fishery in the area.~~

~~Interactions with ETP~~ 1: Cetacean species ~~such as the Ruby Dolphin are monitored through sporadic landings monitoring by a government agency (Column B-type information source). The agency reports the gear used and any bycatch species that are landed, to the species level where possible. Through this monitoring, there was one report of 1 Ruby Dolphin mortality in the past two years in this UoA.~~in the UK

The UK Joint Nature Conservation Committee (JNCC) defines cetacean populations as “a collection of individuals all of the same species with a tendency to be found in the same area. Populations contain genetic variation within the population itself, and between other populations. Populations can exist in isolation, or can co-exist at least during a part of the year with other conspecific populations (i.e. other populations of the same species) in the same area”. The JNCC notes that most cetaceans in UK waters are part of larger biological populations, with ranges extending into waters of other countries or the High Seas. However, to obtain the best conservation outcomes for species, it divides the populations into smaller management units, which provide an indication of the spatial scales at which impact assessments, cumulatively or in combination, need to be assessed for key cetacean species in UK waters. The management units are based on best understanding of biological population structure and any ecological differentiation between populations, but the boundaries are determined either by political boundaries (e.g. UK vs Irish waters) or the management of human activities (e.g. ICES divisions for fisheries management)[55]. For example, for bottlenose dolphin (*Tursiops truncatus*) the JNCC identifies seven management units in the UK, some of which fall into UK waters and others are shared with other countries, e.g. Greater North Sea[56]. These seven management units could be considered ETP/OOS units for the purposes of fishery assessments. Where a fishery overlaps with multiple ETP/OOS units, each would be considered a separate scoring element.

Example 2: Global marine turtles

For marine turtles, regional management units (RMUs) were developed through the IUCN Marine Turtle Specialist Group to evaluate the relative impacts of fisheries on appropriate population units for widely distributed species[57;58]. RMUs are biologically and geographically explicit population segments. They use spatially integrated information, including information on individual nesting sites, genetic stocks, and geographic distributions of different life-history stages to account for complexities in marine turtle population structures.[59] RMUs are equivalent to IUCN sub-populations, so they are used as the appropriate demographic unit for IUCN Red List assessments. The use of spatial information allows overlap of individual RMUs with specific fisheries to be evaluated. The RMU would also be the most relevant ETP/OOS unit for most fishery assessments. However, there are some areas (e.g. Australia) where genetic sub-structuring exists, and specific genetically defined management units have been identified. For UoAs in those areas, these management units may be the more relevant ETP/OOS unit.

Example 3: Oceanic whitetip shark in Western Pacific

The oceanic whitetip shark (*Carcharhinus longimanus*) is distributed globally in tropical and sub-temperate waters. Oceanic whitetips were evaluated as Critically Endangered as a species on the IUCN Red List in the 2018 assessment[60]. The IUCN assessment indicates that there are no data available on the global population size of the oceanic whitetip shark, but that preliminary results from genetic studies suggest there may be some differences between individuals in the Western Atlantic and Indo-Pacific[61].

The Western and Central Pacific Fisheries Commission (WCPFC) undertook a stock assessment for the oceanic whitetip shark stock in the Western and Central Pacific Ocean (WCPO) in 2019 2019[62]. This stock assessment indicated that there is no evidence for more than one population within the WCPO but that there is limited horizontal movement inferred from satellite tagging, suggesting that there is a potential for regional residency in the Pacific Ocean. Defining the stock at this scale also allows for the WCPFC, as the relevant management body, to assess the impact of

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[55] IAMMWG (2015) Management Units for cetaceans in UK waters (January 2015), JNCC Report No. 547, JNCC, Peterborough, ISSN 0963-8091.
[56] IAMMWG (2015) Management Units for cetaceans in UK waters (January 2015), JNCC Report No. 547, JNCC, Peterborough, ISSN 0963-8091.
[57] Wallace, B.P., DiMatteo, A.D., Hurley, B.J., Finkbeiner, E.M., Bolten, A.B., et al. (2010) Regional Management Units for Marine Turtles: A Novel Framework for Prioritizing Conservation and Research across Multiple Scales. PLoS ONE 5(12): e15465. Available at: https://doi.org/10.1371/journal.pone.0015465.
[58] Wallace, B.P., Kot, C.Y., DiMatteo, A.D., Lee, T., Crowder, L.B., and Lewison, R.L. 2013. Impacts of fisheries bycatch on marine turtle populations worldwide: toward conservation and research priorities. Ecosphere 4(3):40. http://dx.doi.org/10.1890/ES12-00388.1
[59] Wallace, B.P., DiMatteo, A.D., Hurley, B.J., Finkbeiner, E.M., Bolten, A.B. et al. (2010) Regional Management Units for Marine Turtles: A Novel Framework for Prioritizing Conservation and Research across Multiple Scales. PLoS ONE 5(12): e15465. Available at: doi:10.1371/journal.pone.0015465
[60] Rigby, C.L., Barreto, R., Carlson, J., Fernando, D., Fordham, S., Francis, M.P., Herman, K., Jabado, R.W., Liu, K.M., Marshall, A., Pacoureau, N., Romanov, E., Sherley, R.B., and Winker, H. (2019) *Carcharhinus longimanus*. The IUCN Red List of Threatened Species 2019: e.T39374A2911619. Available at: http://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T39374A2911619.en
[61] Rigby, C.L., Barreto, R., Carlson, J., Fernando, D., Fordham, S., Francis, M.P., Herman, K., Jabado, R.W., Liu, K.M., Marshall, A., Pacoureau, N., Romanov, E., Sherley, R.B., and Winker, H. (2019) *Carcharhinus longimanus*. The IUCN Red List of Threatened Species (2019). e.T39374A2911619 Available at: http://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T39374A2911619.en
[62] Tremblay-Boyer, L., Carvalho, F., Neubauer, P., and Pilling, G. (2019) Stock assessment for oceanic whitetip shark in the Western and Central Pacific Ocean (2018) WCPFC-SC15-2019/SA-WP06. Report to the WCPFC Scientific Committee. Fifteenth Regular Session, 12–20 August 2018, Pohnpei, Federated States of Micronesia. 98 pp

fisheries in the region on this stock and to apply management measures. Given that the stock is based on some biological information and is managed at stock level by the relevant management body, the WCPO stock of oceanic whitetip is a relevant ETP/OOS unit.

Example 4: Black-browed albatross populations in the South Atlantic

There are several possible taxonomic units below species that CABs could consider in this case – for example, seabirds can be grouped by "colony", "sub-colony" or "breeding site", "island group", "population" or, in the case of coastal breeding birds, by administrative unit such as county or country. Considering different political responsibilities, legislation, threats, population trends and dynamics, at-sea distributions, and migration patterns, "island group" may be the most relevant ETP/OOS unit, where practical, or country for continental land masses. For example, the Agreement on Conservation of Albatrosses and Petrels (ACAP) assigns priorities for research and monitoring at the island group level, and this is also the level at which ACAP identifies Priority Populations (as flagships); i.e. those populations declining at more than 3% per year, hold more than 10% of global breeding numbers, and are at risk from fisheries requiring international action to improve their conservation.

An example supporting selection of island group as the ETP/OOS unit is the case of black-browed albatross (*Thalassarche melanophris*) in the South Atlantic. The 2018 IUCN status assessment of black-browed albatross determined that as a species they are Least Concern[63]. There are no sub-population assessments for this species group at this time in IUCN. However, black-browed albatross from different island groups would likely qualify as IUCN sub-populations, i.e. they can be defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange. Black-browed albatrosses in the Falkland Islands are genetically distinct from those elsewhere, and the status trend is increasing, whereas on South Georgia the population is declining[64]. The South Georgia population cannot be genetically distinguished from birds breeding on islands in Chile; however, in most seabird species, including albatrosses, banding studies indicate that individuals show very high micro-philopatry, often recruiting into the same sub-colony or, in species where nests are loosely aggregated, into the same sub-area from which they fledged[65]. Most of the remainder recruit onto the same island or stretch of coast ("colony"), relatively few into adjacent colonies and very small numbers (or none) into colonies in other island groups.

Given that there is also an understanding of at-sea distribution for the populations from different island groups, and generally good separation between individuals from island groups at sea, the island group (e.g. South Georgia, Falkland Islands) level would be the most relevant ETP/OOS unit for fisheries interacting with this species.

Example ~~In addition, interviews with the government officer in charge of the inspections, the fishers themselves have indicated that entanglements with cetaceans are rare in this fishery, but that when they do occur that the species are able to be safely released (Column B-type information sources).~~

~~The evidence from the landings data and interviews is assessed by the team as meeting the SG60 requirement for Ruby Dolphin. However, due to the poor conservation status of this species and the uncertainty over the true impact of the fishery on this species, it does not meet the SG80 level, i.e., there are no Column A-type data sources to validate the information.~~

~~If in addition to the above, the local NGO or a University researcher were to undertake a short-term quantitative research project investigating the number of interactions within this fishery and their likely outcome (mortality, injury, release without harm), and that this research validated that the impact was in fact very low, then the combined evidence would meet the SG80 level.~~5: Minke whale populations in North Pacific

[63] BirdLife International (2018) *Thalassarche melanophris*. The IUCN Red List of Threatened Species 2018. Available at: https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22698375A132643647.en

[64] Burg, T.M., Catry, P., Ryan, P.G., and Phillips, R.A. (2017) Genetic population structure of black-browed and Campbell albatrosses, and implications for assigning provenance of birds killed in fisheries. Aquatic Conservation: Marine and Freshwater Ecosystems DOI: 10.1002/aqc.2765

[65] Gauthier, G., Milot, E., and Weimerskirch, H. (2010) Smallscale dispersal and survival in a long-lived seabird, the wandering albatross. Journal of Animal Ecology 79: 879–887.

The situation with common minke whales (*Balaenoptera acutorostrata*) in the North Pacific around Japan is a good example of when the team may need to be more precautionary when selecting an ETP/OOS unit. The IUCN status of common minke whales is Least Concern[66]. There is uncertainty about the exact population structure of minke whales in the North Pacific, but the International Whaling Commission (IWC) recognises at least two populations of minke whales in this region: the 'O' type are relatively abundant whereas the 'J' type have been heavily depleted[67]. The two populations have different overall distributions but mix in some areas where they are subject to bycatch and directed takes. Where the UoA overlaps with the area in which the species mix in distribution or the distribution is uncertain, the choice of ETP/OOS unit should be precautionary. This is because it is not always possible to distinguish the population from which the individual mortalities came from. Thus, unless there is evidence to the contrary from the UoA, the 'J' type minke whales would be the most relevant ETP/OOS unit.

Where the UoA overlaps with the area where reliable spatial information indicates that only the 'O' type of whale is distributed, it would be more appropriate to select only the 'O' type as the ETP/OOS unit.

Scoring issue (a) – assessment of direct UoA effects on ETP/OOS unit(s) ▲

The MSC's intent is that the UoA does not hinder the recovery of the ETP/OOS unit to a level consistent with achieving favourable conservation status. In the MSC context, direct effects of the UoA on the ETP/OOS unit covers injuries and mortalities due to interaction with the fishing gear or vessels, including unobserved or cryptic mortality that may result from ghost fishing. Direct effects may also include sub-lethal effects, such as injuries that do not immediately result in death and loss of fitness due to disturbance. The indirect effects of the UoA on the ETP/OOS unit are those that result from fishery impacting the ecosystem in a way that consequently effects the ETP/OOS unit. These indirect effects are assessed as part of the Ecosystem Outcome PI 2.4.1.

If an ETP unit is already at a level consistent with favourable conservation status, this may be used as evidence that the UoA does not hinder recovery of the ETP unit to this level. However, the team should consider whether there are other factors that would mean that the UoA may be hindering recovery; for example, if the impact assessment evaluating status relative to favourable conservation status was undertaken more than 5 years ago, or the ETP/OOS unit has shown steady declines likely attributable to UoA mortalities.

Determining whether impacts are negligible

The MSC has defined thresholds for teams to use to determine whether ETP/OOS unit mortalities can be considered "negligible", i.e. a level at which teams are required to consider that the UoA is not hindering recovery (at all SG levels) of the ETP/OOS unit. The use of "negligible" is intended to ensure that there is no need for a qualitative or quantitative evaluation of the impact of the UoA on the ETP/OOS unit, where fishing mortalities are "highly unlikely" to impact the population of the ETP/OOS unit. The ETP/OOS unit should still be scored at the SG60, 80, and 100 levels but the "negligible" criteria may be used as a justification that the UoA is not hindering recovery.

It is not possible to consider that the impact on an OOS species is "negligible" if the ETP/OOS unit has a breeding population (e.g. mature adults) size of less than 5,000 individuals. It is also not possible to consider that the impact is negligible if average annual mortalities from the UoA are greater than 10 individuals. These levels were set with precautionary values considering that for a population size of 10,000 individuals, 10 would be 0.1% of the population. However, a % threshold was not used overall as the MSC's intent is that when mortalities are greater than 10, the UoA impact is assessed in the ETP/OOS outcome PI.

When there are mortalities of ETP/OOS units above "negligible" levels, the team will need to:

- Apply the RBF (MSC Fisheries Standard Toolbox Section A), or
- Evaluate the likelihood that the UoA is hindering recovery to favourable conservation status, based on existing quantitative assessments, such as those provided in Table GSA5

[66] Cooke, J.G. (2018) *Balaenoptera acutorostrata*. The IUCN Red List of Threatened Species 2018: Available at: https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T2474A50348265.en.
[67] IWC (2021) Scientific Committee Report (SC68C). International Whaling Commission. 200pp.

~~In addition to the catch, the UoA-related mortality of caught species needs to be understood, particularly for unwanted catch. If not killed outright, the eventual mortality of unwanted catch returned to the sea, i.e., the number that will eventually die if released, thrown away, or slipped can be estimated using methods such as confinement, field observations, tagging and telemetry (Suuronen, 2005; Neilson et al, 2011). However, these methods can be expensive and alternative methods to estimate mortality based on proxies can be effective with certain species or in certain circumstances, including:~~

~~SC51 Observer assessment of individual species vitality (e.g., prior to release/throwing away) or physical condition as a proxy for mortality (Richards et al, 1995; DFO, 2012);~~

~~SC52 Time to mortality (TM) estimates (Benoit et al, 2013);~~

~~SC53 Biochemical indicators (Beamish, 1966)~~

~~GSA3.6.3.2~~

~~In scoring issue (a) CABs are required to consider a number of factors when determining the adequacy of the information in relation to its ability to determine and to detect changes in the outcome indicator score.~~

~~The background document to the FAO Guidelines on the Precautionary Approach to Fisheries (FAO, 1996) suggests that fisheries assess statistical power of the tests and methodologies used for comparing the relative 'soundness' of the information available. The statistical power measures the probability that the monitoring programme will effectively detect the reduction of the reproductive capacity below safe thresholds, and is strongly influenced by the elements listed in SA3.7.4.2. The lower the statistical power of the assessment, the more precautionary the management response should be (FAO, 1996).~~

~~GSA3.6.4~~

~~If there is unwanted catch and Scoring Issue (e) on the 'review of alternative measures' is scored in the Management PI 2.1.2, information should also be adequate to support understanding the effectiveness and practicality of measures used by the UoA as well as potential alternative measures.~~

~~GSA3.7 Secondary species outcome PI (PI 2.2.1)~~

~~GSA3.7.1 Treatment of out of scope species~~

~~Out of scope species (birds, reptiles, amphibians, mammals) are always considered a main species regardless of their total catch volume.~~

~~GSA3.7.2 Recognition of 'considerable' catches for out of scope species~~

~~To determine whether catches are considerable as defined in SA 3.7.4 for out of scope species, teams should use their expertise and a precautionary approach to determine whether the UoA impact is considerable or not. For such species, the 10% default catch weight requirement may be less applicable than for in-scope species. Precautionary measures may include looking at proxies for fishing related mortality as defined in .~~

~~GSA3.7.3 Consideration of efforts to minimise the mortality of unwanted catches~~

~~The guidance for clause applies here also.~~

~~GSA3.8 Secondary species management strategy PI (PI 2.2.2)~~

~~The guidance for clause applies here also.~~

~~GSA3.9 Secondary species information PI (PI 2.2.3)~~

~~applies here also.~~

~~GSA3.10 ETP species outcome PI (PI 2.3.1)~~

~~Scoring issue (a) – Combined impacts of MSC UoAs~~

~~The team should consider whether the ETP species overlaps with other MSC UoAs and whether there are limits set that pertain to these UoAs in either national legislation or binding international agreements.~~

~~As indicated in , the intent of the MSC when referring to agreements that are "binding" is that the international legislation is binding on the parties to the agreement. Neither the flag state of the UoA, nor the state in which fishing takes place, need be a signatory to this agreement for it to be applicable to MSC certified UoAs.~~

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The "negligible" criteria are provided for OOS species using the number of individuals rather than weight. However, recognising that for many fish and invertebrate species the catch is reported by weight, a threshold of < 2% of UoA catch is applied.

Determining the likelihood of hindering recovery to favourable conservation status

The favourable conservation status reference point is set as a minimum of 50% of carrying capacity but may be higher depending on the life-history characteristics of the species. Different terms may be used to characterise the TRPs consistent with the MSC definition of favourable conservation status including optimum sustainable population (OSP), maximum net productivity level (MNPL) and maximum sustained fishing mortality (MSM). Fishing mortality or biomass-based reference points, such as MSY, may be used if they are set to ensure recovery to at least 50% of carrying capacity.

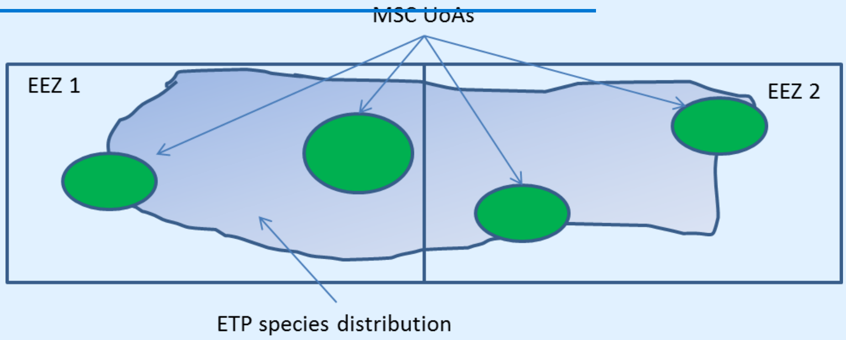
Where ETP/OOS units are not "likely" to be at favourable conservation status, the UoA needs to demonstrate that any mortalities from the ETP/OOS unit are "unlikely" to hinder recovery. That is, the level of mortalities is low enough that they would not prevent recovery to favourable conservation status, if the species is capable of recovering to this level, within 100 years or 3 generations, whichever is shorter.

It is not the MSC's intent that the team undertake an assessment of the status of the ETP/OOS unit or estimate the impact of fishing mortalities. It is for the UoA(s), or organisations responsible for assessing status of species, to undertake these analyses and provide them to the team to consider. When applying the MSC scoring guidepost probability levels, the team should then assess this information, including considering the quality and recency of the assessment and the UoA-specific information used.

Example~~ 1: Two EEZs, one with limits and one without~~

~~For example in below, an ETP species distribution overlaps with four MSC UoAs, two~~ : Assessment of ~~which are in EEZ 1 and two in EEZ~~ 2.~~ EEZ 1 has national limits set for the ETP species, but EEZ 2 does not. There are no international limits set through international agreements for the ETP species. In this case, the assessment team should score the MSC UoAs in EEZ 1 using scoring issue (a) and should.~~1a where potential biological removal is used to ~~take the combined impacts of only the EEZ1 MSC UoAs into account. The assessment team should score the MSC UoAs in EEZ 2 using scoring issue (b) and would not need to take their combined impacts into account.~~evaluate UoA impact

~~Figure GSA: Example ETP species distribution~~



~~Example 2: Two EEZs. both with different limits~~

~~In above, let us instead suppose that both EEZ 1 and EEZ 2 have set national limits for the ETP species, but these limits are only for the fisheries within their respective EEZs. There are no international limits set through international agreements for the ETP species. In this case, the MSC UoAs in both EEZs would use scoring issue (a) to score the species. However, the assessment team should consider the combined impacts of MSC UoAs in EEZ 1 and the combined impacts of UoAs in EEZ 2 separately (i.e., the 2 MSC UoAs in EEZ 1 in relation to EEZ 1 limits and the 2 MSC UoAs in EEZ 2 in relation to EEZ 2 limits).~~For marine mammals, the US defines populations in relation to Optimum Sustainable Population. Populations that are not at Optimum Sustainable Population are those below their MNPL, or below 50–70% of a historical population size representing carrying capacity[68]. To evaluate this, mortality limits for marine mammals are represented using potential biological removal (PBR), which is linked mathematically to the MNPL, specifically to achieve the conservation objective that 95% of simulated populations met two criteria:

- That populations starting at MNPL stayed there or above for 20 years.
- That populations starting at 30% of carrying capacity recovered to at least MNPL over 100 years[69].

Thus, PBR as applied in this case is an appropriate method to determine whether the UoA hinders recovery to favourable conservation status.

In this example, a management agency calculated a PBR of 100 individuals for dolphin A in 2020. To assess SG60, the team would evaluate the likelihood that the UoA-related mortality presented for dolphin A was below this level. The PBR uses a precautionary value for a recovery factor and the assessment was undertaken recently, so the probability that the PBR is consistent with achieving the population objective has a high degree of certainty. However, the team also needs to consider the quality of the UoA-related mortality information. If the average estimate of UoA mortalities of dolphin A is 90 individuals (i.e. close to the PBR limit) over the period 2015–2020, but this estimate is based on very limited fishery-independent information that was then scaled to the UoA level, the team may decide that it is only "likely" (SG60) that the UoA is not hindering recovery. However, if higher-quality estimates of UoA mortalities were provided, despite the number of mortalities being close to the PBR limit, the team may decide that a score of 80 is appropriate.

~~**Example 3: Two EEZs, one with limits and one without, and international agreement with limits**~~

~~In below, EEZ 1 has national limits for the ETP species for fisheries within their EEZ and EEZ 2 does not. However, there is also an international agreement for the ETP species that sets a limit within a specified area. EEZ 1 is a signatory to this agreement and EEZ 2 is not, although both operate in the agreement area. In this case, the assessment team should consider that as there are limits set by the international agreement, the species should be scored in scoring issue (a) for all UoAs, irrespective of whether they are in EEZ 1 or EEZ 2. The limits set by the international agreement should be the ones that the combined impacts of MSC UoAs need to be within, regardless of whether they are within their own separate national limits.~~

Methods for assessing status of the ETP/OOS unit or impact of the UoA

Several methods are available to estimate the status of the ETP/OOS unit, or whether the impact of the UoA(s) would hinder recovery to favourable conservation status. Possible methods include stock assessments or population viability analyses. Examples of other commonly used methods are presented in Table GSA5. The MSC does not advocate the use of one method over another, because each may have pros and cons in a given situation. With all of these methods, the team should consider the appropriateness of the assessment for estimating whether the fishery hinders recovery of the ETP/OOS unit to a level consistent with favourable conservation status, as well as the uncertainty associated with the outcomes.

Table GSA5: Examples of application of methods to estimate impact and associated population objectives

Method /application	**Description**	**Population objective & recovery timeframe (if defined)**	**References**
PBR as used in the US Marine Mammal Protection Act	~~**Figure GSA: Example of ETP distribution in relation to MSC UoAs and two national EEZs, with international agreement for ETP species**~~	PBR is linked mathematically to the achieving above the	Gerrodette and DeMaster, 1990[70]; Wade, 1998[71];

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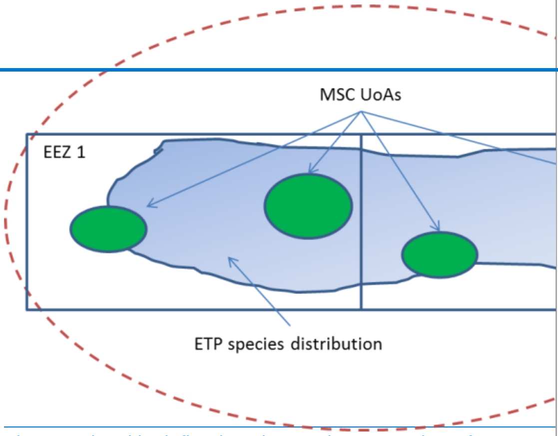
Inserted Cells

Inserted Cells

[68] Gerrodette, T., and DeMaster, D.P (1990) Quantitative determination of optimum sustainable population level. Marine Mammal Science 6: 1–16.
[69] Wade, P.R. (1998) Calculating limits to the allowable human-caused mortality of cetaceans and pinnepeds. Marine Mammal Science 14(1): 1–37.
[70] Gerrodette, T. and DeMaster, D.P. (1990) Quantitative determination of optimum sustainable population level. Marine Mammal Science 6: 1–16.
[71] Wade, P.R. (1998). Calculating limits to the allowable human-caused mortality of cetaceans and pinnepeds. Marine Mammal Science 14(1): 1–37.

Method /application	Description	Population objective & recovery timeframe (if defined)	References
	 The PBR level is defined as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. Equation: $PBR = N_{MIN} 0.5 R_{MAX} F_R$ Where: • N_{MIN}= minimum population estimate of the stock • $0.5R_{MAX}$ = one-half the maximum theoretical or estimated net productivity rate of the stock at a small population size • F_R= recovery factor specified between 0.1 and 1. Current marine mammal stock assessment guidelines set the default recovery factor for endangered species at 0.1 and for depleted and/or threatened or stocks of unknown status at 0.5	MNPL (the lower bound of OSP, equivalent to at least 50% carrying capacity). Specifically, it is set to achieve the conservation objective that 95% of simulated populations met two criteria: 1) that populations starting at MNPL stayed there or above for 20 years or 2) that populations starting	NMFS, 2016[72] MMC, 2022[73]

[72] NMFS (2016) National Marine Fisheries Service Procedure 02-204-01: Guidelines for preparing stock assessment reports pursuant to the 1994 amendments to the Marine Mammal Protection Act. 23 p. Available at: https://media.fisheries.noaa.gov/dam-migration/guidelines_for_preparing_stock_assessment_reports_2016_revision_gamms_iii_opr2.pdf
[73] MMC (2022) MMPA provisions for Managing Fisheries Interactions with Marine Mammals. Available at: https://www.mmc.gov/priority-topics/fisheries-interactions-with-marine-mammals/mmpa-provisions-for-managing-fisheries-interactions-with-marine-mammals.

Method /application	Description	Population objective & recovery timeframe (if defined)	References
		at 30% of carrying capacity recovered to at least MNPL over 100 years. The US Marine Mammal Protection Act (MMPA) also requires preparation of take reduction plans in specified cases. The goals of the take reduction plan are to reduce serious injury and mortality below PBR within 6 months and reduce serious injury and mortality to insignificant	

Method /application	Description	Population objective & recovery timeframe (if defined)	References
		levels within 5 years. This insignificance threshold is defined as less than 10% of PBR, known as the zero-mortality rate goal (ZMRG).	
PBR for albatrosses and petrels with minimal demographic information	PBR level defined as above, but equation differs: $PBR = \tau f \hat{B}$ τ is the coefficient that incorporates species maximum growth rate and species-appropriate multiplier and includes uncertainty in the estimate of the number of breeding pairs. $\hat{B}$ is the estimated number of breeding Pairs. f = recovery factor between 0.1 and 1. Recommended f = 0.1 for threatened and above species, f = 0.3 for near threatened and f = 0.5 for all other species.	Maintain population at or above its MNPL (depending on recovery factor value selected – more precautionary values would lead to maintenance of population at levels closer to carrying capacity).	Dillingham and Fletcher, 2011[74]

[74] Dillingham, P. W., and Fletcher, D. (2011) Potential biological removal of albatrosses and petrels with minimal demographic information. Biological Conservation, 144(6): 1885–1894.

Method /application	Description	Population objective & recovery timeframe (if defined)	References
Reproductive value loss limit (RVLL) as used for marine turtles	$RVLL = b\left(\hat{\lambda}_m - 1\right)\hat{N}'_{\min} f_u,$ $\hat{\lambda}_m - 1$ is estimated maximum annual net population growth rate (the hat notation denotes an estimate) that corresponds to MNPL. $\hat{N}'_{\min}$ is the minimum abundance estimate of the population rescaled by reproductive value. f_u is uncertainty factor selected to address management considerations or potential bias in the other parameters.	Adapted from PBR for life-history characteristics for marine turtles, so used MNPL (at least 0.5K). *K* is carrying capacity	Curtis and Moore, 2013[75]
Fixed % total abundance as used by ASCOBANS for harbour porpoise in the Baltic Sea	Using a basic population model for harbour porpoises and assuming no uncertainty in any parameter, the maximum anthropogenic removals that achieves the ASCOBANS interim objective over an infinite time horizon is 1.7% of the population size in that year. To reach the objective, the intermediate precautionary aim is to reduce bycatch to less than 1% of the best available population estimate.	ASCOBANS interim objective is 80% of K. The overall objective is to minimise (i.e. ultimately reduce to zero) anthropogenic mortality.	UNEP/ASCOBANS, 2020[76]
Removals limit algorithm (RLA), as used	The RLA comprises a simple population model that is fitted to a time series of estimates of abundance to estimate population growth rate and depletion, which are then used in removals calculation. The RLA is tuned through computer simulation to set limits to anthropogenic mortality that allow	The ASCOBANS interim conserva	Hammond et al., 2019[77]

[75] Curtis, K.A, and Moore, J. (2013) Calculating reference points for anthropogenic mortality of marine turtles. Aquatic Conservation: Marine and Freshwater Ecosystems 23. 10.1002/aqc.2308.
[76] UNEP/ASCOBANS (2020) Resolution 8.5. Monitoring and Mitigation of Small Cetacean Bycatch. ASCOBANS 9th Meeting of the Parties, 7–11 September 2020. UNEP/ASCOBANS/Res8.5 (Rev.MOP9).
[77] Hammond, P.S., Paradinas, I., and Smout, S.C. (2019) Development of a Removals Limit Algorithm (RLA) to set limits to anthropogenic mortality of small cetaceans to meet specified conservation objectives, with an

Method /application	Description	Population objective & recovery timeframe (if defined)	References
for small cetaceans in the North Sea (similar to the catch limit algorithm used by the International Whaling Commission's Revised Management Procedure)	the specified conservation objectives to be met. The robustness of the RLA is determined by assessing its performance in a range of computer simulation tests describing uncertainty in our knowledge of population dynamics, the data and the wider environment.	tion objective is used as a basis (i.e. to allow populations to recover to and/or maintain 80% of carrying capacity in the long term). Converting this into a quantitative objective for this study, they used: a population should recover to or be maintained at 80% of carrying capacity, on average, within a 100-year period. In simulation tests, this	

example implementation for bycatch of harbour porpoise in the North Sea. JNCC Report No. 628, JNCC, Peterborough, ISSN 0963-8091.

Method /application	Description	Population objective & recovery timeframe (if defined)	References
		equates to the median population level being at 80% of carrying capacity.	
Population sustainability threshold (PST) in the New Zealand spatially explicit risk assessment (SEFRA) for seabirds	PST is the maximum number of fisheries deaths that a population can sustain while still achieving the defined population objective and has been adapted from the PBR approach. In the SEFRA approach, this value is compared to a modelled estimate of total fishery-related deaths (D). A risk ratio (D/PST) is calculated to give the overall risk ranking. The risk score is expressed as a Bayesian distribution including uncertainty, so a level of confidence that the objective will be achieved can be specified. Equation: PST = 0.5 Φ*rmax*N Where Φ is an adjustment factor estimated by simulation and defined to ensure that impacts equal to PST (R = 1) correspond to a defined population stabilisation objective.	Default objective is that Risk = 1 corresponds to a median population-stabilisation outcome of 75% of the unimpacted level.	Richard et al., 2020[78]; Fisheries New Zealand, 2020[79]; Sharp, 2017[80]
Sustainability assessment for fishing effects (SAFE) as used	The proportion of each species' population that is vulnerable to capture, after accounting for various selectivity effects, is assessed against biological reference points (BRPs) developed from empirical equations that relate life-history traits to natural mortality (M) (e.g. comparisons with maximum sustainable fishing mortality). Not designed to estimate recovery timeframes.	Depends on reference point selected. Can use MSM, which is	Zhou and Griffiths, 2008[81]

[78] Richard, Y., Abraham, E., and Berkenbusch, K. (2020) Assessment of the risk of commercial fisheries to New Zealand seabirds, 2006-07 to 2016-17. New Zealand Aquatic Environment and Biodiversity Report 237. Available at: https://www.mpi.govt.nz/dmsdocument/39407-aebr-237-assessment-of-the-risk-of-commercial-fisheries-to-new-zealand-seabirds-200607-to-201617
[79] Fisheries New Zealand (2020) National Plan of Action – Seabirds 2020. Supporting Document. Available at: https://www.mpi.govt.nz/dmsdocument/40658-National-Plan-Of-Action-Seabirds-2020-supporting-document
[80] Sharp, B.R. (2017) Spatially Explicit Fisheries Risk Assessment (SEFRA): A framework for quantifying and managing incidental commercial fisheries impacts on non-target species. Chapter 3 in: Aquatic Environment and Biodiversity Annual Review (AEBAR) 2017: A summary of environmental interactions between the seafood sector and the aquatic environment. Ministry for Primary Industries, New Zealand, 724 pp.
[81] Zhou, S., and Griffiths, S.P. (2008) Sustainability assessment for fishing effects (SAFE): a new quantitative ecological risk assessment method and its application to elasmobranch bycatch in an Australian trawl fishery. Fish. Res., 91: 56–68.

Method /application	Description	Population objective & recovery timeframe (if defined)	References
for elasmobranch bycatch in an Australian prawn trawl fishery		equivalent to MSY.	
Ecological assessment of the sustainable impacts of fisheries (EASI-Fish) in eastern Pacific Ocean tuna fisheries (examples with elasmobranch, turtle, and dolphin species).	EASI-Fish first estimates the instantaneous fishing mortality rate from the volumetric overlap of multiple fisheries on a species' 3-dimensional spatial distribution, in this case developed using a relative environmental suitability (RES) model based on presence-only data coupled with environmental data for the assessment region. The estimated fishing mortality is then used in length-structured "per-recruit" models to determine the vulnerability status of each species using conventional and precautionary fishing-mortality and spawning-stock-biomass-based BRPs commonly used in stock assessment.	Depends on reference point selected, e.g. F value at MSY (F_{msy})	Griffiths et al., 2019[82]

Note on the Use of IUCN Red List and Favourable Conservation Status

The IUCN Red List provides threat statuses for species or populations. The team should not use these threat statuses as an automatic evaluation of whether an ETP/OOS unit is currently at a level consistent with favourable conservation status. The IUCN Red List was developed to identify risk of extinction, so it is possible that an ETP/OOS unit listed as Least Concern may not be at favourable conservation status but has not yet depleted to a level or at a rate that would trigger a higher threat categorisation on the IUCN Red List. In addition, the IUCN Red List may not provide a threat

[82] Griffiths, S.P., Kesner-Reyes, K., Garilao, C., Duffy, L.M. and Roman, M.H. (2019) Ecological Assessment of the Sustainable Impacts of Fisheries (EASI-Fish): a flexible vulnerability assessment approach to quantify the cumulative impacts of fishing in data-limited settings. Marine Ecology Progress Series, 625, 89–113.

evaluation at the same level as the ETP/OOS unit; for example, if it provides a threat status for a species but not the specific population impacted by the UoA.

The IUCN Red List assessment may provide useful information on the current population size and trends for species, where these have been updated regularly, as well as links to relevant risk assessments. However, the intent of the MSC requirements is that there is a specific quantitative analysis on the status of the ETP unit with respect to favourable conservation status or the potential for any mortalities from the UoA(s) to hinder recovery to this level.

GSA3.8.3 Intentional harassment or intentional killing of marine mammals ▲

The targeted exploitation of marine mammals is not within scope of the MSC Fisheries Standard. However, its understood that some fisheries intentionally kill or harass marine mammals whilst targeting species in the scope of the MSC Fisheries Standard. The intent of SA3.8.3 is to ensure that for any UoAs in which intentional harassment or intentional killing of marine mammals is an integral part of the fishing operation (activity or practice), such activity has not hindered recovery to favourable conservation status.

The MSC recognises that there are challenges in clearly demonstrating that a UoA has not hindered recovery when considering all potential sources of impact associated with intentional harassment or intentional killing of marine mammals (including observed mortality, unobserved/cryptic mortality, sub-lethal population-level impacts, or any other impact that may affect population status).

Consequently, this requirement focuses on evaluating outcome status in a more precautionary manner by requiring a high degree of certainty that recovery is not necessary or has already occurred.

The team should interpret “high degree of certainty” as a probability level that is equal to or greater than the 95th percentile, consistent with the SG100 level in Table SA8.

GSA3.8.3.2–3.8.3.4 ▲

An example of the intentional harassment or intentional killing of marine mammals as an integral part of the fishing operation is the intentional pursuit and encirclement of marine mammals with fishing gear (e.g. purse seine nets) or vessels.

The team should not consider the following examples of intentional harassment or intentional killing of marine mammals as being an integral part of the fishing operation:

- The use of non-lethal deterrent devices or actions aimed at deterring marine mammals from damaging catch or gear, or otherwise deployed to reduce entanglement risk, except where:
    - It is demonstrated that their continued deployment/use causes serious injury or directly compromises marine mammal survival.
    - Firearms are used to deter or kill marine mammals. These are lethal devices and if used as an integral part of the UoA fishing operation, should trigger the application SA3.8.3

~~GSA3.10.3~~

~~Guidance for clause applies here also, noting that where those clauses refer to mortality of unwanted catch they apply here to mortality of ETP species.~~

~~GSA3.11 ETP species management strategy PI (PI 2.3.2)~~

~~Guidance applies here also.~~

~~GSA3.11.1~~

~~At all three scoring guideposts in scoring issue (a), teams are required to consider the need to minimise mortality. At SG80 and SG100, however, the scoring issue refers to the need for the strategy or comprehensive strategy to manage the UoA's impact on ETP species (see definitions in and associated guidance in GSA3).~~

~~In addition to minimising mortality, the teams should consider the strategy/ comprehensive strategy's ability to manage indirect impacts here, in line with scoring in the Outcome PI 'indirect effects' scoring issue.~~

~~GSA3.11.3~~

~~Guidance for clauses and its sub-clauses applies here, noting that in primary and secondary PIs the aim is to minimise UoA-related mortality of unwanted catch but in ETP the aim is to minimise UoA-related mortality of all ETP species.~~

~~GSA3.12 ETP species information / monitoring PI (PI 2.3.3)~~

~~Guidance applies here also, except for guidance on specific scoring issues (a) and (b) as there is no 'main' distinction for ETP.~~

~~GSA3.13 Habitats outcome PI (PI 2.4.1)~~

~~Use of UoA~~

~~In PI 2.4.1, the impact of the UoA itself is assessed. Thus, the "status" of the habitat, in terms of its current state and likely recoverability (see), should be determined with respect to the impacts of the UoA rather than all fishing impacts.~~

~~Treatment of vulnerable marine ecosystems~~

~~The definition of serious and irreversible harm (see , , and the) allows for there to be some continued fishing on all habitats. Even UoAs operating in very slow-recovering habitats, for instance vulnerable marine ecosystems (VMEs), may be managed so that the impact from fishing continues but is minor and tolerable.~~

~~The MSC requirement is that habitats are not impacted beyond the point at which they could recover to 80% (or more) of their unimpacted level within 5-20 years. VMEs are generally habitats with slow recovery rates that are unlikely to be able to recover within 5-20 years from states below 80% of their unimpacted levels. For this reason and due to the fact that VMEs are afforded specific consideration in international and customary law (the UNGA resolutions and FAO Guidelines), VMEs should not be reduced to a state below 80% of the unimpacted level.~~

~~Although an individual UoA may achieve an 80 score in the outcome PI 2.4.1 when fishing on a VME because its individual impact is unlikely to cause the VME serious and irreversible harm, the MSC recognises the unique value of VMEs and the possibility that all fishing (all MSC UoAs plus other fisheries – see , the subclauses, and the) may nevertheless be causing more than 20% damage to VMEs. Therefore, unless there is a comprehensive management plan (see and the) covering all fishing impacts on the VME, under the management PI 2.4.2, MSC requires that UoAs avoid VMEs even if they score higher than 80 on the outcome PI 2.4.1.~~

~~GSA3.13.1 Habitat structure and function~~

~~The habitat's structure and function (i.e., the ecosystem services that it provides), including abundance and biological diversity, is of concern in an MSC assessment. Thus, an assessment should look not only at the impact on the habitat but also the habitat's delivery of ecosystem services. For instance, if only a part of the habitat is affected by fishing but this part delivers the greatest ecosystem services, then this should be taken into account in the assessment. Particular habitats may determine the carrying capacity of the target, primary, secondary, and/or ETP species, and a mosaic of habitats may be necessary for some species to complete their life cycle or determine the overall composition of the ecological community.~~

~~GSA3.13.1.1 Use of the RBF~~

~~Teams may score the outcome PI 2.4.1 for data-rich UoAs using the default assessment tree or for data-deficient UoAs using the alternative Consequence Spatial Analysis (CSA) (Annex PF).~~

~~When using the default assessment tree to score the PI, the UoA should have information of sufficient quality to undertake an analytical approach effectively. First, the CSA defines a habitat using the SGB nomenclature (; see also Table GSA6).~~

~~Second, the CSA utilises inferences and proxies for the habitats' and gears' attributes to extrapolate the risk to habitats from the fishing gear.~~

~~The default assessment tree requires knowledge of the likelihood that the UoA does not cause serious or irreversible harm to the habitat, meaning that the following questions must be answered:~~

~~SC54 What habitats are encountered by the UoA?~~

~~SC55 What are the impacts of the gear(s) on those habitats?~~

~~To answer the first question in a non-data-deficient situation, the team should have UoA-specific (quantitative) SGB information and/or data, such as detailed habitat mapping for the relevant area (as defined in). To answer the second question in a non-data-deficient situation, the team should have gear-specific (quantitative) impact information and/or data, such as fishing-effort mapping with knowledge of regeneration ability that is specific to the UoA and/or habitat-specific research results that examine the impact of the gear(s) on habitats in the relevant area.~~

~~If the available information is not UoA specific but more generic (qualitative) relating to the general area in which the UoA operates or to a broader region, the CSA will likely be needed to score the outcome PI effectively. Finally, if the type and quality of information is uncertain, the CAB would need to rationalise whether or not the CSA is needed.~~

~~GSA3.13.2 Habitat characteristics~~

~~Usually habitats impacted by the UoA are benthic habitats (i.e., associated with or occurring on the bottom) rather than pelagic habitats (i.e., near the surface or in the open water column), but impacts on the biotic aspects of pelagic habitats could be considered.~~

~~When determining which benthic habitats are impacted by the UoA, the team should consider habitats on the basis of the substratum, geomorphology, and (characteristic) biota (SGB) characteristics.~~

~~provides examples of what constitute the SGB characteristics. For example, one habitat may be defined as fine – low relief – no fauna or flora. (Note that this nomenclature is also used within the CSA, which is used to assess habitat impacts in data-deficient situations.) It is not the intent that the team creates a table of this nature for the UoA's habitats. Rather, the intent is that the team uses this table to categorise the habitats affected by the UoA prior to assessment.~~

~~**Table GSA: SGB habitat nomenclature (modified from Williams et al., 2011[83])**~~

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- The unwanted catch of marine mammals, as this outcome is normally considered to be unintentional.

~~Substratum~~	~~Geomorphology~~	~~Biota~~
~~Fine (mud, sand)~~ ~~SC55.1.1 Mud (<0.1 mm particle diameter)~~ ~~SC55.1.2 Fine sediments(0.1-1 mm)~~ ~~SC55.1.3 Coarse sediments (1-4 mm)~~	~~Flat~~ ~~SC55.1.4 Simple surface structure~~ ~~SC55.1.5 Unrippled/flat~~ ~~SC55.1.6 Current rippled/directed scour~~ ~~SC55.1.7 Wave rippled~~	~~Large erect~~ ~~Dominated by:~~ ~~SC55.1.8 Large and/or erect sponges~~ ~~SC55.1.9 Solitary large sponges~~ ~~SC55.1.10 Solitary sedentary/sessile epifauna (e.g., ascidians/bryozoans)~~ ~~SC55.1.11 Crinoids~~ ~~SC55.1.12 Corals~~ ~~SC55.1.13 Mixed large or erect communities~~
~~Medium~~ ~~SC55.1.14 Gravel/pebble (4-60 mm)~~	~~Low relief~~ ~~SC55.1.15 Irregular topography with mounds and depressions~~ ~~SC55.1.16 Rough surface structure~~ ~~SC55.1.17 Debris flow/rubble banks~~	~~Small erect/encrusting/burrowing~~ ~~Dominated by:~~ ~~SC55.1.18 Small, low-encrusting sponges~~ ~~SC55.1.19 Small, low-standing sponges~~ ~~SC55.1.20 Consolidated (e.g., mussels) and unconsolidated bivalve beds (e.g., scallops)~~ ~~SC55.1.21 Mixed small/low-encrusting invertebrate communities~~ ~~SC55.1.22 Infaunal bioturbators~~
~~Large~~ ~~SC55.1.23 Cobble/boulders (60 mm - 3 m)~~ ~~SC55.1.24 Igneous, metamorphic, or sedimentary rock (>3 m)~~	~~Outcrop~~ ~~SC55.1.25 Subcrop (rock protrusions from surrounding sediment <1 m)~~ ~~SC55.1.26 Low-relief outcrop (<1 m)~~	~~No fauna or flora~~ ~~SC55.1.27 No apparent epifauna, infauna, or flora~~
Example: Application of SA3.8.3 for 2.2.1 scoring issue (a) Fishery A is a purse seine fishery that targets a species of tuna. The fishery comprises 18 vessels, with 2 UoAs. UoA1 targets free school	~~High relief~~ ~~High outcrop (protrusion of consolidated substrate >1 m)~~ ~~Rugged surface structure~~	~~Flora~~ ~~Dominated by:~~ ~~Seagrass species~~

Deleted Cells

Deleted Cells

83 83 Williams, A., Dowdney, J., Smith, A.D.M., Hobday, A.J., and Fuller, M., 2011. *Evaluating impacts of fishing on benthic habitats: A risk assessment framework applied to Australian fisheries*. Fisheries Research 112(3):154-167.

(unassociated) sets, and UoA2 targets FAD sets. The fishery interacts with 10 ETP/OOS units, 2 of which are marine mammals (a species of baleen whale and a species of dolphin). The team considered whether there is evidence that the fisheries interactions with the 2 marine mammal ETP/OOS units involved the intentional harassment or intentional killing of that unit as an integral part of the fishing operation, as per the definitions set out in SA3.8.3.2–SA3.8.3.4. The team found that the dolphin interactions were incidental bycatch recorded in unassociated sets. Therefore, the team did not trigger the application of SA3.8.3 to score the direct effects of the dolphin ETP/OOS unit. The baleen whale interactions had occurred where the fishery had set on (encircled) the whale. Available observer data highlighted that these whale sets were an intended part of the fishery's operations, comprising 3% of sets in UoA2. This part of the fishery operation was determined to be a form of intentional harassment and determined to be an integral part of the fishing operation. As such, the team triggered the application of SA3.8.3 for UoA2 to score the impacted baleen whale ETP/OOS unit at the SG80 level. The team assessed the available information about the proportion of whales released alive, the scale and intensity of the fishery and findings from several studies on the post-capture survival rates of the species. In combination with studies on the status of the species, the team used this information to determine that UoA2 is unlikely to hinder recovery of the ETP/OOS unit to favourable conservation status. The fishery therefore met SG60 for scoring issue a. However, there was insufficient information available to enable the team to determine the population status of		

the baleen whale ETP/OOS unit was at a level consistent with favourable conservation status with a high degree of certainty as required by SA3.8.3 to meet SG80 for this unit. Therefore, for UoA2, the baleen whale ETP/OOS unit did not meet SG80 for scoring issue a. The team assessed the other 9 ETP/OOS units that did not trigger SA3.8.3. These all met SG60 and met or exceeded SG80 for the direct effects scoring issue (PI 2.2.1 (a)). In the scoring rationale, the team included explanations for each unit. The team applied the scoring element approach set out in FCP v3.0 7.15~~Solid reef of biogenic origin~~ ~~SC55.1.28 Biogenic (substratum of biogenic calcium carbonate)~~ ~~Depositions of skeletal material forming coral reef base~~. As only one of 10 scoring elements failed to achieve SG80, the score for 2.2.1 (a) was 75. The team set a condition against PI 2.2.1 for the fishery to verify the status of the ETP/OOS unit using a quantitative estimate of the population size. Within the Client Action Plan, the client set out that they will contract a university to undertake a study of the population of the baleen whale ETP/OOS unit with results to be made publicly available.		

GSA3.9 ETP/OOS unit management strategy PI (PI 2.2.2) ▲

The MSC's intent for this PI is that management measures or strategies are implemented that deliver the ETP/OOS outcome SG80 level and minimise mortalities of the ETP/OOS unit.

Management measures or strategies should be designed to achieve both of these objectives and should have been implemented "on the water".

Scoring issue (a) – Management strategy ▲

"If necessary"

If the UoA has no, or "negligible" (as defined in SA3.8.2.5) impact on this component, the team does not need to score scoring issue (a) for SG60 and SG80.

However, there is no “if necessary” clause in SG100. For the team to score SG100 on this component, a comprehensive strategy should be in place for the UoA for ETP/OOS species since incidental impacts could still occur and management needs to be responsive.

Measures expected to minimise mortality

Measures that are expected to minimise mortality are defined in this requirement. The assessment team should consider:

- How the measures have been selected.
- Whether they represent “best practice” when it comes to minimising mortality or have been shown to be effective at minimising mortality in the UoA or similar fisheries, i.e. to the extent practicable.

Where “best practice” has been established as achieving the lowest UoA mortality possible whilst not negatively affecting the mortality of other non-target species or unduly affecting targeting catch rates (a small decrease in target catch may be expected, e.g. 10%), the expectation is that these measures are implemented in the fishery in order to meet at least the SG60 level.

Where “best practice” is established

“Best practice” may already be established by national management agencies or in international fora. The MSC’s intent is that where “best practice” measures exist and at least one “best practice” measure is implemented in the fishery, the measures expected to minimise mortality part of PI 2.2.2 scoring issue (a) would be met at the SG60 level. To achieve SG80 or higher for this part of PI 2.2.2 scoring issue (a), two or more “best practice” measures should be applied (unless only one “best practice” measure exists). In this context it is also the MSC’s intent that any relevant legally mandated best-practice measures for the UoA should be complied with. This compliance aspect is considered in PI 3.2.3 scoring issue (d) as per SA4.9.2.

The FAO produces Best Practice Technical Guidelines for bycatch of birds, turtles, and mammals, although these are not updated regularly[84]. Also, the ACAP reviews and identifies "best practice" mitigation measures for seabird bycatch in a number of gear types. In order to be considered "best practice", a number of criteria are required to be met including:

- Individual fishing technologies and techniques should be selected from those shown by experimental research to significantly reduce the rate of seabird incidental mortality to the lowest achievable levels.
- Fishing technologies and techniques, or a combination thereof, should have clear and proven specifications and minimum performance standards for their deployment and use.
- Fishing technologies and techniques should be demonstrated to be practical, cost effective and widely available.
- Fishing technologies and techniques should, to the extent practicable, maintain catch rates of target species.
- Fishing technologies and techniques should, to the extent practicable, not increase the bycatch of other taxa.
- Minimum performance standards and methods of ensuring compliance should be provided for fishing technologies and techniques and should be clearly specified in fishery regulations[85].

Where "best practice" is not clearly established

For some species/gear interactions, there are no established "best practice" measures. In these cases, the measures applied in the fishery should be selected from those that are shown to reduce mortality rates to the lowest practicable levels in the UoA or similar fisheries.

For example, when pingers are used correctly (i.e. applied across the entire UoA and adequately monitored for placement and functioning), they may be considered to minimise harbour porpoise bycatch in gillnets. However, pingers could not be considered to minimise common dolphin bycatch in gillnets because there is no clear evidence for their consistent effectiveness. For common dolphins, the UoA would need to have implemented other measures that are expected minimise mortality, e.g. based on measures that have been shown to be successful elsewhere or through development of new measures tested in the UoA itself in order to meet the SG60 requirement.

Scoring issue (b) – management strategy effectiveness ▲

The MSC's intent is that the UoA needs to provide evidence that it is progressing towards achieving the objectives of minimising mortality of the ETP/OOS unit. There are four possible ways of demonstrating this:

1. There is evidence that the UoA has zero mortalities (including unobserved) of the ETP/OOS unit.

~~SD1~~ 2. The "negligible" requirements in SA3.8.2.5

[84] FAO (2009) Fishing operations. 2. Best practices to reduce incidental catch of seabirds in capture fisheries. FAO Technical Guidelines for Responsible Fisheries: No. 1, Suppl. 2. Rome: FAO. 49pp.
[85] https://www.acap.aq/bycatch-mitigation/mitigation-advice

~~SD2 GSA3.13.3 Main habitats~~

~~The determination of commonly encountered habitats and VMEs (both of which are treated as "main" habitats in the information PI 2.4.3) should be supported by evidence provided by the UoA to the assessment team. If a habitat's designation is uncertain, the team should take the precautionary approach, identify uncertain habitats as commonly encountered or VMEs as appropriate, and then most likely use the CSA (Annex PF).~~

~~GSA3.13.3.1 Commonly encountered~~

~~Commonly encountered habitats would likely include those that the target species favours, that the UoA's gear is designed to exploit, and/or that make up a reasonable portion of the UoA's fishing area.~~

~~GSA3.13.3.2 VME~~ ~~VMEs have one or more of the following characteristic, as defined in paragraph 42 of the FAO Guidelines:~~

- ~~SC56 Uniqueness or rarity – an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by similar areas or ecosystems~~
- ~~SC57 Functional significance of the habitat – discrete areas or habitats that are necessary for survival, function, spawning/reproduction, or recovery of fish stocks; for particular life-history stages (e.g., nursery grounds, rearing areas); or for ETP species~~
- ~~SC58 Fragility – an ecosystem that is highly susceptible to degradation by anthropogenic activities~~
- ~~SC59 Life-history traits of component species that make recovery difficult – ecosystems that are characterised by populations or assemblages of species that are slow growing, are slow maturing, have low or unpredictable recruitment, and/or are long lived~~
- ~~SC60 Structural complexity – an ecosystem that is characterised by complex physical structures created by significant concentrations of biotic and abiotic features~~

~~The FAO Guidelines' Annex identifies the following species groups, communities, and habitat-forming species that may form VMEs and may be indicative of the occurrence of VMEs:~~

- ~~SC61 Certain coldwater corals and hydroids (e.g., reef builders and coral forest, such as stony corals, alcyonaceans, gorgonians, black corals, and hydrocorals)~~
- ~~SC62 Some types of sponge-dominated communities~~
- ~~SC63 Communities composed of dense emergent fauna where large sessile protozoans and invertebrates (e.g., hydroids and bryozoans) form an important structural component of habitat~~
- ~~SC64 Seep and vent communities comprised of invertebrate and microbial species found nowhere else (i.e., endemic)~~

~~The FAO Guidelines' Annex also lists various geographical features that are often associated with these communities.~~

~~The MSC's intent is that, even though the FAO Guidelines were written for deep-sea fisheries, the Guidelines' VME characteristics also apply to non-deep-sea fisheries. Further, when the FAO Guidelines are applied in shallow, inshore waters, the definition of VME could include other species groups and communities (e.g., seagrass beds, complex kelp-dominated habitats, biogenic reefs).~~

~~SD3 GSA3.13.4 Serious or irreversible harm~~

~~The MSC's definition of "serious or irreversible harm" is very similar to the FAO Guidelines'[86] definition of "significant adverse impacts". A key consideration in both definitions is the concept of reversibility or recoverability. Both definitions consider the time frame required for a habitat to recover. Damage requiring 5-20 years (or more) from which to recover should be considered "serious or irreversible" or "significantly adverse", consistent with FAO (2009).~~

~~The MSC defines "recovery" as recovering to at least 80% of the level to which the habitat would eventually recover in the absence of all fishing, considering the existing environmental and anthropomorphic conditions – a hypothetical climax state under existing conditions. This is often referred to in the text as an "unimpacted" level.~~

~~For VMEs the pre-existing historical extent of the habitat should be considered in the calculation of the current state of the VME in relation to unimpacted levels if the historical extent is known and if recovery in those areas of historical extent would be possible. If the habitat has been altered completely so that the pre-existing state does not exist, recovery of that state is not expected; however if recovery of the pre-existing state is possible, this should be considered.~~

apply.

3. There is evidence of demonstrable reductions in the mortality of the ETP/OOS unit over time.
4. The UoA may not have evidence of demonstrable reduction but it:
    a. Is "highly unlikely" to be hindering recovery of the ETP/OOS unit to favourable conservation status (demonstrated through meeting SG80 in PI 2.2.1 (a) or scoring 80 or above when the PSA is applied.
    b. Has a "comprehensive strategy" and has applied all existing "best practice" measures expected to minimise mortality (demonstrated through meeting SG100 in PI 2.2.2 (a).

Where none of these four criteria apply, the MSC's intent is that the UoA does not meet SG80 for this scoring issue.

For demonstrable reduction, a specific magnitude of reduction is not specified. However, the MSC's intent is that real, on-the-water progress towards reducing the mortality rate needs to be demonstrated by the UoA in order to meet SG80. Overall declining trends in ETP/OOS unit mortalities over a five-year period, for example, could be taken as evidence of demonstrable reductions, even if there may be some stochasticity in ETP/OOS unit mortalities over this time. However, the team should also consider the reasons for any reductions, including whether the reductions may be due to a decline in the abundance of the ETP/OOS unit rather than the implementation of management measures to minimise mortality. The MSC's intent is that if the demonstrable reductions are likely to be caused by declines in abundance rather than the measures implemented by the fishery, this would not be considered evidence of demonstrable reductions and SG80 would not be met.

Example~~:~~

Reductions in UoA-related mortality are demonstrated in longline fishery 1, which interacts with 3 seabird units: A, B, and C. Bird-scaring (tori) lines and offal-discharge practices were introduced as "best practice" mitigation measures in the year 2000. In 2005, the bycatch rate for all 3 seabirds had reduced from 0.2 birds/1,000 hooks to < 0.05 birds/1,000 hooks. The population sizes for seabird units A, B, and C had remained relatively stable during this period and the number of birds following the vessels remained consistent. However, the number of mortalities had demonstrably declined. Fishery 1 would meet at least SG80 for PI 2.2.2 scoring issue (b).~~Off the north coast of Australia, several shelf-break VME areas have been damaged but are still there in reduced form and would recover if left undisturbed for several years. Therefore, these areas should be considered within the scope of the habitat's recovery.~~

[86] Food and Agriculture Organization of the United Nations, 2009. *International guidelines for the management of deep-sea fisheries in the high seas*. FAO, Rome.

Scoring issue (c) – "Review" of "alternative measures" ▲

Where mortalities are above the defined "negligible" level, a review of "alternative measures" by the UoA or related management agency is required. The MSC's intent is that even when implementing "best practice", current measures may not allow these levels to be reached; therefore, regular (at least 5-yearly) reviews of "alternative measures" are needed. There is no 60 level because it is assumed that at least one such review took place in order for the current measures to minimise mortality to be implemented. At SG80, if the additional "alternative measures" are shown to be more effective than current measures, these should be implemented unless they:

- Negatively affect crew safety, or
- Unduly affect target species catch (i.e. more than 10%), or
- Negatively impact on other species or habitats.

For example, in the longline fishery 1 example above, bird-scaring lines have led to a demonstrable reduction in bird mortalities between the years 2000 and 2005. However, from 2005 to 2020 the level of mortality has remained around 0.05 birds/1,000 hooks. In real terms, this represents hundreds of individual mortalities of seabird units A, B, and C annually. There are therefore mortalities above the "negligible" level of these ETP/OOS units and the assessment team would need to assess scoring issue (c). The UoA would need to demonstrate whether any other "alternative measures" had been considered and whether they had been implemented. If not implemented, justification for not doing so, in relation to the scoring requirement, would be required in order to meet SG80.

In the longline fishery 1 example, night-setting was reviewed in 2018 as an "alternative measure". It was demonstrated to reduce the mortality of seabird units A and B but increase the mortality of non-target fish species and seabird unit C. This measure was therefore not implemented. This would demonstrate that SG80 was met. However, if this review did not also consider "best practice" measures for seabirds and longlines, such as forms of line weighting, it would not meet SG80.

GSA3.11 Habitats outcome PI (PI 2.3.1) ▲

Treatment of impact not caused by the UoA

Only the impact of the UoA itself is used to determine the status of the habitat. However, if non-UoA anthropogenic activities (or natural events) have had an impact on the habitat, the team should assess the UoA's relative impact as per GSA3.2.

Treatment of "more" sensitive habitats

An individual UoA may achieve an SG80 score in the outcome PI 2.3.1 when fishing on a "more" sensitive habitat because its individual impact is unlikely to cause the "more" sensitive habitat serious and irreversible harm. However, the MSC recognises the unique value of "more" sensitive habitats and the possibility that all fishing, where all fishing includes all MSC UoAs plus other fisheries, may nevertheless be causing "more" sensitive habitats to fall below 80% of their unimpacted state. Therefore, unless there is a comprehensive management plan covering all fishing impacts on the "more" sensitive habitat, under the management PI 2.3.2 (see SA3.12.1.1), the MSC requires that UoAs avoid "more" sensitive habitats even if they score higher than 80 on the outcome PI 2.3.1.

GSA3.11.1 Habitat structure and function ▲

The team's assessment should take into account both the impact on the habitat and the habitat's delivery of ecosystem services. For example, if only a part of the habitat is affected by fishing but this part delivers the greatest ecosystem services, the team should take this into account in the assessment.

GSA3.11.2 Habitat characteristics ▲

Usually, habitats impacted by the UoA are benthic habitats (i.e. are associated with, or occur on, the bottom) rather than pelagic habitats, which are near the surface or in the open water column. However, the team may consider impacts on:

- The biotic aspects of pelagic habitats.
- Habitats that the gear may accidentally come into contact with if gear loss or malfunction were to occur. This is required to meet SG100 under the management PI 2.3.2 (SA3.12.1.2.b)

The team may use Box GSA8 to categorise the habitats encountered by the UoA, according to their SGB status.

Box GSA8: SGB habitat nomenclature[87]

Substratum

Fine (mud, sand)

- Mud
  (< 0.1mm particle diameter)
- Fine sediments
  (0.1–1mm)
- Coarse sediments
  (1–4mm)

Medium

- Gravel/pebble (4–60mm)

Large

- Cobble/boulders (60mm–3m)
- Igneous, metamorphic, or sedimentary rock (> 3m)

Solid reef of biogenic origin

- Biogenic (substratum of biogenic calcium carbonate)
- Depositions of skeletal material forming coral reef base

Geomorphology

Flat

- Simple surface structure
- Unrippled/flat
- Current rippled/directed scour
- Wave rippled

Low relief

- Irregular topography with mounds and depressions
- Rough surface structure
- Debris flow/rubble banks

Outcrop

[87] Modified from Williams, A., Dowdney, J., Smith, A.D.M., Hobday, A.J., and Fuller, M. (2011) *Evaluating impacts of fishing on benthic habitats: A risk assessment framework applied to Australian fisheries.* Fisheries Research 112(3):154–167.

- Subcrop (rock protrusions from surrounding sediment (<1m))
- Low-relief outcrop (<1m)

High relief

- High outcrop (protrusion of consolidated substrate (>1m))
- Rugged surface structure

Biota

Large erect, dominated by:

- Large and/or erect sponges
- Solitary large sponges
- Solitary sedentary/sessile epifauna (e.g. ascidians/bryozoans)
- Crinoids
- Corals
- Mixed large or erect communities

Small erect/encrusting/burrowing, dominated by:

- Small, low-encrusting sponges
- Small, low-standing sponges
- Consolidated bivalve beds (e.g. mussels)
- Unconsolidated bivalve beds (e.g. scallops)
- Mixed small/low-encrusting invertebrate communities
- Infaunal bioturbators

No fauna or flora

- No apparent epifauna, infauna, or flora

Flora, dominated by:

- Seagrass species

GSA3.11.3 ▲

The team should use a precautionary approach when determining whether a habitat impacted by a UoA is "less" sensitive or "more" sensitive.

Unimpacted habitat structure and function

Unimpacted habitat structure and function (i.e. unimpacted habitat state) is used in determining whether habitats are "less" or "more" sensitive. The team should therefore consider the following:

For habitats that have been afforded protection by a competent authority:

- If the habitat was already impacted by any fishery at the time it was afforded protection, and all the impact occurred after 2006, the unimpacted state is the idealised expected recovery state.
- If the habitat was already impacted by any fishery at the time it was afforded protection, and all the impact occurred before 2006, the unimpacted state is the current state of the habitat at the time it was afforded protection.
- If the habitat was not impacted at the time it was afforded protection, the unimpacted state is the current state of the habitat at the time it was afforded protection.

The idealised expected recovery state is the unimpacted state as defined in a recovery plan, or assumed from modelling predictions, or comparisons with historical data and/or adjacent habitats.

For habitats that have not been afforded protection by a competent authority, the unimpacted state is that which is:

- Defined in a recovery plan, or
- As assumed from:
  - Modelling predictions, or
  - Comparisons with historical data, or
  - Adjacent or comparable habitats.

If the unimpacted state has not been defined, and cannot be assumed from available information or data, it should be considered as the state of the habitat in year 2006. The year 2006 is the date of the UNGA Resolution 61/105[88]. In this instance, there is an acceptance that the UoA should not be penalised for historical damage (i.e. damage prior to 2006).

Habitat recovery

Habitat recovery relates to the whole habitat, not just some species within the habitat. Likelihood of recovery should take into account the likely speed of recovery, as well as the certainty of recovery of a habitat.

The MSC has nominated the 80% level as a reasonable point at which to expect most of the habitat's structure and function (including abundance and biological diversity) to have been restored, taking into consideration the likely logistic population growth of habitat-forming organisms.

The team may consider using the Benthic Impacts Tool (MSC Fisheries Standard Toolbox Tool C~~Likelihood of~~) to help determine recovery ~~should take into account the likely speed~~rates of habitats, and therefore help inform scoring of ~~recovery~~PI 2.3.1 (a).

GSA3.11.3.1 FAO VME ▲ ~~higher score for recovery within 1 year, for instance, than within 20 years)~~

FAO Vulnerable Marine Ecosystems (VMEs) are habitats that have been designated as ~~well~~such by a competent authority, based on the VME criteria as ~~the certainty~~defined in the International Guidelines for the Management of Deep-sea Fisheries in the High Seas[89].

GSA3.11.4 "Serious or irreversible harm" to "less" sensitive habitats ▲ ~~recovery of~~

The hypothetical climax state is the state to which a habitat would eventually recover to (in the absence of all fishing), when considering existing environmental and anthropogenic conditions. Climax states are generally considered to be stable, and towards the end of ecological succession.

"Less" sensitive habitats should not be retrospectively classified as "more" sensitive habitats if unable to recover to at least 80% of their hypothetical climax state within 20 years if fishing were to cease entirely.

[88] United Nations General Assembly (2006) Resolution 61/105: Sustainable fisheries, including through the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and related instruments (8 December 2006). A/UNGA/RES/61/105.

[89] Food and Agriculture Organization of the United Nations (2009) International guidelines for the management of deep-sea fisheries in the high seas. FAO, Rome.

GSA3.11.5 "Serious or irreversible harm" to "more" sensitive habitats ▲

In the case of "more" sensitive habitats, "serious or irreversible harm" is a reduction in habitat structure and function below 80% of the unimpacted state. The unimpacted state is as defined in GSA3.11.3.

The MSC's intent is to not hold UoAs responsible for historical damage to "more" sensitive habitats unless they were responsible for such impact. Therefore, if the habitat is currently below 80% of its unimpacted state, and the impact was clearly caused by other MSC UoAs, or non-MSC fisheries, then the UoA would meet at least SG60, However, avoidance of such habitats would be required under PI 2.3.2 until the habitat has recovered to at least 80% of its unimpacted state, and there is a comprehensive plan showing that all fishing will allow the habitat to recover to, and maintain, at least 80% of its unimpacted state. If the UoA was responsible for the impact, it would fail to meet SG60 unless it undertook immediate action to avoid the habitat.

The team should not consider minimal damage that occurs to an FAO-designated VME when a move-on rule is triggered as "serious or irreversible harm", even when the habitat is below 80% of its unimpacted level.

The team may consider the pre-existing historical extent of "more" sensitive habitats if:

- The historical extent is known.
- Recovery in those areas of historical extent would be possible.

Example~~:~~

Off the north coast of Australia, several shelf-break VME areas have been damaged but are still there in reduced form and would recover if left undisturbed for several years. ~~and provide some examples of recovery rates and resulting habitat status in some hypothetical situations. For each of these examples, it is assumed that the UoA is the only one impacting the habitat (i.e., all fishing impacts on the habitat are covered by the one UoA). If multiple UoAs were impacting the habitat, the individual UoAs' impacts would be less.~~

Therefore, the team should consider these areas within the scope of the habitat's recovery.~~Example A (dotted line) represents the current status (in relation to unimpacted status) of the habitat impacted by a moderate-impacting UoA (e.g., demersal longline). This UoA impacts 60% of the entire distribution of this habitat type (shown in). It also fully protects 40% of the habitat type inside a closed area (not shown in figure). Because the gear is moderate impacting, the habitat status in the fished parts of the habitat is 50% of the unimpacted level. The recovery rate for this habitat type is fast, and it is likely that the overall status of the habitat would rise above 80% of the unimpacted level in around 5 years. Combined with the unimpacted status of the habitat in the closed area, this means that the habitat would recover to 80% of the unimpacted level in 5 years, achieving at least an 80 score and potentially a higher score if there is greater confidence supported by evidence for this expected recovery.~~

~~Example B (dotted and dashed line) represents the status of the habitat impacted by a high-impacting UoA (e.g., demersal trawl) that protects 40% of the habitat type and fishes the other 60%. Again, the status of the impacted habitat area is shown in the figure but not the status of the habitat within the protected area. Since this is a high-impacting gear, the habitat has been degraded in the fished areas to 10% of the unimpacted level. This habitat is not very resilient, barely reaching the 80% level in 20 years and not reaching it in 5 years. Across both the closed area and the impacted areas, the UoA would be unlikely to be causing serious or irreversible harm but with less confidence than Example A (possibly achieving a 60 score in this case).~~

~~Example C (solid line) represents the same high-impacting UoA that protects 40% of a slow-growing habitat and fishes the other 60% of that habitat, the latter which has been degraded to 10% of the unimpacted level. This habitat has a very slow recovery rate and will take longer than 20 years to reach the 80% unimpacted level. This UoA is, therefore, causing serious or irreversible harm to this habitat and would not be likely to score a 60~~

Examples of recovery rates and resulting habitat

Figure and Table provide some examples of recovery rates and resulting habitat status in some hypothetical situations. For each of these examples, it is assumed that the UoA is the only one impacting the habitat; therefore, all fishing impacts on the habitat are covered by 1 UoA. If multiple UoAs were impacting the habitat, the impact of individual UoAs would be less.

Example A

The dotted line represents the current status, in relation to unimpacted status, of the habitat impacted by a moderate-impacting UoA; for example, demersal longline. This UoA:

- Has an impact on 60% of the entire distribution of this habitat type.
- Fully protects 40% of the habitat type inside a closed area, which is not shown in figure.

Because the gear has a moderate impact, the habitat status in the fished parts of the habitat is 50% of the unimpacted level. The recovery rate for this habitat type is fast, and it is likely that the overall status of the habitat would rise above 80% of the unimpacted level in around 5 years. Combined with the unimpacted status of the habitat in the closed area, this means that the habitat would recover to 80% of the unimpacted level in 5 years, achieving at least an 80 score and potentially a higher score if there is greater confidence supported by evidence for this expected recovery.

Example B

The dotted and dashed line represents the status of the habitat impacted by a UoA with a high impact, such as demersal trawl. This UoA:

- Protects 40% of the habitat type.
- Fishes the other 60%.

The status of the impacted habitat area is shown in the figure but the status of the habitat within the protected area is not shown.

Since this is a high-impacting gear, the habitat has been degraded in the fished areas to 10% of the unimpacted level. This habitat is not very resilient, barely reaching the 80% level in 20 years and not reaching it in 5 years. ~~Figure GSA: An illustration of different~~Across both the closed area and the impacted areas, the UoA would be unlikely to be causing “serious or irreversible harm” but with less confidence than in example A, possibly achieving an SG60 score.

Example C

The solid line represents the same high-impacting UoA that:

- Protects 40% of a slow-growing habitat.
- Fishes the other 60% of that habitat.

The fished habitat has been degraded to 10% of the unimpacted level. This habitat has a very slow recovery rate and will take more than 20 years to reach the 80% unimpacted level. This UoA is, therefore, causing serious or irreversible harm to this habitat and would be unlikely to score a 60.

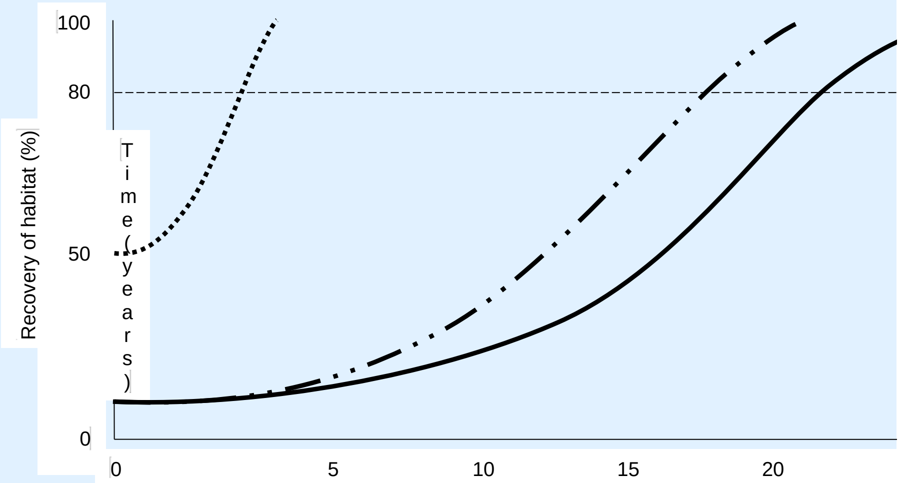
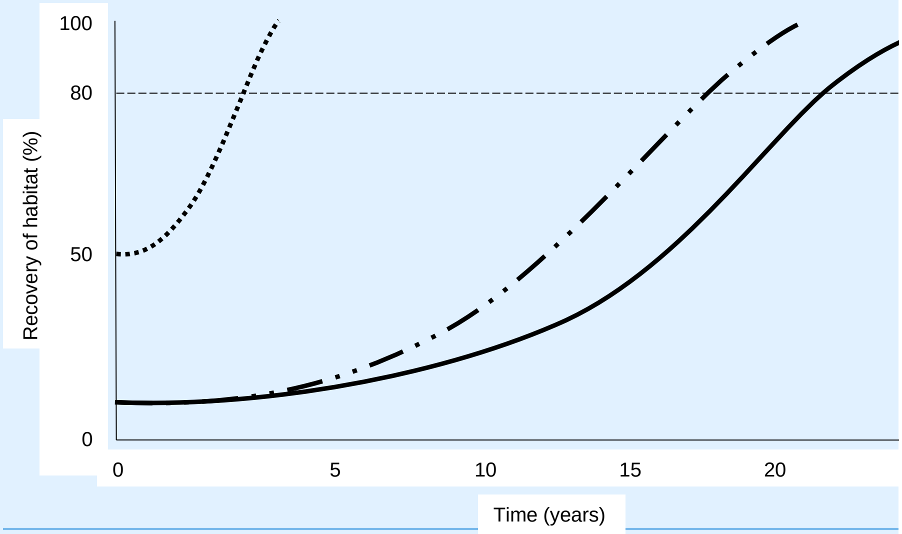


Figure GSA5: **Example recovery rates for habitats over time under different fishing conditions where fishing is removed at year 0**

Table GSA6



provides additional details on the UoAs and habitats to accompany the examples provided in ~~.~~ Figure GSA5.

Rows A-H illustrate in a qualitative sense how the overall habitat status could be estimated, both at the current time and in the future depending on ~~(1) the extent of habitat protection in a closed area, (2) the level of habitat degradation outside the closed area, and (3) the habitat recovery rate. Any current scenario that results in the overall habitat being less than 80% of the unimpacted level is considered serious or irreversible harm. Row I gives the likelihoods of the UoAs causing serious or irreversible harm (see), and Row J gives the corresponding MSC scores.~~:

- The extent of habitat protection in a closed area.
- The level of habitat degradation outside the closed area.
- The habitat recovery rate.

Any current scenario that results in the status of the overall habitat being less than 80% of the unimpacted level is considered "serious or irreversible harm". Row I gives the likelihood of the UoAs causing "serious or irreversible" harm (see Table SA8

~~Table GSA:~~), and Row J gives the corresponding MSC scores.

Table GSA6: UoA and habitat characteristics for the examples in Figure

UoA and habitat characteristics	Example A (dotted line)	Example B (dotted and dashed line)	Example C (solid line)
A. Proportion of habitat fully protected in closed area	40%	40%	40%
B. Area of habitat subject to fishing	60%	60%	60%
C. Level of gear impact	Moderate	High	High
D. Current status of habitats in fished areas (% of unimpacted ~~level~~state)	50%	10%	10%
E. Current overall status of habitat, compared to unimpacted ~~level~~state (A + [B x D])	70%	46%	46%
F. Habitat recovery rate	Fast	Medium	Slow
G. Expected future status of habitats in fished areas in 20 years if fishing ceases (% of unimpacted ~~level~~state)	100%	80%	50%
H. Expected future overall status of habitat in 20 years, compared to unimpacted ~~level~~state (A + [B x G])	100%	88%	70%
I. Likelihood that the UoA is causing **serious or irreversible harm**	**Highly unlikely**	**Unlikely**	**Not unlikely**
J. MSC score	80 or higher, depending on confidence and evidence (unconditional pass)	60 (pass with condition)	< 60 (fail)

~~SD4~~ GSA3.~~13.4.1~~

~~The special consideration of serious and irreversible harm afforded to VMEs derives from both their generally long recovery times and the special status afforded them in international and customary law~~

~~(see above,). While many VMEs may have long recovery times, some may not, but they are all subject to the specific VME requirements in this clause.~~

~~MSC's adoption of the FAO Guidelines for identifying VMEs (see) means that habitats with recovery times substantially greater than 20 years should usually be identified as VMEs. Habitat recovery here relates to the whole habitat, not just some species within a habitat. There may be some habitats with long recovery times that for some reason do not meet the FAO Guidelines' definition on VMEs. However, even for these non-VME habitats, an inability to recover from small reductions in state in fewer than 20 years should lead to a conclusion under the provisions of that it would not be possible to deplete them below 80% and still expect them to recover to 80% within 5-20 years.~~

~~Note that the minimal VME damage that occurs when a move-on rule is triggered should not be counted as serious or irreversible harm even when a VME habitat is below 80% of its unimpacted level.~~

~~GSA3.13.5~~ 11.6 Area of consideration ▲

~~The MSC's intent in specifying the "area covered by the governance body(s) responsible for fisheries~~The "managed area" is the UoA's overall fishery management ~~in~~ area, which will usually be wider than the area~~(s) where~~ in which the UoA actually operates~~" (~~ i.e. the ~~"managed~~UoA area~~" for short)~~). This is to ~~consider~~ensure by default the consideration of habitat impacts within the areas controlled by the management regimes under which the UoA operates. ~~This may be a single EEZ, a combination of EEZs in the case of a UoA that fishes on a shared stock, a combination of an EEZ and an RFMO, or entirely an RFMO. For many UoAs, the managed area may be only part of an EEZ (for example, the jurisdictional area for the UoA or the area covered by a management plan under which the UoA operates).~~The management regime may be:

~~However, where there is reasonable evidence that the habitat distribution extends beyond the "managed area", the assessment of habitat impacts should be based on this extended distribution. The basis for concluding that the habitat range extends beyond the "managed area" should be documented clearly.~~

~~Two~~
- A single exclusive economic zone (EEZ).
- A combination of EEZs, in the case of a UoA that fishes on a shared stock.
- A combination of an EEZ and an RFMO.
- Entirely an RFMO.

For many UoAs, the managed area may be only part of an EEZ; for example, the jurisdictional area for the UoA or the area covered by a management plan under which the UoA operates.

There are 2 types of exceptional ~~cases exist~~case:

1. Situations where the range of the habitat(s) is much smaller than the area of the governance body's control ~~(e.g., ,~~, for example:
    - Where the RFMO covers an entire ocean but the habitat is restricted in distribution~~) or~~ .
    - Where it is not sensible to consider the entire area because areas under that governance body's control are not contiguous ~~(e.g., where an EEZ covers two separate areas)~~ or have quite different bio-physical and habitat characteristics.
2. Situations where the managed area is extremely restricted, such as cases where an EEZ has only a very narrow extent ~~due to~~because of encroaching baselines of adjoining EEZs, and it does not make sense to consider such a narrow habitat within the assessment.

Field Code Changed

Examples of these exceptional cases~~:~~

~~The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)~~
- CCAMLR manages fishing throughout the Southern Ocean. Clearly, it would not be appropriate or feasible to include the entire area covered by CCAMLR when considering the range of the habitat(s) affected by vessels fishing only in the Ross Sea.
- A fishery that operates mainly in the Norwegian Trench overlaps with the North Sea and the Norwegian EEZ. These latter ~~two~~2 areas cover more than 3 million km² in total. It is likely that the UoA is fishing a relatively small portion of this total area and therefore impacting a small portion of the habitat(s). Again, it would not be reasonable to consider the entire range of the habitat(s) across the total area.
- The Gambia coastline is only ~~800 km~~800km long and the EEZ is only 19,~~500 km²~~500km². Several habitats extend along much of the western coast of Africa, extending into other EEZs. Given the small area controlled by the Gambian government, it would be appropriate to consider the entire range of the habitat(s) ~~range~~ beyond the Gambian EEZ.

In such exceptional cases, it would be reasonable for the ~~assessment~~ team to scale up or scale down the “managed area” when determining the appropriate habitat range to consider. The team should apply expert judgement and provide rationale for such scaling.

In a nested management situation, the team should consider the widest management range. However, the examples given above for management regimes may apply.

~~The team should apply expert judgement and provide rationale for such scaling.~~

GSA3.11.6.4 Habitat outside the “managed area” ▲~~14~~

Since different habitat types are scored as separate elements, there may be situations when a particular habitat (or element) extends beyond the “managed area”. In such situations, if the habitat extends significantly beyond the “managed area”, and as such, the “managed area” is a relatively small portion of the habitat’s overall range, then the team should take into consideration habitat outside the “managed area”. However, if the “managed area” covers a large part of the habitat’s range, the “managed area” itself will be sufficient for scoring.

GSA3.12 Habitats management strategy PI (PI 2.4~~3~~3.2) ▲

Field Code Changed

When scoring the habitat PIs, the team should consider any habitat-specific management that exists for the “managed area”.

The MSC’s approach to management of ~~VMEs~~“more” sensitive habitats

The MSC’s approach to the assessment of sustainability with regard to ~~VMEs~~“more” sensitive habitats is based on ~~the~~ United Nations General Assembly (UNGA) resolutions (especially 61/105[90] and 64/72[91]) and ~~more specifically~~ the FAO Guidelines for deep-sea fisheries[92]. The central requirements of the FAO Guidelines for designated VMEs are as follows:

- A set of criteria for identifying VMEs.

[90] United Nations General Assembly (2006) Resolution 61/105: Sustainable fisheries, including through the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and related instruments (8 December 2006). A/UNGA/RES/61/105.
[91] United Nations General Assembly (2009) Resolution 64/72: Sustainable fisheries, including through the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and related instruments (4 December 2009). A/UNGA/RES/64/72.
[92] Food and Agriculture Organization of the United Nations (2009) International guidelines for the management of deep-sea fisheries in the high seas. FAO, Rome.

- Impact assessments to determine ~~if~~whether fishing activities are likely to produce significant adverse impacts on VMEs.
- Acquisition of data to determine the fishing footprint and the interaction of fisheries with VMEs.
- Development of a “functioning regulatory framework” that includes regulations to protect VMEs.
- In the absence of a “functioning regulatory framework~~,~~”, establishment of an interim precautionary approach that allows for the development of appropriate ~~conservation and management measures~~CMMs to prevent significant adverse impacts on VMEs while preventing such impacts from taking place inadvertently and that consists of ~~(a)~~ :
    - Closing of areas where VMEs are known or likely to occur ~~and (b)~~ .
    - Refraining from expanding the level or spatial extent of effort of vessels involved in deep-sea fisheries.

These elements are incorporated into the MSC requirements by requiring either a comprehensive management plan ~~(see and the)~~ that determines that all fishing will not cause serious and irreversible harm to ~~VMEs~~“more” sensitive habitats (which includes designated FAO VMEs), or that MSC UoAs should avoid ~~VMEs~~ “more” sensitive habitats individually and cumulatively ~~(implementing~~. Given the complexity of undertaking an impact assessment on “more” sensitive habitats, the ~~final bullet above).~~

~~The wording of the management PI 2.4.2 requires~~MSC considers that ~~management measures/strategies are expected~~most UoAs should choose to ~~deliver the outcome PI's SG80 level, which is based on an assessment of the UoA's impact~~apply the simpler approach of avoiding “more” sensitive habitats altogether.

~~This~~For scoring issue (b) at the SG60 level, some examples of “plausible argument” are general experience, theory, or comparison with similar UoAs or habitats.

The team should ~~be taken~~also take this approach as the desired outcome of the management measures/strategies for ~~non-VME~~“less” sensitive habitats ~~as well~~.

~~Scoring issue (a) – Management strategy in place~~

“

GSA3.12.1 ▲

If ~~necessary” does not appear in the scoring issue (a) at the SG100 level, meaning that in order to score 100, a management strategy should be in place for all UoAs (see), even those that do not regularly contact benthic habitats since gear loss or unexpected benthic change could occur.~~

~~provides an example of a strategy for a pelagic UoA.~~

~~SD5 GSA3.14.1~~

~~Where~~ there is a ~~VME~~“more” sensitive habitat in the UoA's “managed area~~” (see ,~~”, the ~~subclauses, and the),~~team should score the management PI 2.~~4~~3.2 ~~is scored~~ in relation to both ~~non-VME~~“less” sensitive and “more” sensitive habitats ~~and VMEs~~.

Table GSA3

~~GSA3.14.2~~ provides generic guidance ~~is given~~ on the differences between “measures~~,~~”, “partial strategy~~,~~”, and “strategy ~~(see).~~”. Table GSA7 provides examples of “measures~~,~~”, “partial strategies~~,~~”, and “strategies” in terms of benthic habitats. These are only examples of such management levels and do not necessarily meet the whole of the scoring rationale requirements. ~~Assessment teams~~The team should always use ~~their~~its expert judgement to determine how well, or otherwise, management measures, partial strategies, or strategies are designed to ensure the UoA does not pose a risk of "serious or irreversible harm" to relevant habitats.

A strategy should include regular review of "alternative measures" to reduce the impact of the UoA on the habitat. ~~Appropriate~~ The team should also consider appropriate "alternative measures" determined in this review ~~should also be considered~~ during the review of measures to minimise unwanted catch (PIs 2.1.2~~, 2.2.2,~~ and 2.~~3~~2.2), particularly when making a decision on which measures to implement ~~(refer~~.

UoAs are expected to take appropriate action, within measures/strategies, to avoid impacting "more" sensitive habitats. Precautionary measures/strategies to avoid encounters with "more" sensitive habitats are also required, and ~~).~~these may include closed areas, move-on rules, frozen footprints, gear modifications (or restrictions), authorisation to undertake new fishing activities, and/or consideration of dFADs, taking into consideration their design, monitoring and retrieval strategies.

GSA3.~~14.2~~12.1.1 ▲

A partial strategy for a UoA using a pelagic gear or a low-impacting bottom gear, such as a gear with a footprint score of 1 in Table A28 in the MSC Fisheries Standard Toolbox, may not need to include requirements and implementations. The team should provide rationale in those cases. The team may find it useful to refer to the pelagic examples in Table GSA7~~UoAs may qualify for a higher score on this PI if they have a comprehensive management plan that is supported by a comprehensive impact assessment that determines that all fishing activities will not cause serious or irreversible harm to VMEs. The MSC equates this higher level of performance to the FAO Guidelines' best management practice "functioning regulatory framework".~~ .

GSA3.12.1.2 ▲

A comprehensive management plan could also include avoidance measures to ensure that serious or irreversible harm to ~~VMEs~~"more" sensitive habitats does not occur.

Some damage to ~~VMEs~~"more" sensitive habitats is acceptable as long as overall "serious or irreversible harm" to structure and function is avoided. If a strategy ~~chooses~~does not ~~to~~ afford complete protection to all ~~VMEs~~"more" sensitive habitats in an area, this ~~decision~~ should ~~include~~be supported by an impact assessment to demonstrate that:

- "Serious or irreversible harm" is avoided ~~and that VMEs~~.
- "More" sensitive habitats are not impacted by more than 20% of their unimpacted ~~levels. In cases where the historical distribution of VMEs is known and it can be expected that damaged areas could recover, these should be included in the calculation of "unimpacted level".~~state

In cases where a comprehensive management plan is in place but the ~~VME~~"more" sensitive habitat is below the 80% recovery criterion, the plan should first allow the ~~VME~~"more" sensitive habitat to recover to at least 80% of its unimpacted state before fishing continues. In other words, the only allowance for continued fishing by MSC UoAs on a ~~VME is (a) if there is a comprehensive plan that shows that all fishing will keep the VME at 80% or recover it to 80% and (b) when the VME has recovered or is above 80%.~~"more" sensitive habitat is when:

- There is a comprehensive~~,~~ plan that shows that all fishing will keep the "more" sensitive habitat at 80% or recover it to 80%.
- The "more" sensitive habitat has recovered to, or is above, 80%.

A formal comprehensive impact assessment may not be necessary in all cases ~~(e.g.,~~; for example, when benthic gear ~~are~~is prohibited but pelagic gear ~~are~~is permitted because the risk to benthic habitats is ~~very~~ negligible~~). Refer to~~ . See Table GSA7 for an example of a strategy for a pelagic UoA.

~~SD6 GSA3.14.2.2~~

~~In the absence of a comprehensive management plan that takes all fishing activities into account, MSC UoAs cannot necessarily assume that their impacts, while unlikely to cause serious and~~

~~irreversible harm on their own (and therefore potentially meeting the SG80 level under the outcome PI 2.4.1), will not contribute to a cumulative impact that is serious and irreversible to VMEs.~~

~~Therefore, the MSC will expect these MSC UoAs to take appropriate action within measures/strategies to avoid impacting VMEs. Given the complexity of undertaking an impact assessment on VMEs, the MSC expects that most UoAs will choose to apply the simpler approach of avoiding VMEs.~~

~~The partial strategy should include a mechanism by which to consider a habitat that might be a VME (i.e., designated as a "potential VME" by another MSC UoA or a management authority). Since the characteristics of a VME are not directly physical features but relate to a number of different elements () as well as recoverability, a VME is often difficult to determine. Therefore, a management system should be open to the possibility that habitats that contain high densities of VME-indicator organisms may or may not be VMEs, and a habitat's VME status will need to be determined by subsequent research. However, the appropriate precautionary approach is to treat these areas as potential VMEs and to implement precautionary measures to protect them ahead of confirmatory evidence, as outlined in the FAO Guidelines paragraphs 63-67.~~

~~A common precautionary response to the presence of VMEs is to develop avoidance measures (e.g., move-on rules) with the intention that the UoA is able to avoid any further encounter with VMEs or potential VMEs. This response ensures that serious and irreversible harm is avoided.~~

~~The minimal VME damage that occurs when a move-on rule is triggered does not constitute serious or irreversible harm even when a VME habitat is below 80% of its unimpacted level.~~

~~Reviews of move-on rules (e.g., ICES, 2010[93]; Rogers and Gianni, 2010[94]; Weaver et al., 2011[95]) have detected the following frequent problems:~~

~~SC65~~ ~~There is limited or no scientific basis on whether the thresholds used for move-on rules are indicative of VMEs and often they are not specific to different gears, species, or habitat and do not identify an effective move-on distance.~~

~~SC66~~ ~~In cases where the move-on distance is small, the effect may simply be to increase damage to VMEs.~~

~~SC67~~ ~~The materials necessary to help observers and fishers identify and quantify VME taxa are inadequate and/or not standardised.~~

~~SC68~~ ~~Good information collection, including vessel monitoring systems (VMS) and automatic identification systems (AIS), and full observer coverage is often needed to apply the move-on rules correctly.~~

~~In acknowledgement of this, requires that at the SG80 level, the move-on rules be scientifically based and specific to the gear and VME. Therefore, at the SG80 level, some justification for the use of a specific move-on rule is expected, whereas at the SG60 level, a commonly accepted, default rule could be used.~~

~~The lifting of a closure implemented using a move-on rule should be based on a high level of scientific evidence to identify conservation and management measures that prevent significant adverse impacts to VMEs. Note that because a comprehensive impact~~

[93] ICES, 2010. *Report of the ICES/NAFO joint working group on deep-water ecology (WGDEC), 22–26 March 2010, Copenhagen, Denmark*. ICES CM 2010/ACOM:26, 160 pp.
[94] Rogers, A.D. and Gianni, M., 2010. *The implementation of UNGA Resolutions 61/105 and 64/72 in the management of deep-sea fisheries on the high seas*. Report prepared for the Deep-Sea Conservation Coalition, International Programme on the State of the Ocean, London, United Kingdom, 97 pp.
[95] Weaver, P.P.E., Benn, A., Arana, P.M., Ardron, J.A., Bailey, D.M., Baker, K., Billett, D.S.M., Clark, M.R., Davies, A.J., Durán Muñoz, P., Fuller, S.D., Gianni, M., Grehan, A.J., Guinotte, J., Kenny, A., Koslow, J.A., Morato, T., Penney, A.J., Perez, J.A.A., Priede, I.G., Rogers, A.D., Santos, R.S., and Watling, L, 2011. *The impact of deep-sea fisheries and implementation of the UNGA Resolutions 61/105 and 64/72*. Report of an international scientific workshop, National Oceanography Centre, Southampton, 45 pp.

~~assessment has not been done at this level of performance, effectively all VMEs and potential VMEs should be afforded some level of precautionary protection.~~

~~A partial strategy for a UoA using a pelagic gear or a low-impacting bottom gear (e.g., a gear footprint score of 1 in Table PF16) may not need to include requirements and implementations (as per). The team should provide rationale in those cases. The team may find it useful to refer to the pelagic examples in .~~

~~SD7 GSA3.14.2.3~~

~~At the SG60 level, commonly accepted move-on rules can be used as "Measures". These may be rules that are used for the same gear in other situations or in other areas of the world but that have not been specifically designed for the UoA's gear and/or encountered VMEs.~~

~~**Table GSA:**~~**Table GSA7:** **Potential measures, partial strategies, and strategies in relation to habitat impacts**

~~**Examples of potential measures, partial strategies, and strategies in relation to habitat impacts (modified from Grieve et al., 2011[96])**~~

~~General UoA description~~	~~Measures~~	~~Partial strategy~~	~~Strategy~~	~~Rationale~~
~~Cod UoA using fixed gear (e.g., gillnets) in inshore zones and mobile gear (e.g., otter trawl) in offshore zones – There are some closed areas and closed seasons for specific gears in either or both the inshore and offshore zones, though these are primarily stock and bycatch management measures. Some habitat protection is afforded by these management arrangements. Monitoring and information gathering efforts are directed at species management arrangements.~~	~~✓~~			~~The management arrangements in place are designed to manage impacts on other components under the assessment tree (e.g., P1 and P2 species). They indirectly contribute to management of habitats because of closed inshore areas to mobile gears, seasonal closures in the offshore environment, and distribution of relevant habitats extends well beyond known fishing areas (i.e., the areas of fishing activity). The arrangements might be considered cohesive, but there is no evidence of efforts to investigate them through the lens of habitat management in order to understand how they work to achieve desirable habitat outcomes (i.e., how they avoid posing risk of serious or irreversible harm to relevant habitats).~~

[96] Grieve, C., Brady, D.C. and Polet, H., 2011. *Best practices for managing, measuring, and mitigating the benthic impacts of fishing: final report to the Marine Stewardship Council.* Unpublished work.

~~Multi-species trawl UoA in inshore tropical waters – Trawling is banned in inshore waters during the seasonal monsoon to protect juvenile and spawning habitat for fish and invertebrate species.~~	~~✓~~			~~The seasonal closure can be considered an individual tool or action that seeks to explicitly protect juvenile and spawning habitat despite being designed to enhance the sustainability of species of interest. However, there is little evidence to suggest that impacts of the arrangement are investigated to determine whether or not habitat protection is occurring or to understand how the measure works to achieve habitat protection; nor are there any other measures, plans, or statutes that would determine how managers would change the seasonal closure if it ceased to be effective from a habitat perspective.~~
~~Groundfish trawl UoA in offshore zones with explicit links to other species/multi-gear management plans – Some closed areas within the groundfish UoA prohibit use of any bottom-contacting fishing gear. Non-UoA (i.e., environmental protection-led) regulations designate two habitat areas of concern, which are also closed to bottom-contacting fishing gear. Vessel monitoring systems and other enforcement efforts aim to ensure no violation of closed or protected areas. Information gathering seeks to monitor the protected zones, and fishing impacts are considered in subsequent analyses. Arrangements about the use or otherwise of bottom-contacting gear have changed according to shifting distributions of benthic species of interest to the other UoAs.~~		~~✓~~		~~There is a clear multi-species management approach with the linking of species/gear management plans. The closed areas indirectly contribute to the management of habitats for the groundfish UoA, though they were established to protect the stocks of other sessile target species (e.g., scallops). The habitat protection zones, though designed for broader conservation purposes, serve to protect habitats of concern. The arrangements could be considered cohesive, particularly as there is evidence of strict enforcement of the protection zones and closed areas, coupled with high sanctions imposed for violators. Similarly, there are some efforts to understand how bottom-contacting gear might impact other benthic biota, but these are aimed at interests other than those in the UoA. The closed areas and protection zones were not designed specifically to manage habitats in relation to the groundfish UoA, nor are there specific mechanisms described that would enable managers to appropriately modify fishing practices if unacceptable impacts to habitats were identified.~~
~~Co-managed and community-based managed tropical UoAs using multiple gears on a diverse range of habitats – Under a broad~~		~~✓~~		~~There is science-based rationale for protecting the habitats as spawning, larval, or juvenile areas for the sustainability of fish species.~~

~~marine management area, which was not specifically designed to manage fishing but general community uses of the marine environment, protection is afforded to a mosaic or patchwork of seagrass, mangrove, and coral reef habitats where bottom-contacting gear use is restricted or banned altogether. The cultural context and scale of the various UoAs lend themselves to the community-based management approach.~~				~~The arrangements are cohesive, comprising several measures that indirectly protect habitats for biodiversity purposes. There is some understanding of how this works to protect habitats and a demonstrable awareness of the need to change measures if they stop being effective from a habitats perspective. While the management approach is not explicitly designed to manage fishing impacts on habitats, there is a functioning management framework (although not strictly speaking "regulatory") that suggests UoAs in the area do not cause serious or irreversible harm to habitats. There are some efforts aimed at understanding how specific strategies might work in relation to the various habitats impacted by the community's fishing. Despite the cultural context and relatively small scale of individual UoAs, the total approach does not add up to a "strategy" within a functioning regulatory framework that is directed specifically at management of habitat impacts of the UoA or other MSC UoAs.~~
~~Midwater trawl UoA on continental slope where some seamounts are encountered and rare bottom-contact is made – In acknowledgement that these features can be considered VMEs, some seamounts are afforded strict protection from any bottom-contacting gears, including midwater trawl gear, and there is a complete ban on the use of bottom/otter trawl gear on all seamounts. This gear restriction constitutes the key part of the UoA management strategy.~~		~~✓~~		~~The strategy is cohesive by virtue of permitting only midwater trawling on any seamount in the region. The functioning regulatory framework is explicit with the ban on bottom-contacting gear on all seamounts and as such represents a precautionary approach. Other MSC UoAs are also required to comply with these rules. Managers have implemented a mechanism to avoid contact with VMEs (seamounts) by mandating the use of only non-bottom contact gears. However, while the strategy is designed to avoid serious or irreversible harm to these VMEs, it can only be considered a partial strategy as it relies upon the generally accepted rarity of bottom contact by midwater trawls and other gears rather than an explicit means of understanding the effectiveness of the management approach in ensuring that serious and irreversible harm is not~~

				~~happening to seamounts or the mechanism that might need to be in place if it ceases to be effective.~~
~~Demersal trawl UoA in inshore and offshore areas – Overarching management framework takes an ecosystem-based fisheries management approach involving impact assessments for management plans (including impacts on habitats), spatial controls like closures to protect essential fish habitat, effort reduction rules, and buyout/lease-back arrangements incentivising the use of less bottom-contacting gear to catch fish quotas.~~			~~✓~~	~~Management is cohesive and strategically aimed at managing the impacts of the UoA, other MSC UoAs, and non-MSC fisheries on relevant habitats within a comprehensive ecosystem-based management plan. There are a suite of measures and tools available and evidence of their use. Ecological risk and impact assessments have been carried out and have determined that all fishing activity will not cause serious or irreversible harm to habitats, including VMEs. There is active management seeking to reduce the impact of the UoA on both essential fish habitat and other habitats that were rated higher risk from an ecosystem-management perspective, including VMEs. The management plan has clearly articulated objectives relating to the Habitats component and sets out how management will be modified if undesirable impacts are detected. Monitoring and evaluation are enshrined within the management plan and are directed at understanding fishing impacts on habitats, as well as the usual species-related monitoring and evaluation. Explicit strategies aim to manage the cumulative impacts of fishing, by the UoA, other MSC UoAs, and non-MSC fisheries, on "main" habitats so as to avoid serious or irreversible harm.~~
~~Multiple UoAs targeting mixed-species complexes using multiple gears (bottom- and non-bottom-contacting gears, including hand rakes, dredges, trawl gear, gillnets, and trap and line methods) in inshore and offshore environments ranging from cool temperate waters to warm tropical seas – A bioregional marine planning framework uses an ecosystem-based fisheries management approach involving ecological risk assessments and risk management planning for fish. Precautionary management approach to risks identified for~~			~~✓~~	~~Management is cohesive and strategic, aimed specifically at managing fishing impacts on species, habitats, and other ecosystem components within a comprehensive ecosystem management plan. Several measures are in place, and research, monitoring, and evaluation are aimed at understanding the impacts of the UoA on habitats. Management strategies (e.g., plans) contain explicit mechanisms for modifying fishing practices based on unacceptable impacts coming to light through research, monitoring, or evaluation. There is evidence~~

~~habitats includes closed areas for a variety of gears (that may change from year to year) and a system of marine protected areas, offering more permanent protection from any bottom-contacting gears. Habitat mapping and strategic research planning and execution are progressively closing the information gaps on the impacts of fishing on habitats, as well as the relative health of relevant habitats. Results are routinely used to inform fishery management decisions.~~				~~these have been implemented to modify fishing impacts on relevant habitats. As this is one of the most comprehensive and cohesive management approaches, "main" habitats, including VMEs, and cumulative impacts are explicitly considered by managers in the risk assessment and management process, the research strategy, and the management decision-making processes.~~
~~Pelagic longline UoA targeting migratory pelagic species – There is little or no known bottom-contact by the gear, except perhaps in cases of gear loss. The species targeted cannot be caught using trawl or other bottom-contacting gear.~~			~~✓~~	~~The use of the gear, the understanding that comes from years of peer-reviewed research about its impacts, and the specific management strategy that mandates only its use could be construed as a cohesive and strategic arrangement. This is supported by demonstrable understanding about how the use of pelagic longlines work to avoid impacting benthic habitats specifically, and some understanding about the impacts of lost gear on habitat and the relative effects of such impacts are deemed to be low risk for overall habitat health. Periodic assessments (i.e., directed research and risk assessments) are undertaken to inform management decision makers about lost-gear impacts to ensure that management strategies are working and are demonstrably avoiding serious or irreversible harm to "main" habitats and to determine whether changes need to be made to mitigate unacceptable impacts.~~

Examples of potential measures, partial strategies, and strategies in relation to habitat impacts[97]

General UoA description	Measures	Partial strategy	Strategy	Rationale
Cod UoA using fixed gear (e.g. gillnets) in inshore zones and mobile gear (e.g. otter trawl) in offshore zones There are some closed areas and closed seasons for specific gear in either or both the inshore and offshore zones, though these are primarily stock and bycatch management measures. Some habitat protection is afforded by these management arrangements. Monitoring and information gathering efforts are directed at species management arrangements.	✓			The management arrangements in place are designed to manage impacts on other components under the assessment tree; for example, P1 and P2 species. They contribute indirectly to management of habitats because of inshore areas closed to mobile gear and seasonal closures in the offshore environment, and distribution of relevant habitats extends well beyond known fishing areas. The arrangements might be considered cohesive, but there is no evidence of efforts to investigate them through the lens of habitat management in order to understand how they work to meet desirable habitat outcomes and avoid posing risk of **serious or irreversible harm** to relevant habitats.
Multi-species trawl UoA in inshore tropical waters Trawling is banned in inshore waters during the seasonal monsoon to protect juvenile and spawning habitat for fish and invertebrate species.	✓			The seasonal closure can be considered an individual tool or action that seeks to explicitly protect juvenile and spawning habitat despite being designed to enhance the sustainability of species of interest. However, there is little evidence to suggest that impacts of the arrangement are investigated to determine whether or not habitat protection is occurring or to understand how the measure works to achieve habitat protection; nor are there any other measures, plans, or statutes that would determine how managers would change the seasonal closure if it ceased to be effective from a habitat perspective.
Groundfish trawl UoA in offshore zones with explicit links to other		✓		There is a clear multi-species management approach with the linking of species/gear management plans. The closed

[97] Modified from: Grieve, C., Brady, D.C., and Polet, H. (2011) *Best practices for managing, measuring, and mitigating the benthic impacts of fishing: final report to the Marine Stewardship Council*. Unpublished work.

species/multi-gear management plans Some closed areas within the groundfish UoA prohibit use of any bottom-contacting fishing gear. Non-UoA, environmental protection-led regulations designate 2 habitat areas of concern, which are also closed to bottom-contacting fishing gear. Vessel monitoring systems and other enforcement efforts aim to ensure no violation of closed or protected areas. Information gathering seeks to monitor the protected zones, and fishing impacts are considered in subsequent analyses. Arrangements about the use or otherwise of bottom-contacting gear have changed according to shifting distributions of benthic species of interest to the other UoAs.				areas contribute indirectly to the management of habitats for the groundfish UoA, though they were established to protect the stocks of other sessile target species (e.g. scallops). The habitat-protection zones, though designed for broader conservation purposes, serve to protect habitats of concern. The arrangements could be considered cohesive, particularly as there is evidence of strict enforcement of the protection zones and closed areas, coupled with high sanctions imposed for violators. Similarly, there are some efforts to understand how bottom-contacting gear might impact other benthic biota, but these are aimed at interests other than those in the UoA. The closed areas and protection zones were not designed specifically to manage habitats in relation to the groundfish UoA, nor are there specific mechanisms described that would enable managers to appropriately modify fishing practices were unacceptable impacts to habitats identified.
Co-managed and community-based managed tropical UoAs using multiple gear on a diverse range of habitats Under a broad marine management area, which was not specifically designed to manage fishing but general community uses of the marine environment, protection is afforded to a mosaic or patchwork of seagrass, mangrove, and coral reef habitats where bottom-contacting gear use is restricted or banned. The cultural context and scale of the various UoAs lend themselves to the community-based management approach.		✓		There is science-based rationale for protecting the habitats as spawning, larval, or juvenile areas for the sustainability of fish species. The arrangements are cohesive, comprising several measures that indirectly protect habitats for biodiversity purposes. There is some understanding of how this works to protect habitats and a demonstrable awareness of the need to change measures if they stop being effective from a habitats perspective. While the management approach is not designed explicitly to manage fishing impacts on habitats, there is a functioning management framework, although not strictly speaking "regulatory", that suggests UoAs in the area do not cause **serious or irreversible harm** to habitats. There are some efforts aimed at understanding how specific strategies might work in relation to the various habitats impacted by the community's fishing. Despite the cultural context

				and relatively small scale of individual UoAs, the total approach does not add up to a **strategy** within a functioning regulatory framework that is directed specifically at management of habitat impacts of the UoA or other MSC UoAs.
Midwater trawl UoA on continental slope where some seamounts are encountered and rare bottom contact is made In acknowledgement that these features can be considered FAO-designated VMEs (or **more** sensitive habitats), some seamounts are afforded strict protection from any bottom-contacting gear, including midwater trawl gear, and there is a complete ban on the use of bottom/otter trawl gear on all seamounts. This gear restriction constitutes the key part of the UoA management strategy.		✓		The strategy is cohesive by virtue of permitting only midwater trawling on any seamount in the region. The functioning regulatory framework is explicit with the ban on bottom-contacting gear on all seamounts and as such represents a precautionary approach. Other MSC UoAs are also required to comply with these rules. Managers have implemented a mechanism to avoid contact with VMEs (seamounts) by mandating the use of only non-bottom-contact gear. However, while the strategy is designed to avoid **serious or irreversible harm** to these habitats, it can only be considered a **partial strategy**. This is because it relies upon the generally accepted rarity of bottom contact by midwater trawls and other gear rather than an explicit means of understanding the effectiveness of the management approach in ensuring that **serious and irreversible harm** is not happening to seamounts or the mechanism that might need to be in place if it ceases to be effective.
Demersal trawl UoA in inshore and offshore areas Overarching management framework takes an ecosystem-based fisheries management approach involving impact assessments for management plans (including impacts on habitats), spatial controls like closures to protect essential fish habitat, effort reduction rules, and buyout/lease-back arrangements incentivising the use of less bottom-contacting gear to catch fish quotas.			✓	Management is cohesive and strategically aimed at managing the impacts of the UoA, other MSC UoAs, and non-MSC fisheries on relevant habitats within a comprehensive ecosystem-based management plan. There are a suite of measures and tools available and evidence of their use. Ecological risk and impact assessments have been carried out and have determined that all fishing activity will not cause **serious or irreversible harm** to habitats, including **more** sensitive habitats. There is active management seeking to reduce the impact of the UoA on both essential fish habitat

				and other habitats that were rated higher risk from an ecosystem-management perspective, including **more** sensitive habitats. The management plan has clearly articulated objectives relating to the habitats component and sets out how management will be modified if undesirable impacts are detected. Monitoring and evaluation are enshrined within the management plan and are directed at understanding fishing impacts on habitats, as well as the usual species-related monitoring and evaluation. Explicit strategies aim to manage the cumulative impacts of fishing, by the UoA, other MSC UoAs, and non-MSC fisheries, on habitats in order to avoid **serious or irreversible harm**.
Multiple UoAs targeting mixed-species complexes using multiple gear (bottom- and non-bottom-contacting gear, including hand rakes, dredges, trawl gear, gillnets, and trap and line methods) in inshore and offshore environments ranging from cool temperate waters to warm tropical seas A bioregional marine planning framework uses an ecosystem-based fisheries management approach involving ecological risk assessments and risk-management planning for fish. Precautionary management approach to risks identified for habitats includes closed areas for a variety of gear (that may change from year to year) and a system of marine protected areas (MPAs), offering more permanent protection from any bottom-contacting gear. Habitat mapping and strategic research planning and execution are progressively closing the information gaps on the impacts of fishing on habitats, as well as the relative health of relevant habitats. Results are routinely used to inform fishery-management decisions.			✓	Management is cohesive and strategic, aimed specifically at managing fishing impacts on species, habitats, and other ecosystem components within a comprehensive management plan. Several measures are in place, and research, monitoring, and evaluation are aimed at understanding the impacts of the UoA on habitats. Management strategies (e.g. plans) contain explicit mechanisms for modifying fishing practices based on unacceptable impacts coming to light through research, monitoring, or evaluation. There is evidence these have been implemented to modify fishing impacts on relevant habitats. As this is one of the most comprehensive and cohesive management approaches, both **less** sensitive and **more** sensitive habitats, as well as cumulative impacts are explicitly considered by managers in the risk assessment and management process, the research **strategy**, and the management decision-making processes.
Pelagic longline UoA targeting migratory pelagic species			✓	The use of the gear, the understanding that comes from

There is little or no known bottom contact by the gear, except perhaps in cases of gear loss. The species targeted cannot be caught using trawl or other bottom-contacting gear.				years of peer-reviewed research about its impacts, and the specific management **strategy** that mandates only its use could be construed as a cohesive and strategic arrangement. This is supported by demonstrable understanding of how the use of pelagic longlines work to avoid impacting benthic habitats specifically, and some understanding about the impacts of lost gear on habitat, and the relative effects of such impacts are deemed to be low risk for overall habitat health. Periodic assessments (i.e. directed research and risk assessments) are conducted to inform management decision makers about lost-gear impacts to ensure that management strategies are working and are demonstrably avoiding **serious or irreversible harm** to habitats and to determine whether changes need to be made to mitigate unacceptable impacts.

GSA3.~~14.3~~

~~If there is no impact on a VME (i.e., either by the UoA, another MSC UoA, or a non-MSC fishery, where relevant – see~~12.2.2 ▲ ~~and the), scoring issue (d) is not scored.~~

~~GSA3.14.3.2~~

An MSC UoA needs to have some way of assessing whether the actions of all MSC UoAs and other non-MSC fisheries, where relevant, are applicable to ~~it avoiding impacts on VMEs~~the avoidance of impacts on more sensitive habitats. An area may be closed to fishing by the management entity, or by a client fishery or non-MSC fishery (prior to the management entity doing so). The team should consider all of these closed area scenarios when scoring the UoA. For instance, a “precautionary VME closure” might be declared by a trawl UoA on triggering a move-on rule, and MSC UoAs impacting in that ~~closure~~closed area would be required to respect this closure under the requirements of the management PI 2.~~4~~3.2. However, other measures, such as changing to a semi-pelagic gear, may not be relevant or appropriate for other MSC UoAs.

~~When an MSC UoA/non-MSC fishery closes an area for reasons other than VME conservation (e.g., for operational reasons to gain a market advantage), other MSC UoAs need not abide by such a closure.~~

GSA3.~~14.4~~

~~For scoring issue (d), the team should be able to demonstrate that, where appropriate, area protection is respected; that move-on rules are applied appropriately; and that information from all MSC UoAs and non-MSC fisheries, where this information is available and relevant, on likely areas of VMEs is being handled correctly by the UoA.~~

~~In addition to VMS and AIS, electronic monitoring might include data taken from chart plotters, mobile phone signal triangulation, on-deck CCTV, and net-mounted camera systems as long as these can be externally verified.~~

~~"Qualitative evidence" should include results from non-verified surveys and/or stakeholder interviews to confirm that management requirements (including move-on rules) are applied effectively. The expectation at the SG60 level is that the UoA avoids all areas closed by its management entity and those closed by the UoA's own move-on rules.~~

~~"Some quantitative evidence" at the SG80 level should include verified electronic data or some other method of external verification (e.g., observer coverage, inspections) consistent with the scale and intensity of the UoA to confirm that management requirements are applied effectively.~~

~~"Clear quantitative evidence" at the SG100 level should include verified electronic data and some other method of external verification consistent with the scale and intensity of the UoA to confirm that management requirements are applied effectively. The expectation at the SG80 and SG100 levels is that the UoA additionally respects the areas closed by all MSC UoAs and non-MSC fisheries to ensure the cumulative protection of VMEs.~~

~~Observer programmes and inspection programmes may be used depending on the scale and intensity of the UoA. That is, for a small-scale developing-world UoA operating gear with a likely small impact on VMEs, it may be acceptable to use chart plot information supported by occasional inspections, whereas for a large-scale industrial UoA operating gear with a likely large impact on VMEs, it would normally be necessary at the SG80 level to operate VMS or AIS systems together with significant observer coverage.~~

~~GSA3.15~~13 Habitats information PI (PI 2.4~~4~~3.3) ▲

Assessing informal approaches against PI 2.4~~4~~3.3

~~Teams~~The team should consider whether ~~qualitative and/or quantitative~~ information is available to understand:

- The distribution of habitat ~~and~~.
- The impact of the UoA on habitat.

The ~~assessment~~team should factor in the likelihood of changes within the UoA that could ~~potentially~~ lead to an increase in the risk of impact from fishing activity over time.

~~Teams~~The team should ~~further~~ consider whether information is collected to detect these changes to ensure that the UoA is moving in the desired direction or operating at a low-risk level.

~~Information may be from~~ Examples of information type include:

- Local knowledge or research from fishers or community members. ~~It may be~~
- Place-based ~~(i.e.,~~information that is local to a particular geographical area~~) and may have~~.
- Information with social, economic, or ecological dimensions. ~~It~~

The information will reflect the knowledge and opinions about issues held by individuals and groups local to the UoA. Local knowledge can be valuable first-hand experience that might provide information on a wide range of topics, including:

- Habitat distribution and range~~,~~.
- Gear impacts on local habitats~~,~~.

- Gear and UoA spatial overlap with habitats~~, and~~ .
- Scale and intensity of the UoA.
- Depending on the scale of the UoA, this information could be collected through informal stakeholder processes or a less subjective review process.

~~Guidance on~~ Scoring issue (c) – monitoring ▲

Field Code Changed

When scoring issue (c) at the SG80 level, the team should consider all potential increases in risk, such as changes in:

- The scoring of the outcome PI~~, in~~ .
- The operation of the UoA~~, or in~~ .
- The effectiveness of the measures.

GSA3.~~15.2~~

~~See guidance and .~~

~~GSA3.15.3~~

~~If the CSA is used to score the outcome PI for any scoring element, the team is required to evaluate scoring issues (a) and (b) using the RBF alternative at the SG60 and SG80 levels for that scoring element.~~

~~GSA3.16~~14 Ecosystem outcome PI (PI 2.~~5~~4.1)

GSA3.14.4 "Key" ecosystem elements ▲

"Key" ecosystem elements may include:

- "Key" prey, predators, and competitor species.
- Predator-prey interaction.
- Food web interactions.
- Community composition.
- Carrying capacity.
- Species biodiversity.
- Genetic diversity.
- Migratory behaviour.

GSA3.14.5 Indirect impacts on ETP/OOS species ▲~~Background~~

Indirect effects of the UoA on ETP/OOS species are those that result in changes to the "key" ecosystem elements as identified above.

The ~~Ecosystem component considers the broad~~team is required to evaluate whether any of the impacts of the UoA on "key" ecosystem elements indirectly impact ETP/OOS units and hinder their recovery. Indirect effects of fishing may have positive or negative effects on ETP/OOS units. The MSC's intent is that any ecological ~~community and ecosystem in which the fishery operates. The Ecosystem component does~~effects of the UoA/OOS do not ~~repeat the status assessment of the other components individually but rather considers the wider system structure and function – although if all these components scored highly it might be expected that~~ hinder the ~~Ecosystem component would~~long-term viability of the ETP/OOS unit, and thereby also ~~score highly. The Ecosystem component addresses system-wide issues, primarily impacted indirectly by the fishery, including ecosystem structure, trophic relationships and biodiversity.~~

~~GSA3.16.2~~

~~PI 2.5.1 requires that "the fishery does not~~ cause "serious ~~or irreversible harm to the key elements of ecosystem structure~~ and ~~function." Please refer to and for more details on such harm. Assessments of the risks of "serious or~~ irreversible harm" to the ecosystem ~~in PI 2.5.1 may be made in reference to the maximum levels of impacts allowed under . While P1 scores the setting of TRPs and the theoretical evidence that they will achieve the allowed impact levels, PI 2.5.1 scores the evidence that such levels are being achieved in practice.~~ . Types of indirect effects may include:

~~Serious~~ • Changes to trophic structure or ~~irreversible harm~~function.

- Removal of biomass as food source for the ETP/OOS unit (including localised depletions) or its prey (trophic interactions).
- Addition of biomass due to discards or offal discharge.
- Changes to essential habitat for the species.

The team should provide rationale on which indirect effects, if any, it has considered in relation to the ~~capacity of the ecosystem to deliver ecosystem services could include:~~ETP/OOS unit. The team should provide detail of methods used to evaluate these effects.

~~SC69~~ ~~Trophic cascade (i.e., significantly increased abundance,~~The following case studies illustrate how indirect effects have explicitly been considered and ~~especially decreased diversity, of species low in the food web) caused by depletion of predators and especially 'keystone' predators;~~

~~SC70~~ ~~Depletion of top predators and trophic cascade through lower trophic levels caused by depletion of key prey species in 'wasp-waist' food webs;~~

~~SC71~~ ~~Severely truncated size composition of the ecological community (e.g., greatly elevated intercept and steepened gradient in the community size spectrum) to the extent that recovery would be very slow due to the increased predation of intermediate-sized predators;~~

~~SC72~~ ~~Gross changes in the species diversity of the ecological community (e.g., loss of species, major changes in species evenness and dominance) caused by direct or indirect effects of fishing (e.g., discarding which provides food for scavenging species);~~

~~SC73~~ ~~Change in genetic diversity of species caused by selective fishing and resulting in genetically determined change in demographic parameters (e.g., growth, reproductive output).~~

~~Relatively few~~managed within different fisheries ~~would have the information needed to address ecosystem issues quantitatively, and usually they will be assessed using surrogates, analogy, general observations, qualitative assessment and expert judgement. Harm to ecosystem structure is normally inferred from impacts on populations, species and functional groups, which can often be measured directly. Harm to ecosystem functions is normally inferred from~~. They provide examples of where the team should consider indirect impacts on ~~ecosystem processes and properties such as trophic relationships, community resilience etc. and often have to be inferred from conceptual or analytical models or analyses.~~

~~GSA3.17 Ecosystem management strategy PI (PI 2.5.2)~~

~~Refer to and for more details on 'measures'~~

~~GSA3.18 Ecosystem information / monitoring PI (PI 2.5.3)~~

~~GSA3.18.1~~ ETP/OOS units, and how these relate to key ecosystem elements ~~may include trophic structure and function (in particular key prey, predators, and competitors), community composition, productivity pattern (e.g., upwelling or spring bloom, abyssal, etc.), and characteristics of biodiversity~~.

Case study 1: CCAMLR krill fisheries

CCAMLR has an objective to conserve marine living resources. This includes preventing changes or minimising risk of changes in the marine ecosystem that are potentially not reversible over two to three decades[98].

An example of how this objective is operationalised is that CCAMLR considers the needs of dependent predators such as marine mammals and seabirds when setting quotas for krill harvesting. Krill is an important prey species for seals, cetaceans, and penguins in the Southern Ocean. Indirect impacts of the krill fisheries include removal of krill as prey species, with localised depletion being a key concern given the patchiness of the krill resource[99] and references therein). CCAMLR sets a precautionary catch limit that ensures at least 75% of pristine krill biomass is maintained, and to prevent localised depletion an additional cap is set which cannot be exceeded until the catch is sub-divided into small spatial units[100]. In addition, the Government of South Georgia and the South Sandwich Islands, in whose waters a proportion of the krill fishery takes place, include a number of additional protection measures including a closed season during the times when key predators are breeding, coastal protection zones to reduce competition with land-based predators[101]. Indirect impacts from the UoA on ETP/OOS units should be considered as part of whether the UoA is likely to cause serious and irreversible harm to the predator-prey ecosystem element.

Case study 2: Burry Inlet cockle fishery

The Burry Inlet hand-raked cockle fishery is managed by Natural Resources Body for Wales (NRW), whose overall aim in managing the fishery is to develop a thriving cockle fishery that supports, protects, and enhances the needs of the community and the environment on which it depends [102]. The Burry inlet is a Special Protection Area under the European Commission Directive 79/409 on the conservation of wild birds and is also a Ramsar site[103]. The large estuarine complex supports internationally or nationally important wintering populations of wildfowl including (amongst many others) pintail, shelduck, shoveler, oystercatcher, knot, and redshank[104].

[98] CCAMLR (1980) Convention on the Conservation of Antarctic Marine Living Resources. Hobart: CCAMLR. Available at: https://www.ccamlr.org/en/organisation/camlr-convention-text
[99] Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. (2012) Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp.
[100] Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. (2012) Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp.
[101] Bamford, C.C.G., Warwick-Evans, V., Staniland, I.J., Jackson, J.A., and Trathan, P.N. (2021) Wintertime overlaps between female Antarctic fur seals (*Arctocephalus gazella*) and the krill fishery at South Georgia, South Atlantic. PLoS ONE 16(3): e0248071. Available at: https://doi.org/10.1371/journal.pone.0248071.
[102] NRW (2013) Burry Inlet Cockle Fishery Order 1965: Management Plan 2013. Available at: http://naturalresources.wales/media/679996/burry-inlet-cockle-fishery-order-1965-mp.pdf [accessed on 19 July 2022].
[103] NRW (2013) Burry Inlet Cockle Fishery Order 1965: Management Plan 2013. Available at: https://naturalresources.wales/about-us/strategies-and-plans/burry-inlet-management-plan-cockle-fishery-order-1965/?lang=en
[104] NRW (2013) Burry Inlet Cockle Fishery Order 1965: Management Plan 2013. Available at: https://naturalresources.wales/about-us/strategies-and-plans/burry-inlet-management-plan-cockle-fishery-order-1965/?lang=en

Cockles are a key prey source for many overwintering birds in the Burry Inlet, so the indirect impact of the fishery relates to removal of biomass as a food source for bird species. To ensure that the fishery does not adversely impact the bird species whilst also maintaining a cockle resource for continued exploitation, a TAC is established each year for the fishery based on the results of twice-annual stock assessment surveys and the food requirements of the overwintering birds of the Burry Inlet[105]. A Bird Food Model is used to calculate the food requirements of birds, modelled based on the mean of peak counts of oystercatchers over recent years and information from the literature on energy requirements of the birds and energy content of shellfish[106]. The catch returns from the licensed fishers are monitored to see how much cockle is being removed each month in relation to the set TAC. This enables the TAC or daily quota to be amended if necessary to ensure enough food is left for the birds, as well as to ensure sustainable resource use[107].

The team should consider indirect impacts from the UoA on ETP/OOS units as part of whether the UoA is likely to cause "serious and irreversible harm" to the predator-prey ecosystem element.

GSA3.15 Ecosystem management strategy PI (PI 2.4.2)

Scoring issue (a) – management "strategy" in place ▲

See SA3.3.1 for more details on "measures", "partial strategy" and "strategy".

GSA3.15.2 Interpreting "strategy" ▲

At SG80 and SG100, partial strategies and strategies, respectively, may contain measures designed and implemented to address impacts on components that have been evaluated elsewhere in this framework.

If the measures address specific ecosystem impacts effectively enough to meet the appropriate standard, it is unnecessary to have special "ecosystem measures" to address the same impacts.

UoAs should be capable of adapting management to environmental changes as well as managing the effect of the UoA on the ecosystem.

GSA3.16 Ecosystem information/monitoring PI (PI 2.4.3)

GSA3.16.1 Climate change ▲

The team should consider monitoring the effects of environmental change on the natural productivity of the UoAs as "best practice". The team should include recognition of the increasing importance of climate change.

GSA4 Principle 3

GSA4.1 General requirements for Principle 3 ▲~~A~~

An MSC UoA might include only a sub-set of fishers ~~(~~, such as vessels, fleet operators, and individual fishermen~~)~~ within a wider fleet of fishers fishing for the same biologically distinct stock, using the same method, and under the same or similar management system or arrangements. However, ~~teams~~the team should note that ~~it is the management of the wider fleet which denotes the specific "fishery" that is the subject of assessment under the fishery-specific management system PIs. Special or additional~~

[105] NRW (2013) Burry Inlet Cockle Fishery Order 1965: Management Plan 2013. Available at: http://naturalresources.wales/media/679996/burry-inlet-cockle-fishery-order-1965-mp.pdf.
[106] Stillman, R. & Wood, K. (2013) Predicting oystercatcher food requirements on the Dee Estuary. A report to Natural Resources Wales. Bournemouth University, Bournemouth University.
[107] NRW (2013) Burry Inlet Cockle Fishery Order 1965: Management Plan *2013*. Available at: http://naturalresources.wales/media/679996/burry-inlet-cockle-fishery-order-1965-mp.pdf.

~~management arrangements or features unique to the vessels in the UoA may be considered and reflected in the scores under the fishery-specific management system PIs.~~:

- The management of the wider fleet that denotes the specific "fishery" is the subject of assessment under the fishery-specific management system PIs.
- The team may consider special or additional management arrangements or features unique to the vessels in the UoA. The team may reflect this in the scores under the fishery-specific management system PIs.

Example~~:~~

In some ~~Regional Fisheries Management Organisations (~~RFMOs~~)~~, compliance can be the responsibility of a compliance committee, and sanctions can be brought by:

- The RFMO itself ~~(e.g., through~~in instances of loss of access to resources, such as when a Member's vessel is identified as IUU, or when there is loss of access by ~~a~~the Member itself~~) through its negotiation process, or by~~ .
- The flag state of the vessel ~~having the~~in violation. ~~If a violation is~~

For violations not in any way under the control of the national management authority of the fishery ~~(e.g.,~~ :

- The fishery consisting of vessels from flag state X should not be held responsible for the non-compliance of flag state Y vessels.
- If the fishery consists of vessels registered with flag state X, and the non-compliance is by vessels registered with flag state Y~~)~~, its internal compliance should not be part of the assessment ~~(i.e., in the previous example the fishery consisting of vessels from flag state X should not be held responsible for the non-compliance of flag state Y vessels).~~ .

However, the team should consider the effectiveness of the following actions:

- At the national level ~~(i.e.,~~: the compliance of flag state X vessels~~) and~~.
- At the RFMO level ~~(~~: the overall effectiveness of compliance to deliver sustainable outcomes~~) should be considered~~.

GSA4.1.1 Assessment of multi-level management systems ▲

~~In order to effectively assess multi-level the management systems against Principle 3, the assessment team should determine which biological and/or jurisdictional levels apply to the management system of this UoA. These levels of management should then be considered for all PIs within the relevant P3 component.~~

Table ~~GSA:~~GSA8: Examples of types of jurisdiction for different management systems

Type of jurisdiction	Management system
Purely domestic fishery	The fishery management framework may exist at a local, regional, or national scale within the jurisdiction of a single state. Additionally, a purely domestic UoA may exist in multiple jurisdictions within a state, for example under a federal system of government.
Trans-boundary fish stocks, straddling fish stocks, stocks of highly migratory fish species, and discrete high seas fish stocks	When fish stocks are exploited by ~~two~~2 or more states, international law becomes relevant. These multi-level management systems may have a variety of jurisdictional arrangements that might apply to that UoA ~~and are therefore~~. The team is required to ~~be considered by the assessment team~~consider these jurisdictional arrangements.

GSA4.1.3 Fisheries management bodies that are subject to international cooperation ▲

Under international law, as set out in the UN Convention on the Law of the Sea (UNCLOS) and related instruments, the states concerned, including the relevant coastal states in the case of shared stocks, straddling stocks, and highly migratory species, are required to cooperate to ensure effective conservation and management of the resources.

The relevant instruments that set out these requirements are:

- United Nations Convention on the Law of the Sea (UNCLOS~~)~~, 1982~~;~~).
- United Nations Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 1995 ~~(UNFSA);~~
- FAO Code of Conduct for Responsible Fisheries, 1995 (including the FAO Compliance Agreement of 1993).

The MSC considers UNFSA Article 10 and the UNCLOS requirements as a basis for MSC requirements relating to cooperation for UoAs that are subject to international cooperation for management of the stock. ~~These requirements to cooperate should apply to UoA participants even if cooperation is not formally required by the relevant RFMO/RFMA or if an RFMO/RFMA does not exist. These requirements should also apply to UoAs in the high seas even if the target species are not HMS or shared or straddling stocks and are not formally covered by the UNFSA requirements. The requirement is further elaborated in –.~~These requirements to cooperate should apply to:

~~The intent~~
- UoA participants, even if cooperation is ~~to limit~~not formally required by the ~~extent of responsibility of the UoA for the actions of non-UoA~~relevant RFMO/regional fisheries management ~~bodies, unless they impact directly on~~arrangement (RFMA) or if an RFMO/RFMA does not exist.
- UoAs in the high seas, even if the target species are not HMS, shared, or straddling stocks and are not formally covered by the ~~delivery of P1 and P2 outcomes.~~UNFSA requirements.

The requirements are further elaborated in SA4.3.1–4.

GSA4.1.4.1 Informal or traditionally managed systems ▲

A key characteristic of management mechanisms and measures in traditionally managed or self-governing UoAs is that they may be undocumented or may not be formally ratified.

The CAB could use:

- Semi-structured interviews with a range of stakeholders or other participatory tools to collect information. The information in the sample should be representative of the reality of the UoA.
- Multiple stakeholder participatory approaches ~~can be used~~ to cross-check opinions and views from different segments of the stakeholder community.
- Both of the above ~~could be used by the CAB~~ to support the rationale and validate the conclusions provided for the scores as required in SA4.3~~clauses under~~.

GSA4.3 Legal and/or customary framework PI (PI 3.1.1) ▲

Background

~~Background~~

~~Understanding what is meant by the legal and/or customary framework is key to determining if fisheries management occurs within a framework that both respects relevant laws and is compatible with relevant instruments of international law capable of delivering sustainable fisheries in accordance with P1 and P2.~~

A fishery management system's local, regional, national, or international legal and/or customary framework is:

- The underlying formal or informal supporting structure that incorporates all ~~the~~ formal and informal practices~~;~~.
- Procedures and instruments that control or have an impact on a UoA. This includes policies and practices of both government and private sectors, ~~including (but~~and is not limited to~~):~~:
    - Implementing agencies ~~(e.g.,~~; for example, fisheries agencies~~,~~ and conservation agencies~~);~~.
    - Fishery business groups ~~(e.g.,~~; for example, catch sector cooperatives~~,~~ and industry associations~~);~~.
    - Fishing vessel owners~~;~~.
    - Indigenous groups~~;~~.
    - Local civil society or community groups.
- The government sector, including all applicable government systems, the courts, and the relevant parliamentary and regulatory bodies. The management system is the complex interaction of government legislation, ~~or~~ industry, or customary practice~~, but is not limited to all such elements,~~. However, it may also include controls and practices ~~that are used~~ in a UoA ~~and~~that result in “hard” ~~(~~law~~)~~ or “soft” ~~(~~law, which are accepted practice~~)~~ controls over actual on-water catching practices.

The team may consider governance structures and mechanisms introduced in a UoA to achieve certification to an ISEAL Code compliant international voluntary sustainability standard to be part of a customary framework. Nevertheless, this certification itself does not automatically qualify a fishery to meet MSC scoring requirements. The team should:

- Review the legal and/or customary frameworks in place.
- Reach a scoring determination based on its judgement.

Assessing informal and traditional approaches

In all scoring issues in this PI, for management systems ~~which~~that are less clearly articulated, such as informal and traditional management systems, ~~evidence of~~the team may determine the extent to which this scoring issue is met ~~could be~~ through:

- Accepted norms~~;~~.
- Commonly held values~~;~~.
- Beliefs ~~and/or~~.
- Agreed rules across the fishing communities of which the UoA is part.

Scoring issue (a) – Compatibility of laws or standards with effective management ▲

~~The first scoring issue for this PI relates to the presence or absence of an appropriate and effective legal system, including at the international level a legal and/or customary framework that is capable of delivering sustainable fisheries in accordance with P1 and P2. To score this part of the PI, assessment teams should focus on the existence of a national and/or international framework itself and if it is capable of delivering sustainable fisheries, including through management cooperation where required.~~

~~This may be determined by examining:~~

The team may determine this by examining:

- The presence or absence of the essential features of an appropriate and effective structure within which management takes place~~;~~.
- ~~If~~ Whether those features are hard or soft~~;~~.
- ~~If~~ Whether the framework has a focus on long-term management rather ~~the~~than short term~~;~~.
- How ~~it~~management manages risk and uncertainty~~;~~.
- ~~If~~ Whether the framework is transparent and open to scrutiny, review, and adaptation as new information becomes available.

The essential features needed to deliver sustainable fisheries are defined by their relevance to achieving sustainable fisheries in accordance with P1 and P2 appropriate to the size and scale of the UoA, and may include:

- Establishing when and where people can fish~~;~~.
- Who can fish~~;~~.
- How they may fish~~;~~.
- How much they can catch~~;~~.
- What they can catch~~;~~.
- Who they talk to about the “rules” for fishing~~;~~.
- How they might gather relevant information and decide what to do with it~~;~~.
- How they know that people are abiding by whatever rules are made ~~and~~.
- How they catch, sanction, or penalise wrongdoers.

With these features, the operational framework could be said to be compatible with local, national, or international laws or standards.

For a UoA not subject to international cooperation for management of the stock, national entities expected to cooperate on national management issues include regional and national management, state and federal management, indigenous groups, and other groups, as appropriate to the UoA under assessment.

Scoring issue (b) – Resolution of disputes ▲

Issues and disputes involving allocation of quota and access to marine resources are outside the scope of an assessment against the MSC Fisheries Standard.

When there are no immediately obvious structures for dispute resolution, the team could use participatory techniques ~~could be used~~ to:

- Identify and evaluate the presence of dispute resolution mechanisms used in the UoA~~;~~.
- Obtain information on these dispute mechanisms~~;~~.
- Assess the effectiveness of such mechanisms.

To minimise the likelihood of subjectivity, ~~assessment teams~~the team should include participants and/or interviewees from a wide variety of stakeholder types and from stakeholders operating outside the UoA. Fishers may be able to draw up charts or use other visual or non-textual means to help explain or demonstrate the process for resolving conflicts in the UoA.

The team can determine the level of transparency and effectiveness of the systems ~~can be determined~~ by:

- Using information on the proportion of stakeholders ~~that are~~ aware of the existence of any dispute resolution arrangements~~;~~.
- ~~The~~ Examining history and stories of how disputes have been dealt with in the past~~;~~.
- Ascertaining whether the presence or absence of unresolved disputes can be considered significant indicators of the existence and/or effectiveness of dispute-resolution mechanisms.

The team can determine evidence of consistency with this requirement ~~can be determined by~~ using field observations and structured interviews with fishers and fishing community leaders to ascertain the following:

- The extent to which fishery participants are aware of established rights~~;~~.
- Responses in the past within the UoA to disputes over established rights~~;~~.
- Accepted norms and practice across the UoA that ~~is~~are supportive of such established rights.

Scoring issue (c) – Respect for rights ▲

This scoring issue encompasses groups of individuals with customary rights, as well as indigenous or aboriginal groups with established rights, who are dependent on artisanal or subsistence fishing for either food or livelihood.

GSA4.3.1.b.i Controversial unilateral exemptions to an international agreement ▲

When assessing whether the fishery is conducted under a controversial unilateral exemption to an international agreement, the team should consider:

- The relationship between international and coastal state jurisdictions recognised by relevant international agreements.
- Whether exemptions result in the implementation of a higher or lower level of conservation than are currently agreed by an international management body.
- Whether the sustainable management of the fishery is undermined.

The team should interpret these terms as follows:

- Controversial" means creating a controversy in the wider international community rather than simply between 2 states.
- "Unilateral" means arising from the action of a single state.

- "Exemption" means a refusal to join or abide by the rules of an international management body, or the taking of a reservation or exception to a measure adopted by such body, where in either case the effect is to undermine the sustainable management of the fishery.
- "International agreements" are those with a direct mandate for sustainable management of the resources affected by the fishery according to the outcomes in Principles 1 and 2.

GSA4.3.1.1 Cooperation ▲

With respect to UNFSA Article 10, the requirement under SG60 (SA4.3.1~~) extends~~) applies to the generation of scientific advice, not its implementation (UNFSA Article 10 paragraphs d, e, f, and g). A framework for cooperation with other parties could include ~~for example~~ the ability for parties to coordinate scientific advice to respective management agencies. ~~At SG60 it is expected that the flag state(s) of vessels from the UoA will be participating with a relevant RFMO at least as a cooperating non-contracting party or cooperating non-member.~~

GSA4.3.~~3.~~2—

~~At SG80, organized~~.b Organised and effective cooperation ▲

At SG80, "organised and effective cooperation" with other parties extends to UNFSA Article 10 paragraphs a, h, and j, and could include ~~for example~~ the establishment of appropriate cooperative mechanisms for effective monitoring, control, surveillance ~~and enforcement. Also at SG80 and SG100 the flag state(s) of vessels from the UoA should be participating with a relevant RFMO or other arrangement as Members or, if Membership is prohibited for political reasons, as cooperating non-contracting party or cooperating non-member.~~, and enforcement.

Field Code Changed

Further, at SG80 and SG100, the flag state(s) of vessels from the UoA should be participating either:

- In a relevant RFMO or other arrangement as members, or
- If membership is prohibited for political reasons, as a cooperating non-contracting party or cooperating non-member.

GSA4.3.43 Binding procedures ▲

Field Code Changed

At SG100, binding procedures governing cooperation with other parties could include ~~for example the~~ agreement and compliance with ~~conservation and management measures,~~CMMs to ensure the long-term sustainability of straddling fish stocks and highly migratory fish stocks.

GSA4.3.4 Disputes that overwhelm the fishery ▲

The team should consider whether any outstanding disputes are of substantial magnitude and involve a significant number of interests such that the UoA is unlikely to meet the objectives of MSC Principles 1 and 2. However, the existence of disputes are of themselves not enough to stop a fishery from being eligible for certification. The existence of lawsuits is not considered a barrier to certification, as otherwise parties opposed to certification could lodge lawsuits to prevent an outcome they did not support. The team should use its best judgement to determine whether a dispute compromises the ability of the management system to provide sustainable management, either at the time of assessment or within the subsequent certification period.

GSA4.3.5.1 Formal and informal practices and procedures ▲

These practices or procedures could be formalised under rule of law~~,~~ or be informal but known through traditional or customary means.

~~GSA4.3.6~~

~~Decisions of legislatures (through statutes or national treaties relating to aboriginal or indigenous people), or courts will establish if rights have been conferred upon any particular group or individual. The main consideration in relation to performance against scoring issue (c) is whether a suitable framework exists or does not exist to address the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood, not on the effectiveness or results (e.g., allocation of access) of such a framework.~~

GSA4.4 Consultation, roles, and responsibilities PI (PI 3.1.2) ▲

Background

~~Assessment teams may include consideration of~~In scoring the PI, the team may consider the roles and responsibilities of the fishers in relation to their cooperation with the collection of relevant information and data ~~(e.g.,~~, where relevant and/or necessary. Examples of relevant information and data include catch, discard, and other information of importance to the effective management of the resources and the UoA~~), where relevant and/or necessary, in scoring this PI~~.

~~Scoring Issue (a) – Roles and responsibilities: Assessing informal and traditional approaches~~

~~In some traditionally managed UoAs or UoAs under self-governance, specific roles and responsibilities may not always be clearly articulated or immediately apparent. This does not mean that different institutions or organisations do not undertake specific and agreed roles. A range of entities, ad-hoc committees and other groups with a variety of labels including NGOs may have~~

~~responsibility for different fishery management roles. The arrangements may not be formally codified but may be widely understood across the UoA.~~

~~To verify the extent to which roles and responsibilities are defined across the management system, CABs may need to work with stakeholders to prepare simple governance, institutional or system maps.~~

~~The maps can provide a visual representation of the different groups and organisations involved in the UoA, how they function, which aspects of the management process they are responsible for, and how they relate to one another.~~

~~Scoring issue (b) – Consultation processes~~

~~The main point of scoring issue (b) is that the management system is open to stakeholders and that any information that is viewed as important by those parties can be fed into and be considered by the process in a way that is transparent to the interested stakeholders.~~

~~GSA4.4.1 Transparency~~

~~SG80 and SG100 under scoring issue (b) introduce the added elements of demonstrating that whatever information is gathered, it is considered and that there is transparency about its use or lack of use.~~

~~SG100's demonstration may not necessarily be additional reporting beyond what may already occur in a fishery management system. Examples include:~~

~~SC74 Regular newsletters, broadcasts or reports that go out to stakeholders;~~

~~SC75 Information pages published and distributed;~~

~~SC76 A public record of the minutes of meetings (including use of email or other e-technologies);~~

~~SC77 If dealing with stakeholders who don't have access or ability to read reports, watch broadcasts or use computers there may be report back meetings or other such means to report what happened.~~

~~Teams will need to be satisfied that what evidence is offered does meet the standard of demonstrating consideration of the information (i.e., being transparent) and also explains how the information was or was not used. A UoA cannot score 100 without being transparent on how information provided is or is not used.~~

~~GSA4.4.3 – GSA4.4.4 Effectiveness~~

~~Evaluation of~~Effectiveness of consultation processes

When evaluating the effectiveness of consultation processes, the team might consider the general absence of discrimination against any individuals and/or organisations from any known consultations ~~as part of the measure of performance against this scoring issue.~~. However, the team needs to support any such conclusions ~~need to be supported by~~with valid information collected by rigorous and robust means.

Effective consultation processes within the management system ~~must~~should be appropriate to the scale, intensity, and cultural context of the UoA. ~~For example~~This could include, but ~~importantly~~is not ~~confined~~limited to, consultation at the level of broad policy development and at the level of research planning.

~~Affected parties, depending on the context, may include but are not limited to individuals, mandated representatives, and/or participants in the UoA.~~

In multinational arrangements, there should be adequate consultation at the ~~UoAs'~~UoA's national and international level. Thus, for consultation requirements the team should assess:

- The management authority~~ dealing with the UoA directly (e.g.,~~, such as the coastal state or the flag state~~) and ~~, dealing with the UoA directly.
- The international organisation, where such exists~~, should be assessed for consultation requirements. It is a not a requirement that ~~.

The team is not required to score elements ~~are scored ~~against this PI for:

- Other non-UoA states ~~which~~that are members of the international organisation~~, or ~~.
- Members of a bilateral/multilateral arrangement.

Assessing informal and traditional approaches

In some traditionally managed UoAs or in UoAs under self-governance, specific roles and responsibilities may not always be clearly articulated or immediately apparent. A range of entities, ad hoc committees, and other groups with a variety of labels, including NGOs, may have responsibility for different fishery management roles. The arrangements may not be formally codified but may be widely understood across the UoA.

~~Assessing informal and traditional approaches~~

The team may need to work with stakeholders to prepare simple governance, institutional, or system maps to verify the extent to which roles and responsibilities are defined across the management system.

In the absence of a documented consultation procedure, the team could demonstrate evidence to verify the extent and transparency of consultation processes ~~can be demonstrated ~~by alternative means~~.~~ including:

~~This can include ~~
- Identifying the existence, content, and relative frequency of invitation letters to meetings.~~ It can also include a~~
- Consideration of activities of ~~UoAs'~~the UoA's extension officers~~, how well~~.
- The use of local announcements~~ are used, ~~.
- The use of posters~~, and ~~.
- The extent of awareness of fishers about meeting agendas, meeting content and outcomes.

~~CABs~~The CAB may need to interview fishers about selected case studies to determine how information collected from stakeholders has been used in the past.

~~Information ~~If the team demonstrates that valid and rigorous methods were used, the team may consider information from such interviews ~~may be considered ~~as representative of how the information collected from stakeholders is generally used~~, providing the CABs demonstrate that valid and rigorous methods were used.~~. Conducting interviews with different ~~stakeholder~~stakeholders and cross-checking the information is one way of validating the results.

Scoring issue (b) – Consultation processes ▲

The intent of scoring issue (b) is that:

- The management system is open to stakeholders.
- Information viewed as important by those parties can be fed into and considered by the process in a way that is transparent to the interested stakeholders.

When determining that a process "regularly" seeks and accepts information, the team should use its expert judgement to determine what frequency of review is appropriate. It is not necessary that the definition of the term "regularly" is the same in all contexts throughout the MSC Fisheries Standard, as different frequencies of review may be appropriate in different contexts.

GSA4.4.1 Transparency ▲

Meeting SG100 may not necessarily require additional reporting beyond what may already occur in a fishery management system. Examples include:

- Regular newsletters, broadcasts, or reports that go out to stakeholders.
- Information pages published and distributed.
- A public record of the minutes of meetings, including use of email or other e-technologies.
- Report-back meetings or other such means of reporting when stakeholders do not have access or ability to read reports, do not watch broadcasts, or do not use computers.

The team should verify that the evidence offered:

- Meets the standard of demonstrating consideration of the information, hence is transparent.
- Explains how the information was or was not used.

A UoA cannot meet SG100 without being transparent on how provided information is or is not used.

GSA4.4.5 Local knowledge ▲

"Local knowledge":

- May be long-term knowledge held by many fishers or the community. ~~It might~~
- May be location-based ~~(i.e.,~~, so local to a particular geographical area~~), and~~.
- May have social, economic, or ecological dimensions. ~~It~~
- Will reflect the knowledge and opinions about issues held by individuals and groups local to relevant UoAs.

"Local knowledge" can be valuable first-hand experience that might inform any fisheries management process, including:

- Fisheries research~~,~~.
- Data collection ~~and~~.
- Resource assessment~~,~~.
- Monitoring, control, and surveillance operations~~,~~.
- Policies and processes~~, and~~.
- Fisheries management policies, practices, and/or decisions.

Evaluation of the relative value and robustness of local knowledge in the management process may form part of the process of being transparent about how information is considered and used or not used under SG80 and SG100.

Individuals or groups as referred to in SA4.4.5 could include, but not be limited to~~, fishers,~~:

- Fishers.
- Indigenous people~~,~~.
- Local community representatives or groups~~,~~.
- Local civil society groups ~~like~~, such as local NGOs~~,~~.
- Local fishing businesses and/or their representatives~~, local~~.
- Local government representatives ~~or politicians~~.
- Politicians.

GSA4.5 Long-term objectives PI (PI 3.1.3) ▲

Background

~~The emphasis of this PI is on the presence or absence of long term objectives at the broader management level, i.e.,~~Where UoAs fall under dual control, the objectives of the management agency ~~for all~~controlling those UoAs are the subject of PI 3.1.3. Examples of UoAs under ~~its control. Where UoAs fall under~~ dual control ~~(e.g.,~~ include:

- Internationally managed UoAs where management falls to both a national agency and a bilateral/multilateral agreement or organisation~~, or federally managed UoAs which have some provincial or state management component), the subject of PI 3.1.3 should be the wider organisation.~~.
- Federally managed UoAs that have some provincial or state management component.

This PI deals only with the broader management policy context~~— perhaps~~, which could exist within overarching legislation, or~~ perhaps~~ policy or custom that applies to many or all UoAs within a broader management system. Consideration should focus on whether laws, policies, practices, or customs at that higher level imply and/or require long-term objectives that are consistent with the precautionary approach.

Scoring issue (a) – Objectives assessing informal approaches in PI 3.1.3 ▲

~~Within the scoring issue in this PI,~~ The CAB could infer consistency with ~~requirements in~~ scoring issue (a) by the practices operating within the UoAs covered by the management system.

The CAB could use the following to evaluate ~~how the UoA is considered to perform~~the UoA's performance against this scoring issue:

- A review of the factors that have influenced recent decisions in the UoA~~;~~.
- Knowledge of the extent to which such factors are consistent with achieving sustainability~~ and~~.
- The application of the precautionary approach.

The ~~CAB~~team should consider ~~if~~whether decisions have been taken:

- On the basis of the ecological health of the UoA and associated ecosystems, or
- For other reasons that are not compatible with achieving sustainability over the long term.

~~Scoring~~When scoring this PI, the team should focus on the consistency of any long-term objectives within overarching management policy~~ with~~. The team should expect the ~~notions of being~~UoA to be cautious when information is uncertain, and ~~taking~~to take action even when information is inadequate.

~~The definition of the precautionary approach given in the MSC-MSCI vocabulary was derived from Article 6, UN Agreement for the implementation of the provisions of UNCLOS of 10 December 1982 relating to the conservation and management of straddling fish stocks and highly migratory fish stocks; also known as the "Fish Stocks Agreement".~~

This PI ~~forms an~~is important ~~part of~~to the overall understanding of the use or otherwise of a precautionary approach in the UoA~~ but~~. However, it is not concerned with the operational implementation of the precautionary approach within the ~~'~~"day-to-~~day'~~day" management of the UoA itself.

This PI is not:

- A second opportunity to score UoAs on the use ~~or otherwise~~ of target and ~~limit reference points~~LRPs, which are scored under P1 of the default tree~~, nor to point teams towards~~.
- A second opportunity to refer the team to Article 6, Annex II of the Fish Stocks Agreement for a prescriptive list of what ~~must~~is required to appear in management policy in relation to the precautionary approach.~~ It is also not~~

- A direction to ~~re-score~~rescore management strategies or outcomes covered both in P1 and P2, or decision-making processes covered in a separate PI under P3, where precaution and the precautionary approach are also mentioned.

GSA4.7 Fishery-specific objectives PI (PI 3.2.1)

~~Background~~

~~This PI deals only with the fishery-specific policy context, such as within national or provincial/state or joint authority policy or custom, specifically applied to the fishery as set out in .~~

Scoring issue (a) – objectives assessing informal and traditional approaches ▲

In some traditionally managed fisheries, or fisheries under self-governance, objectives may not always be stated quantitatively or be expressed in a way that is specific to the particular species or fishery. Objectives may specify social and/or economic objectives. In some fisheries, objectives may be defined in terms of addressing further declines, rather than specifically maintaining optimum yields or biomass levels.

The team can determine compliance of the fishery with MSC requirements ~~can be determined by~~by considering how well these variously formulated objectives align with achieving sustainability as ~~expressed by MSC~~per Principles 1 and 2. Objectives that are defined to meet social needs may in some cases be consistent with achieving sustainability as articulated in Principles 1 and 2. However, to be ~~considered as~~ consistent with achieving sustainability, such objectives should not be designed to meet social needs at the expense of ecological considerations.

~~In evaluating such objectives for consistency with achieving outcomes in Principles 1 and 2, the CAB needs to~~ The team should determine ~~if~~whether the fishery is subject to considerations ~~which~~that may lead the emphasis on social or economic objectives to pose potential risks to achieving the outcomes required by Principles 1 and 2.

GSA4.7.2 Measurable objectives ▲

Example~~:~~

An example of an explicit "measurable" objective is "the impact on dependent predators will be reduced by x% over y years".

GSA4.8 Decision-making processes PI (PI 3.2.2)

Scoring issue (a) – decision making processes ▲~~Background~~

~~The focus for this PI is on the decision-making processes themselves, and if they actually produce measures and strategies **within the fishery-specific management system**. It is not an evaluation of the quality of those measures and strategies as this is covered elsewhere in the tree structure under P1 and P2. SG60, SG80 and SG100 refer to decision-making processes taking account of the wider implications of decisions. This means the processes take account of, for example, the consequences of decisions on management objectives for target species on the ecosystem, and of the impacts on those who depend on the fishery for their livelihoods.~~

~~Scoring issue (a) – Objectives~~

The CAB should interpret ~~Assessing informal and traditional approaches~~"established" decision-making processes ~~should be understood~~ to mean that:

- There is a process that can be immediately triggered for fisheries-related issues~~,~~.

- The process has been triggered in the past and has led to decisions about sustainability in the fishery. ~~These processes may or may not be formally documented or codified under an official statute.~~

These processes may or may not be formally documented or codified under an official statute.

Key considerations for assessing whether the system is well ~~-~~established or not include:

- The extent to which the system is recognised by stakeholders in the fishery ~~and~~ .
- The durability or permanency of the decision-making process.

~~CABs~~The team may need to use semi-structured interviews with a range of stakeholders to obtain information about how any decision-making process works. ~~This~~The team may ~~involve selecting~~need to select a case study event ~~(e.g., stock decline in the past, a specific observation across the fishery or other ecological change)~~ and ~~determining~~determine from interviews ~~if,~~whether and how decisions were made in response to the event. ~~As with general requirements relating to the use of semi-structured interviews, a means of cross checking views and validating CAB conclusions and scores should be evidenced.~~Appropriate case study events include:

~~Scoring issue (d) – Decision making process~~

~~Scoring issue (d) considers the importance of stakeholder access to~~

- A stock decline in the past.
- A specific observation across the fishery ~~information~~.
- Other ecological change.

As with general requirements relating to the use of semi-structured interviews, the team should provide evidence of a means of cross-checking views and ~~data,~~validating conclusions and ~~access to information on actions taken by management to ensure stakeholders are able to provide quality input into the~~ scores.

Scoring issue (b) – responsiveness of decision-making processes ▲ ~~-~~

The team should consider all constituents and operational levels of the fishery-specific management system when assessing the responsiveness of decision-making. Where relevant, the team should ensure that the assessment of this scoring issue:

- Recognises decision-making at the level most relevant to the UoA.
- Is not unduly determined by decision-making in other constituents or levels of the fishery-specific management system.

For example, the nature and severity of issues arising at different levels of a management system may vary, as might the responsiveness of decision-makers to those issues. In a co-management situation, decision-makers may need to respond to issues not directly relevant to the management of the UoA.

Similarly, in a network of local management bodies, decision-making processes in one part of the network may be materially different to those in the UoA, despite both bodies being part of the same fishery-specific management system.

Scoring issue (d) – accountability and transparency ▲ ~~Accountability should be understood in the general sense of the word, essentially that~~

The CAB should interpret "accountability" to mean that:

- Management is answerable to stakeholders on management of the fisheries~~, and that this~~.
- The answerability of management is demonstrated by the provision of information on the fishery to stakeholders.

~~The team could assess the extent to which transparency and accountability is embedded within the management system by considering the extent and means by which management provides account of, and information on, the fishery to stakeholders.~~

The data that are required to be available to stakeholders ~~excludes~~exclude data or information that ~~is~~are subject to national privacy and data protection regulation and laws associated with the fishery.

When considering ~~the~~ public access to information on ~~the~~ fisheries' performance and data, the team could ~~include consideration of~~consider:

- The extent to which accurate and up-to-date data available to management ~~is~~are reported to the public or at least accessible on request to stakeholders.
- The resolution ~~at which data are~~ of the available data.
- Whether the data and ~~ensuring that it is~~information available are appropriate to the type and nature and ~~type~~ of the fishery~~ and~~.
- Whether the data and information available are of sufficient clarity to ensure meaningful engagement of stakeholders in the decision-making process.

The availability of information to stakeholders on actions taken by management that have implications for sustainable use of fisheries resource could include:

- Availability of information, or at least non-confidentiality of information, on subsidies that may be considered to have implications for sustainability.
- Availability of information, or at least non-confidentiality of information, on who, for example licence holders, has access ~~(license holders)~~ to the resource.
- Availability of information on infractions against fishery regulation and consequent penalties and/or fines.
- Availability of information on outcomes and impact of management decision where such information is available.

~~At the **SG60** level, it should be expected that at least a general summary of information listed on on, subsidies, allocation, compliance and fisheries management decisions) is available to (fishery, government and non-government) stakeholders on request.~~

~~At the **SG80** level, it should be expected that in addition to the information provided at the SG60 level, information listed in decisions, data supporting decisions, and the reasons for decisions, are made available to all stakeholders on request.~~

~~At the **SG100** level, it should be expected that the information listed in the SG60 and SG80 levels are available openly, publicly and regularly to all stakeholders.~~

Scoring issue (e) – Approach to disputes ▲

~~Scoring issue (e) relates to the issue of approach to disputes through the presence or absence of actual legal disputes.~~

~~If a fisheries management agency is subject to court challenges, it is the record of repeated violation of the same law or regulation, the timely attempts to comply with binding judicial decisions, or acting proactively to avoid legal disputes that are important in determining the level of performance against this part of the PI.~~

When assessing the importance of any evidence relating to this issue, the team should consider ~~if~~whether any violations of the same law or regulations compromise the ability of the management system to deliver sustainable fisheries ~~in accordance with~~as per the outcomes ~~intended by~~in P1 and P2.

~~Assessment of~~When assessing fisheries against this issue, the team may consider the extent to which there may be other or higher authorities to whom fishers or other stakeholders may appeal if they are dissatisfied with fishery rules or their implementation in the fishery by local managers.

If any such appeals have been made, the team should consider and score the responsiveness or otherwise of local managers or leaders ~~should be considered and scored~~.

The team may use semi-structured interviews ~~may be used by CABs~~ to determine the extent to which stakeholders believe that local ~~'managers'/~~managers or leaders respect ~~or otherwise,~~ any judgements or decisions made by any higher or other authority.

The team can use the interviews ~~can also be used~~ to determine the extent to which:

- Managers implement their own rules.
- Stakeholders believe the management system is sufficiently proactive to avoid disputes.

~~CABs~~The team may consider collective, participative, and ~~publically~~publicly accountable involvement in management of the fishery by a broad spectrum of local stakeholders of the fishery as potential evidence of the presence of proactive avoidance of legal disputes. The team may use supporting evidence ~~may come~~ from multiple and cross-checked, semi-structured interviews ~~from~~with a range of stakeholders representing different interests within the community.

GSA4.9 Compliance and enforcement PI (PI 3.2.3) ▲

Background

~~The MSC Fisheries Standard recognises, but does not require, continued improvement in fisheries management beyond the MSC defined "best practice" standard. To meet the MSC Fisheries Standard, there must be a monitoring control and surveillance (MCS) system in place as evidence that fishers comply with the requirements of the management system and there is no evidence of systematic non-compliance (PI 3.2.3).~~

This requirement extends to compliance with management measures associated with MPAs and habitats, as well as other spatial management approaches. ~~Compliance is judged with respect to~~The team should judge compliance on the formal requirements of an MPA's management system relating to fishing activity, including any requirements for research and impact assessment, rather than with ~~respect to~~ an MPA's objectives, which are unsupported by specific PIs (see GSA3.12 for discussion of habitat management strategies).

Box ~~GSA: Marine protected areas~~GSA9: MPAs and other spatial management approaches

~~**Considering marine protected areas and other spatial management approaches**~~

~~Marine protected areas (~~MPAs~~)~~ and other spatial management approaches are potentially valuable management tools. In this context, the term “MPAs” refers to the full range of MPA categories defined by the IUCN, from strict nature reserves to protected areas with sustainable use of natural resources, and “other spatial management” including requirements that are part of fishery management arrangements or plans. ~~While there is not an~~

An MPA may or may not contribute to the delivery of a sustainable fishery and there is no explicit requirement to have MPAs or other spatial management approaches in place for fisheries to meet the MSC standard~~,~~. However, the MSC does require that the effectiveness of the management system~~—~~, to which an MPA or other approach may contribute~~—~~, is sufficient to achieve:

- The sustainability of fish and other species ~~and~~ .
- Ecosystem impacts. ~~It should be noted that an MPA may or may not contribute to the delivery of a sustainable fishery. (See GSA4.9 for discussion on MPAs and compliance.)~~

Assessing informal and traditional approaches

~~In all scoring issues in this PI, assessments may consider~~When evaluating the ~~likelihood of infractions in a particular fishery as the basis for determining the suitability of the MCS system for the fishery.~~

~~Evaluation of~~ effectiveness of MCS in fisheries where a less-formalised MCS system exists, the team may consider the role and effectiveness of a range of factors in deterring illegal activity. These factors may include the following:

~~SC78 Social disapproval;~~

- Social disapproval, such as public “naming and shaming”, for violating fishery customs, rules, or regulations important for sustainability.
- Fines and penalties imposed by community institutions or other local bodies.
- Prevailing norms~~;~~.
- Self-monitoring~~;~~.
- Presence of community fish watchers or wardens~~;~~.
- Accessibility to the resource~~;~~.
- Ability to smuggle catches onshore without detection~~;~~.
- Mobility and homogeneity of the members of the fishery~~;~~.
- Exclusivity of access and market-related factors such as value, demand, or preferences (~~e.g., preferences~~for example, regarding size).

Scoring issue (a) – Monitoring, Control, and Surveillance system ▲

An MCS system (SG80) is a suite of well-integrated mechanisms and tools that work together to improve compliance with regulations. An MCS system should cover all 3 dimensions of routine fishing operations[108] (as listed below), and include reporting requirements and physical inspections:

- Prior to fishing (e.g. valid documentation, training and vessel set-up).
- During fishing.
- During landing of catch.

[108] FAO (2002) Chapter 8: Fishery monitoring, control and surveillance (Bergh, P.E. and Davies, S.). In A Fishery Manager’s Guidebook – Management Measures and their Application (ed. Cochrane, K.L.). Fisheries Technical paper 424. Rome, Italy. 231pp.

At SG100, a comprehensive MCS system is as described for SG80 and SA4.9.3~~The extent to which fishery participants are subject to fines, penalties or other repercussions, or disincentives such as public "naming and shaming", for violating fishery customs, rules or regulations important for sustainability may also be considered. These may include fines and penalties imposed by community institutions or other local bodies.~~

, but should also be risk-based, adaptable, and able to respond to issues in a timely and transparent manner. It should include a process for compliance data acquisition and analysis and, where appropriate to the fishery, should include physical inspections both onshore and at-sea.

Scoring issue (b) – sanctions ▲

At SG80 and SG100 ~~for scoring issue (b), in some fisheries management systems, or for particular types of fisheries, it may be difficult to demonstrate an ability to enforce relevant management measures, strategies and/or rules if violations are rare. However, an absence of violations (or absence of a record~~, the severity of sanctions and ~~penalties for violations) does not necessarily indicate that~~ their likelihood to deter non-compliance should be appropriate and adequate to the UoA, such that they provide deterrence.

At SG100, comprehensive sanctions are those that can respond to a wide range of infringements, in various ways, in order to ensure effective deterrence. For example, the sanctions may be graduated (i.e. consist of a series of structured incremental sanctions of increasing severity) or multifaceted.

Scoring issue (d) – compliance outcome ▲~~and~~

If a UoA has few non-compliance issues and infringements, it may be difficult to demonstrate effective enforcement ~~are effective;~~of management measures. This scenario may not indicate highly effective MCS. Instead, it ~~could mean~~may imply that MCS is ~~in fact~~ ineffective, and ~~what is happening is an absence of detection~~infringements are not being detected or recorded. In contrast, a high number of infringements within a UoA may imply an effective and transparent MCS system. The team should therefore use expert judgement when evaluating information from management authorities.

~~Scoring issue (c) Compliance~~

~~In scoring issue (c), at SG60, SG80 and SG100, while assessing the existence and implementation of MCS surveillance systems, efforts to inform fishers about their obligations under the fishery-specific management system may be considered, but the assessment should not be limited to this.~~

The team should consider regulations specific to governing sustainable fishing practices on the water as those associated with the 'how, what, where, and when' of fishing activities. They may include (but not be restricted to):

- Regulations associated with gear restrictions.
- Catch reporting, quota limits.
- Landing obligations.
- By-catch.
- Spatial and temporal restrictions.

These regulations are important in achieving and maintaining sustainable fisheries and should therefore be considered at all jurisdictional levels.

The team should interpret "systematic non-compliance" as recurring infringement of regulations in a coherent and coordinated manner. For example, if large number of fishers in the UoA are not complying with regulation(s) on a regular basis, the team should regard this as systematic non-compliance. Ad hoc infringements by individual fishers should not constitute systematic non-compliance. Systematic non-compliance demonstrates that the MCS enforcement mechanisms and sanctions in place are not effective in preventing frequent re-offence by the UoA. When assessing scoring issue (d), systematic non-compliance is specific to those regulations governing sustainable fishing practices on the water.

At SG80 and SG100, "majority of regulations" is not restricted to regulations specifically governing sustainable fishing practices on the water (i.e. as defined at SG60). Instead, it should include regulations associated with the 3 dimensions of routine fishing operations outlined in 'Scoring issue (a) – Monitoring, Control, and Surveillance system' above.

GSA4.10 Monitoring and management performance evaluation PI (PI 3.2.4) ▲

~~Background~~

~~This PI focuses on whether the management system has a process of monitoring and evaluating management performance, appropriate to the cultural context, scale and intensity of the fishery, and relevant to fishery-specific management and supporting structures that are able to effect change. This PI intends to evaluate if the management system itself is reviewed, not to re-assess the efficacy of the previous PIs.~~

Fishery-specific management system

In both scoring issues and in each SG under this PI, relevant parts of the fishery-specific management system may include:

- A decision-making process that responds to both wider management issues of stock-wide~~,~~ and/or specific local stakeholder concerns~~;~~.
- Data collection~~;~~.
- Scientific research~~;~~.
- MCS ~~(i.e.,~~ : Compliance and enforcement PI 3.2.3~~)~~~~;~~.
- Collaborating in and initiating a fishery-specific or national research plan~~;~~.
- Responding to feedback and response~~, and~~.
- Monitoring systems as required by the management strategy and information PIs in P1 and P2.

Assessing informal and traditional approaches

~~Assessing informal and traditional approaches~~

~~Assessments against~~When assessing this PI ~~may~~, the team should consider:

- Whether there are opportunities and/or forums for decision-makers to receive feedback on the management system. ~~It should also consider other practices such as exchange of information between the community and the management institution. The regularity of such opportunities should be considered in scoring fisheries against both scoring issues in this PI.~~
- Other practices such as exchange of information between the community and the management institution.
- The regularity of such opportunities.

Where community organisations are operational, these monitoring systems can be self-determined~~, but do~~. However, they require the support of an external evaluation from a higher authority, and evidence that specific checks may be made. The external authority might include provincial or national government agency, university, NGO, or donor. ~~Activities that should be verified~~

To verify activities, the team should ensure compliance with the following indicators:

- An effective organisational structure to implement decisions and corrective actions~~;~~ .
- Evidence that policies are formulated, initiated, and monitored~~, and~~ .

- Where relevant, activities take account of community and scientific advice, which may include consideration of supporting risk assessments ~~undertaken~~conducted by a scientific organisation or university~~;~~.
- Evidence of an effective system of custodial management and self-determined fisheries control systems.

The ~~process of review,~~team should ~~however,~~ not ~~be explicit~~ limit the review process to a sub-management or community organisation. ~~In the event~~It may be that national or provincial government departments delegate specific duties to sub-management organisations, where key parts of the management system require stock-wide management, beyond community level~~, a~~. In such cases, the team review should ~~also include the~~ take into account:

- Higher authorities and their performance in ensuring management against national and international measures~~, and that the correct tools are in place to ensure that appropriate decisions at national level and passed down to the sub management and community organisations~~.
- Whether the correct tools are in place to ensure that appropriate decisions at the national level are passed down to the sub-management and community organisations.

GSA4.10.1 External review ▲

~~At SG80 and 100, "external review" means external to the fisheries management system, but not necessarily international.~~ Depending on the scale and intensity of the fishery, ~~it~~external review could be by:

- Another department within an agency~~;~~.
- Another agency or organisation within the country~~;~~.
- A government audit that is external to the fisheries management agency~~;~~.
- A peer organisation, nationally or internationally~~, and~~.
- External expert reviewers.

End of Annex GSA Guidance

~~Annex~~

End of Section SA Guidance

~~Section~~ GSB Modifications to the default tree for enhanced ~~Bivalve Fisheries~~bivalves – guidance ▲

Foreword to ~~Annex~~Section GSB

~~Annex~~Section GSB is intended to provide supplemental guidance and interpretation when applying:

- The default assessment tree (Sections SA, GSA~~(Annexes SA, GSA) and~~).
- The modifications to the default assessment tree (Section SB~~it (Annex SB)~~) for assessing enhanced bivalve fisheries.

The numbering of sections in this ~~Annex~~Section corresponds to the equivalent sections in Section SB~~.~~.

GSB2 Principle 1

GSB2.1 General requirements for Principle 1 ▲

~~With enhanced catch-and-grow (CAG) bivalve fisheries, management is not based on reference points or the concept of managing stock size. Shellfish are either captured as larvae on ropes or caught as seed and moved to favourable areas for grow out. Instead of removing animals from the system, survivorship is improved through the provision of substrate and better growing conditions. In the end, this process may actually contribute to increasing stock size and biomass instead of reducing it. Since~~Because bivalve culture cannot lead to exploitation rates that approach ~~limit reference points~~LRPs, it is not managed as such. Scoring enhanced CAG bivalve fisheries for P1 stock status is therefore not usually appropriate. However, ~~teams~~the team should still ~~need to~~ determine that there is no threat to the target species~~, and if so confirmed~~. Once this has been determined, the team should confirm there is no need to:

- Score P1~~ nor to~~.
- Have a P1 expert on the team.

~~Management strategies for bivalve culture are based on limiting the impact of the farming activity on the environment, with a particular focus on carrying capacity and benthic habitats. The strategies usually contain a number of elements such as number of farms per site, number of lines per farm, and locations where farming can and cannot occur (to protect certain habitat types). Information on biomass produced is gathered but not for the purpose of assessing stock status. Production surveys can provide management with useful information when used in combination with other environmental indices to give a good picture of the risk posed by the farming activity to the environment. However, they are not measures designed to maintain the wild population at high productivity levels or~~ ~~B_{MSY}~~. ~~Therefore, scoring the harvest strategy and harvest control rules and tools PIs for shellfish farming is not appropriate.~~

GSB2.1.~~2~~3 Translocation ▲

Translocations of marine shellfish have the potential to affect the genetic integrity of wild populations, depending on the scale of the translocation. The team should:

- Examine each situation.
- Provide rationale and evidence explaining the level of risk if it exists.

The team can achieve this by scoring the genetic outcome PI.

GSB2.1.5 Scoring Principle 1 PIs ▲

To ensure that the exploitation of the source seed resource is properly managed, the team should score enhanced CAG bivalve fisheries involving translocations that remove seed stock from source locations ~~should be scored against the stock status, harvest strategy/control rules and tools PIs to ensure that the exploitation of the source seed resource is properly managed. Since it is problematic to assess stock size in relation to biomass or fishing mortality, the RBF may be used.~~ against the following PIs:

- Stock status.
- Harvest strategy/control rules, and tools PIs.

Because it is problematic to assess stock size in relation to biomass or fishing mortality, the team may use the RBF (MSC Fisheries Standard Toolbox Tool A).

In addition to genetic impacts, moving shellfish from one geographic area to another can introduce disease and/or pests, which affect the parent stock and other species within the ecosystem. For CAG fisheries that involve translocation, the assessment team should examine each situation and provide rationale and evidence explaining the level of risk if it exists. The team can achieve this by scoring the translocation PIs within Principle 2.

Note that management bodies may define shellfish translocations based on movement of shellfish between/among areas where harvest is permittable or not (e.g. between areas with differences in water quality, or risk of pest or disease). As such, when determining risk from translocations in scoring, the team should consider any management measures in place, including efforts to address potential disease and/or pest concerns to the species and geographic region where the individuals are out-planted. Examples of practices for managing disease and/or pest impacts from CAG enhancement include:

- Guidance on identification of pest and disease species.
- Detailed information on the current location and extent of pest and disease species.
- Quarantine and control measures.
- Licensing and permitting, whether that be for facilities, location(s), and/or translocation activities.

GSB2.3 Genetic management PI (PI 1.2.5)

Scoring issue (b) – plausible argument ▲ ~~Translocations of native species among different geographic areas may also pose risks to the genetic diversity of wild populations. This issue is most often associated with escapes from salmon net pen culture. However, the life history and genetic characteristics of bivalve populations are very different from those of salmon and other finfish. Salmon populations are highly structured by homing behaviour and adaptations to natal freshwater spawning grounds. Marine shellfish, on the other hand, have widely dispersing planktonic larvae and typically show minimal genetic divergence over broad spatial scales.[109] While there is a low risk for translocations of marine shellfish to affect the genetic integrity of wild populations (depending on the scale of the translocation), it is still necessary for assessment teams to examine each situation and provide rationale and evidence explaining the level of risk if it exists. This will be achieved by scoring the Genetic outcome PI.~~

~~GSB2.1.3 Hatchery~~

~~The use of hatchery propagated seed in bivalve fisheries is increasing. Although beneficial to stocks undergoing restoration or rebuilding, hatchery enhancement may also pose a risk to wild populations. Hatchery-based enhancement may reduce the genetic diversity of wild stocks, leading to reduced fitness and adaptability. This is brought about by intentional or unintentional artificial selection (“domestication” selection) in the hatchery environment. Certain practices that are used in hatcheries~~

[109] Hedgecock D, S Edmands, and P Barber. 2007. *Genetic approaches to measuring connectivity. Oceanography* 20:70-79.

~~to maximise larval survival and growth may lead to decreased survival when seed is placed in the wild. For example, the fine-mesh screens used in shellfish hatcheries to cull small individuals from larval cultures may also select for rapid larval development. If rapid larval development in the hatchery environment were to correlate with poor post-settlement survival and growth, the reproductive success of the wild population may be compromised. This is especially true if the use of hatchery seed is widespread and overwhelms local wild stocks. Many traits could be subject to such domestication selection, and it would be difficult to develop a practical methodology by which to measure genotype-by-environment interaction for larval traits across both hatchery and natural habitats. Nevertheless, risks from hatchery enhancements on genetic diversity or adaptation are manageable with appropriate designs and monitoring.[110]~~

~~Efforts should be made to address genetic concerns specific to the species and the geographic region where the seed will be out-planted. Best practices for managing the genetic impacts of hatchery enhancement include:~~

~~SC79 maintaining a large number of broodstock to ensure against inbreeding and random genetic changes;~~

~~SC80 rotating broodstock within spawning seasons and between years;~~

~~SC81 avoiding the return of hatchery-propagated stock to the hatchery and using it as broodstock;~~

~~SC82 using local broodstock to limit the mixing of genetically divergent populations;~~

~~SC83 maintaining the scale of hatchery enhancement and the reproductive potential of hatchery seed well below the size and reproductive potential of the wild population.~~

Examples of plausible argument used in scoring issue (b) may include general experience, theory, or comparisons with similar fisheries or species.

GSB3 Principle 2

GSB3.1 General requirements for Principle 2

~~All Principle 2 PISGs are applicable to enhanced hatch-and-catch (HAC) bivalve fisheries.~~

GSB3.1.~~1~~2 ▲

There are normally no ~~primary or secondary~~in-scope species captured in enhanced CAG bivalve fisheries based solely on ~~sprat~~spat collection~~; therefore~~. Therefore, the team does not need to score PIs for ~~primary and secondary~~in-scope species ~~do not need to be scored. Fisheries with some level of~~. However, for fisheries where dredging~~, however,~~ may involve the capture of ~~primary or secondary~~in-scope species~~; for these species the primary and secondary PIs are~~ , the team is required to ~~be scored~~ score the in-scope PIs as per Section SA~~the requirements in Annex SA.~~.

There is a potential for enhanced CAG bivalve fisheries to interact with ETP/OOS species.

GSB3.1.~~3.1~~4.2 ▲

For suspended culture~~, the~~ systems, when scoring ~~of~~ Principle 2 habitat PIs, the team should ~~clearly~~ focus on the benthic impacts of bio-deposition and organic enrichment~~, and the~~.

When scoring ~~of~~ ecosystem PIs, the team should ~~clearly~~ focus on issues relating to:

- Carrying capacity ~~and~~ .

[110] Hedgecock D, and K Coykendall. 2007. Genetic risks of hatchery enhancement: The good, the bad, and the unknown. In *Ecological and Genetic Implications of Aquaculture Activities*. Edited by TM Bert, pp. 85-101. Dordrecht: Springer.

- The trophic effects of bivalve filtration/feeding.

~~Benthic Organic Enrichment~~

~~One way in which suspended bivalve culture can impact the environment is by increasing the amount of organic material that settles on the seabed. When shellfish feed, they filter organic matter from the water column and repackage it into faster sinking particles. As this organic sediment builds up underneath bivalve farms, changes to benthic habitat and communities may occur. The extent and severity of these habitat changes is most often site specific and relate to a variety of factors including the following:~~

~~SC84 Scale, duration, and intensity of shellfish production.~~

~~SC85 Growing practices and methods.~~

~~SC86 Concentration of suspended organic matter available for shellfish filtration.~~

~~SC87 Water depth and sedimentation rate.~~

~~SC88 Local currents and prevailing winds.~~

~~During certain situations these factors may combine to produce significant negative effects that can be seen at both the local and wider ecosystem level.~~

~~Total 'free' sulphide (S^{2-}) in surficial (0-2 cm) sediments is a cost-effective indicator of the organic enrichment effects of suspended shellfish cultivation on benthic communities. In general, there is a consistency between changes in various biological and geochemical variables and total S^{2-} in surface sediments along organic enrichment gradients. Other metrics such as redox potential, sediment oxygen demand, sediment organic content and benthic diversity indices may also be used to assess a specific farming operations impact on the benthic environment but are less ideal due to measurement challenges, costs and/or inherent variation.[111]~~

~~Impacts to benthic biodiversity resulting from increased S^{2-} concentrations can be significant and occur even at low S^{2-} levels. The transition from normal to hypoxic conditions has been identified as occurring at 1,500 µM S^{2-}. This threshold represents a transition from "moderate" to "reduced" macrobenthic sulphide concentration and changes in the benthic macrofauna community structure. Anoxic sediments are characterised by S^{2-} concentrations >6,000 µM. A transition within the hypoxic class of sediments at 3,000 µM has been identified where less S-tolerant taxa disappear but more tolerant opportunistic species have not yet increased in abundance. S^{2-} levels above 3,000 µM represent a condition that exerts severe hypoxic stress on benthic community structure and characterise a polluted sediment condition that poses a high risk to benthic habitat.~~Shellfish farming may occur where the natural benthic environment is already heavily enriched with organic matter prior to the initiation of any culture activities. In ~~these~~such cases, ~~comparing~~the team can compare measurements taken underneath farms to measurements taken in control sites outside ~~of~~ the farm ~~can~~to show that the culture activity is not directly responsible for the anoxic conditions.

~~Assessment teams~~The team could apply the sulphide (S^{2-}) methodology in justifying ~~their~~its scores for habitat status:

- For **SG60**, the ~~**SG 60** level for habitats, assessment teams must~~team is required to justify that the fishery is "**unlikely**" to reduce habitat structure and function to a point where there would be serious or irreversible harm. This could correspond to levels of total ~~'free' sulfide~~S^{2-} in surficial sediment beneath farms of ≤ 3,~~000 µM~~000µM.
- For **SG80**, the ~~**SG 80** level for habitats, assessment teams must~~team is required to justify that the fishery is "**highly unlikely**" to reduce habitat structure and function to a point where there would be serious or irreversible harm. This could correspond to levels of total ~~'free' sulfide~~S^{2-} in surficial sediment beneath farms of ≤ 1,~~500 µM~~500µM.
- For **SG100**, the ~~**SG 100** level for habitats, assessment teams must~~team is required to justify that there is evidence that the fishery is "**highly unlikely**" to reduce habitat structure and function to a point where there would be serious or irreversible harm. This could correspond to negligible levels

[111] Bivalve Aquaculture Dialogue. 2010. Bivalve Aquaculture Dialogue Standards. http://www.worldwildlife.org/what/globalmarkets/aquaculture/WWFBinaryitem17872.pdf

of total ~~'free' sulfide~~S^{2-} in surficial sediment beneath farms, such as would be found at background levels for that environment.

Phytoplankton depletion/ecological carrying capacity

~~Bivalve aquaculture dominates the energy flow of a marine system when the phytoplankton consumed by the total production of cultured molluscs exceeds the combined reproduction rate and tidal replenishment rate of phytoplankton in the system. If phytoplankton consumption due to culture activities exceeds ecological carrying capacity, significant changes to ecological processes, species, populations, or communities in the growing environment may occur.~~ Methods for determining the impact of suspended bivalve farming operations on phytoplankton depletion range from simple clearance- and retention-time calculations to expensive and complex computer modelling of ecological carrying capacity of affected water bodies. While it can be difficult to account for all the variables involved in coastal ecological processes, ~~relatively~~the team can use simple calculations ~~can be used~~ to determine whether or not production is "likely" to be sustainable.

The main threat associated with the translocation of shellfish is the introduction of diseases, pests, or invasive species. ~~There are many historically documented cases of shellfish introductions serving as vectors for disease and non-native species. In some of these cases the introductions have resulted in mass mortalities of native species and severely disrupted ecosystems. Biosecurity measures have been put in place in many areas in order to prevent such occurrences; yet regulations and enforcement may be insufficient to prevent intentional or accidental introductions.~~ It is important that the team assesses these risks ~~are assessed~~ through established protocol ~~and~~that is validated through independent scientific review. For general guidance on translocation, see GFCP G7.7.1.2.b.

The removal of seed from an area either through dredging or spat collection may have P2 impacts ~~(e.g., habitat impacts of the dredging activity or ecosystem impacts from seed removal). For this reason CABs should consider P2 impacts for all sources of shellfish seed~~.

GSB3.2 Translocation outcome PI (PI 2.5.1)

Scoring issue (a) – non-native species ▲

In scoring issue (a), the team should interpret "non-native species" to mean a species not already established in the ecosystem.

GSB3.3 Translocation management PI (PI 2.5.2)

Scoring issue (b) – plausible argument ▲

Examples of plausible argument used in scoring issue (b) may include general experience, theory, or comparison with similar fisheries or species.

GSB4 Principle 3

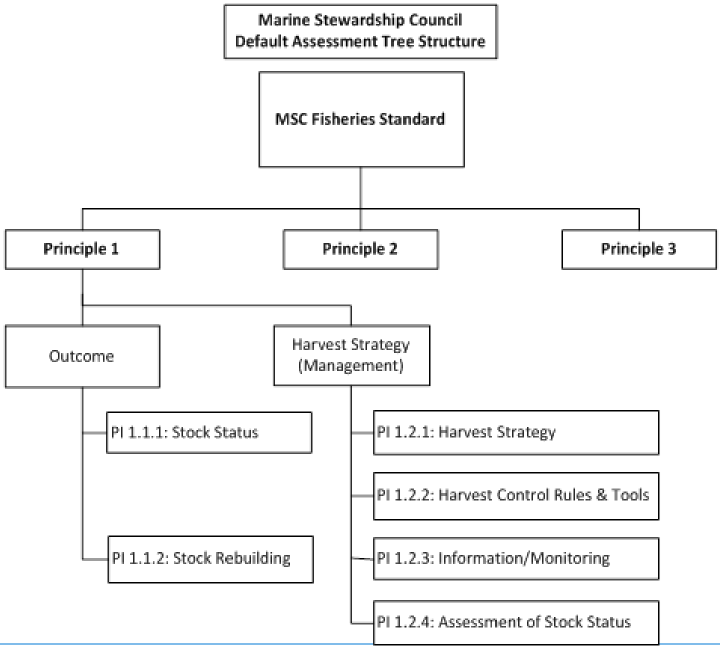
GSB4.1 General requirements for Principle 3 ▲

In cases where P1 is not scored, when scoring ~~of~~ P3, the team should focus only on the relevant management systems applicable to maintaining ~~sustainable~~ P2 outcomes.

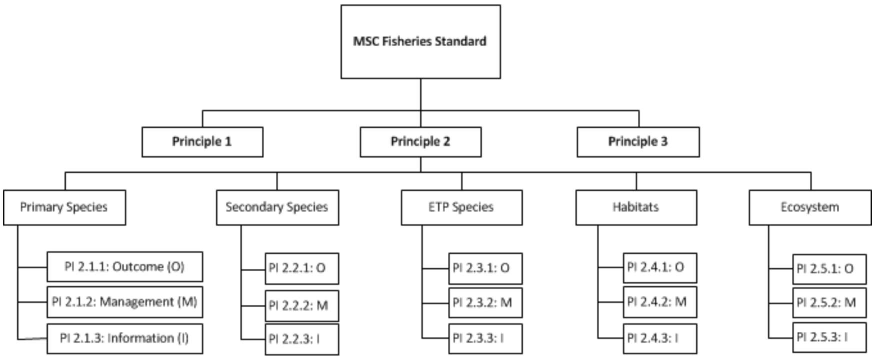
~~Assessment Trees for Enhanced Bivalve Fisheries~~

~~See following Figures~~

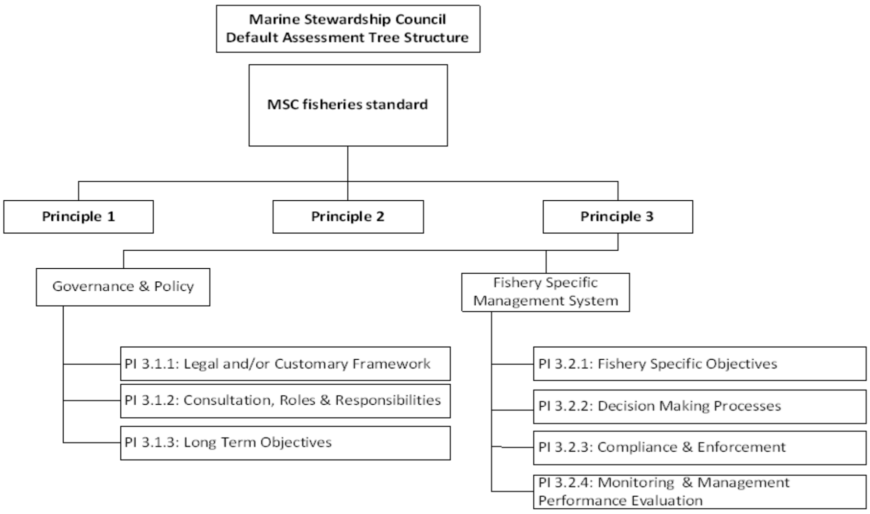
~~Figure GSB: Default assessment tree: Principle 1~~



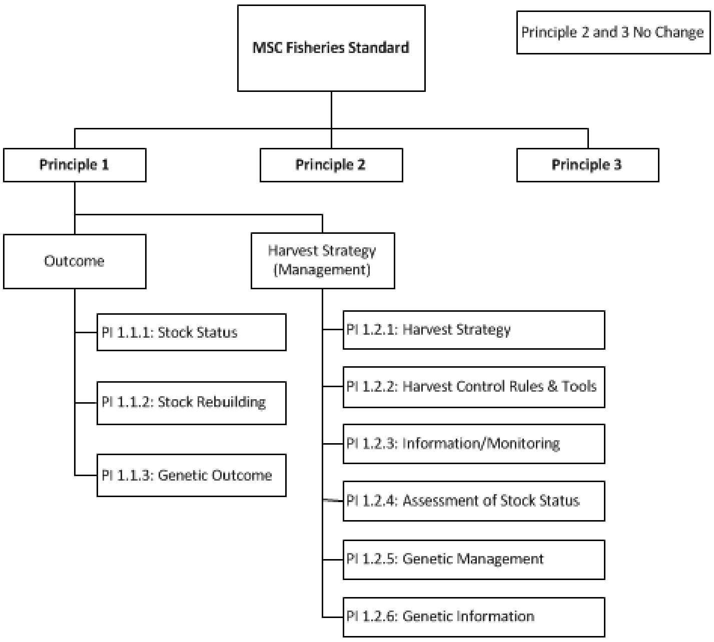
~~**Figure GSB: Default assessment tree: Principle 2**~~



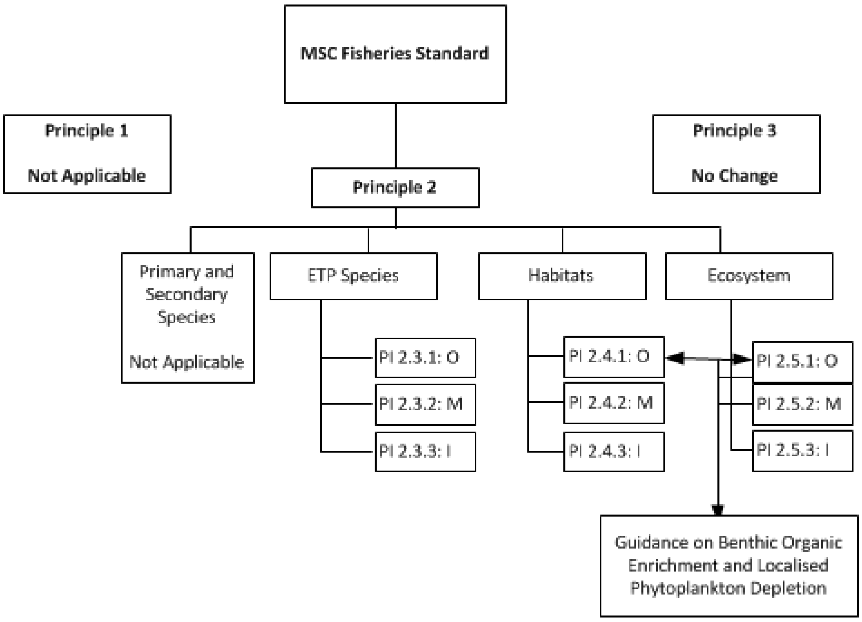
~~**Figure GSB: Default assessment tree: Principle 3**~~



~~**Figure GSB: Enhanced HAC bivalve fishery Principle 1**~~

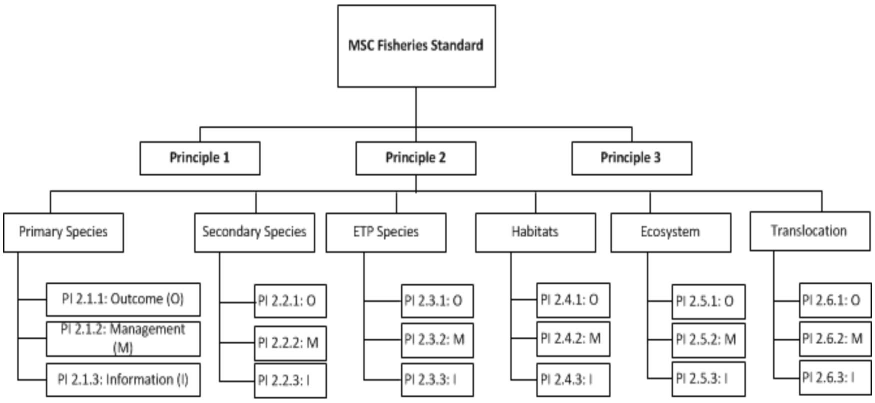


~~**Figure GSB: Enhanced CAG bivalve fishery based solely on spat collection without translocation: Principle 2**~~

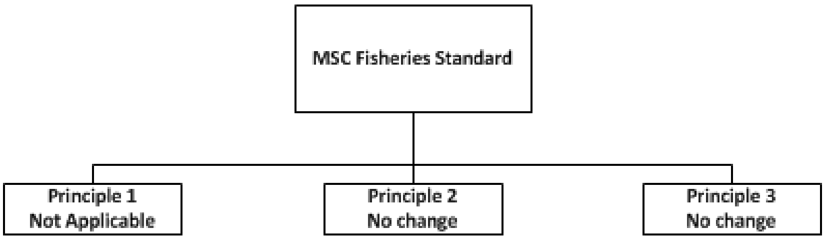


~~**Figure GSB: Enhanced CAG bivalve fishery based solely on spat collection with translocation: Principle 1**~~

~~Figure GSB: Enhanced CAG bivalve fishery based solely on spat collection with translocation: Principle 2~~



~~Figure GSB: Enhanced CAG bivalve fishery with seed collection by dredging/fishing and no translocation: Principles 2 and 3~~



~~**Figure GSB: Enhanced CAG bivalve fishery with seed collection by dredging/fishing and translocation: Principle 1**~~

~~**Figure GSB: Enhanced CAG bivalve fishery with seed collection by dredging/fishing and translocation: Principle 2**~~

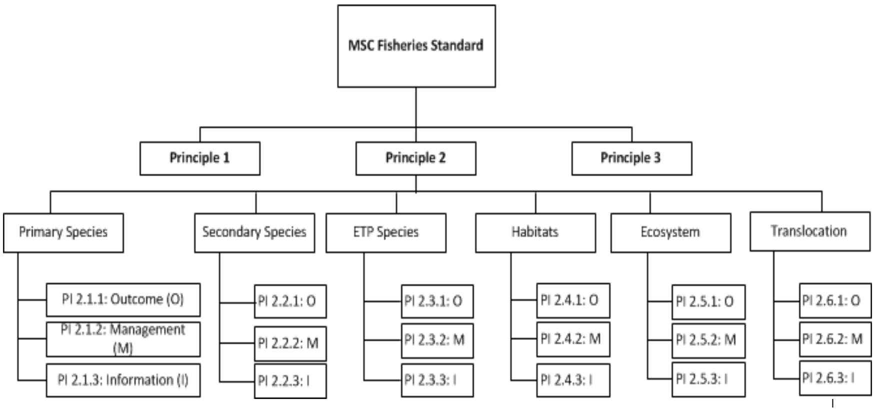


Table GSB1: Summary of scoring required for different types of enhanced bivalve fisheries

End of Annex GSB Guidance

Fishery type									
	Enhancement type	Spat/Seed collection type	Trans-locationTranslocation occurring	Principle 1	Genetic outcome (P1)	Genetic management & information (P1)	Translocation PIs (P2 impacts)	Primary SpeciesIn-scope species (P2)	Secondary Species
1	HAC	Hatchery produced		✓✓	✓✓	✓✓		✓✓	✓
2	CAG	On ropes/ collectors							
3	CAG	On ropes/ collectors	✓✓	✓ ✓ (RBF)	✓✓		✓✓		
4	CAG	By dredging						✓✓	✓
5	CAG	By dredging	✓✓	✓✓ (RBF)	✓✓		✓✓	✓✓	✓

~~Annex~~ End of Section SB Guidance

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Section GSC Modifications to the default assessment tree for salmon fisheries ~~– Guidance~~

Foreword to ~~Annex~~Section GSC ~~Guidance~~ ▲

~~Salmon assessments differ from assessments of wholly marine species due to their complex population structure and the existence of artificial production in some places. They are complicated by the fact that any one salmon fishery may simultaneously harvest multiple populations and/or species, where each population and species can have different inherent abundances and productivities and therefore different abilities to persist in the presence of a given long-term harvest rate.~~

~~Annex~~Section GSC provides guidance and interpretation in applying:

- The default assessment tree (Section SA~~) and~~).
- The modifications for salmon fisheries (Section SC~~(Annex SC),~~), based on the above considerations.

~~Assessment teams~~The team should not deviate from this guidance without justification.

~~For the purposes of the MSC,~~ Salmon fisheries with an enhancement component are required to conform to the scope criteria in Table 1~~Table 1 in the . Enhancement is used to define~~ of the Standard.

The CAB should interpret "enhancement" as any activity aimed at:

- Supplementing the survival and growth of ~~one~~1 or more aquatic organisms, or ~~at~~
- Raising the total production or the production of selected elements of the salmon populations beyond a level that is sustainable by natural processes.

GSC1 General requirements

GSC1.1.1 ▲

For the purposes of salmon assessments, the ~~assessment~~ team should consider ~~Annex~~Section GSC guidance as taking precedence over Section GSA. Where no guidance is provided, the team should use Section GSA~~be used~~.

~~GSC1.1.2~~

~~All salmon fisheries, even those that are not enhanced, are scored in all PIs in .~~

GSC1.1.3 ▲

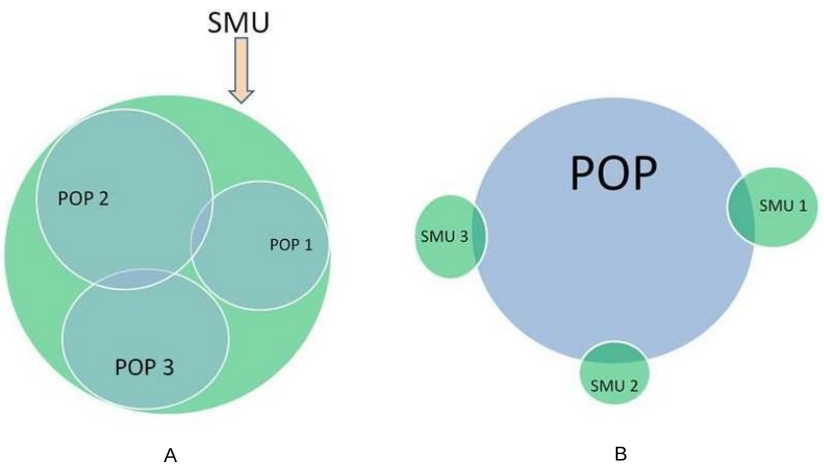
Examples of stock management units (SMUs) and populations are shown in Table GSC1.

Table GSC1: Terms and definitions

Term	Guidance to definitions in Annex SC
Population	Examples of populations, ~~one~~1 or more of which would normally comprise a single SMU, include: • Conservation Units (CUs) under Canada's Policy for the Conservation of Wild Salmon Policy (WSP ~~or~~).

Term	Guidance to definitions in Annex SC
	• Evolutionarily Significant Units (ESUs) under ~~NOAA's~~the National Oceanic and Atmospheric Administration (NOAA)'s application of the US Endangered Species Act for salmon.
Stock Management Unit ~~(SMU)~~	In practice, an SMU may~~ be comprised of~~: • Comprise an array of wild production components, such as populations of Prince William Sound pink salmon ~~(~~(Figure GSC1 scenario A~~) or it may~~). • Represent a collection of populations such as early summer, summer, or late Fraser River sockeye. In some situations, a population may be larger and more widely distributed than the ~~localized~~localised management units, such as terminal chum fisheries in British Columbia (Figure GSC1~~(~~: scenario B). In this situation, the team may treat these component SMUs ~~may be treated~~ as ~~one~~1 SMU for assessment purposes as long as the impacts of fishing on the population and the component SMUs are similar. Reference points are set for and evaluated at the SMU level, taking into account specific thresholds or other constraints that apply to ~~one~~1 or more component populations of that SMU.

Figure GSC1: ~~Two~~2 potential scenarios illustrating the relationship between populations and SMUs



GSC2 Principle 1

GSC2.1 General requirements for Principle 1

GSC2.1.1 ▲

In P1, the complexity of salmon population dynamics requires that ~~within Principle 1~~the team should consider the sustainable management of salmon ~~should be considered~~ at ~~two~~2 levels[112] ~~(Portley and Geiger 2014[113]);~~:

- **Level 1: the level of the SMU**. The objective of management should be to:
    - Ensure that spawner abundance in the SMU is maintained at a level consistent with high production ~~(;~~ for example, for a target such as spawner abundance at maximum sustainable yield (S_{MSY}~~,~~), or a proxy that reflects equal or lower risks to ~~one~~1 or more populations~~)~~.
- **Level 2: the level of the populations within an SMU**. The objective of management should be to:
    - Ensure that the diversity and productivity of these populations are maintained at levels that ensure a high probability of persistence over time~~, and~~.
    - Enable them to ~~allow that they could~~ rebuild to high production in time in the absence of fishing.

GSC2.2 Stock status PI (PI 1.1.1) ▲

In PI 1.1.1, the team should assess the status of an SMU ~~is assessed~~ in relation to reference points.

The definition of the SMU, establishment of its reference points, and design of its related management strategy should ~~take into consideration the need to manage populations within the SMU to reflect the different productivities and other features of those populations, and should follow the guidance for PIs 1.2.1 to 1.2.4 as appropriate.~~:

- Take into consideration the need to manage populations within the SMU to reflect the different productivities and other features of those populations.
- Follow the guidance for PIs 1.2.1 to 1.2.4 as appropriate.

Scoring issue (b) – TRPs ▲

Examples of TRPs include target escapement goals and target harvest rates.

GSC2.2.1 ▲

Field Code Changed

Escapement-based reference points generally refer to spawner abundance only in assessments of current status relative to ~~limit~~LRPs and ~~target reference points.~~TRPs. The team may, where other reference points are used, refer to GSA2.2.3~~such as~~ . Example of other reference points include:

- Target harvest rate~~,~~ .
- Fishing mortality ~~or~~ .

[112] Portley, N., and Geiger, H.J. (2014) *Stock management units and limit reference points in salmon fisheries: Best practice review and recommendations to the MSC*. Marine Stewardship Council Science Series 2: 89–115.
[113] Portley N and Geiger HJ (2014) *Stock management units and limit reference points in salmon fisheries: Best practice review and recommentdations to the MSC*. Marine Stewardship Council Science Series 2: 89 – 115.

- Other proxies~~ teams may refer to~~ .

GSC2.2.2 ▲

~~Assessment teams are required to~~ The team should evaluate whether achievement of spawning goals is solely for wild ~~(~~, natural-origin~~)~~ salmon, ~~i.e.,~~ after excluding:

- Hatchery fish~~,~~ .
- The contribution from spawning channels~~, and~~ .
- Removal of fish for hatchery ~~brood stock~~broodstock.

GSC2.2.2.1–2 ▲

~~Factors that~~The team should ~~be considered~~consider the following factors in estimating escapement of only wild fish~~ include~~:

- Relative abundance of artificially-produced versus wild salmon.
- Presence and enumeration of artificially-produced fish in the salmon fishery and on the wild spawning grounds~~, and~~.
- The management system's intent ~~of~~as to how artificially-produced fish are accounted for in ~~terms of~~ meeting reference points.

~~GSC2.2.2.2~~

~~Where the management does not make a distinction between wild and artificially-produced salmon, assessment teams should reduce the score of the PI by a factor which reflects the magnitude of the uncertainty in the estimates of stock status caused by the lack of enumeration of artificially produced fish.~~

GSC2.2.3 ▲

~~In some situations~~ Scoring PI 1.1.1 for salmon fisheries ~~is not straightforward.~~can be complex. Where the following situations arise, the following guidance applies:

- If there are no ~~limit reference points~~LRPs defined by management, as is often the case with salmon fisheries, ~~assessment teams~~the team should refer to GSC2.7~~the guidance in~~ .
- ~~In the event that~~ If 15 years of data are not available, the team should apply equivalent percentages ~~should apply~~ to the timeframe that is available.
- If the ~~target reference point~~TRP is expressed as a range, with an upper and a lower bound~~,~~:
  - The SMU should have met or exceeded the mid-point of the escapement goal range, and/or ~~the assessment~~
  - The team should look for evidence that directed fishing is lowered as the lower bound is approached.
- The threshold levels in SC2.2.3.1 and SC2.2.3.3 assume an approximately random distribution of performance over the 15-year period. Where this is not the case, and there is instead a consistent trend downwards such that most of the failures to reach the escapement goals were in the most recent years, then ~~SG 80~~SG80 is not met.
- ~~For~~ The team may consider each cycle line separately in the case of:
  - Species or stocks that display cyclic dominance, such as pink salmon where separate stock dynamics pertain to alternate years, or ~~Fraser sockeye where each cycle line spawns only every fourth year, each cycle line may be considered separately.~~

- Fraser sockeye where each cycle line spawns only every 4th year.

For example, the team may assess pink salmon even-year and odd-year populations ~~should be assessed~~ separately.

~~SC89 Long-term climate and ecosystem changes often affect salmon production and abundance.~~

Consideration of environmental variability and its impact on stock status is covered in SA2.2.7.

GSC2.3 Stock rebuilding PI (PI 1.1.2) ▲

The requirements for rebuilding salmon SMUs differ from those for other species in the following ways~~;~~:

- The complex structure of salmon stocks requires rebuilding strategies to account for specific populations that may have lower productivities than the SMU average. One example is effective differential harvest protection through proven time and area strategies to ~~minimize~~minimise harvest impacts on low-abundance or less-productive populations.
- Reduced stock status may be caused by:
  - The fishery, ~~other human intervention such as habitat degradation, or environmental change. In the former~~in which case the rebuilding strategy is the responsibility of the fishery management agency.
  - Other human intervention such as habitat degradation or environmental change.
- If~~, in the latter two cases,~~ reduced stock status is caused by human intervention and the impact is out of the management control of the fishery ~~(i.e., the fishery management agency)~~, the fishery response should take into account the multipurpose nature of the use patterns in those waterways ~~(e.g.,~~. For example, the fishery management agency should adjust management goals either up or down to be appropriate to the new productivity of the system~~)~~.

Scoring issue (c) – use of enhancement in stock rebuilding ▲

In scoring issue (c), use of enhancement in stock rebuilding, the team should consider the following:

- **Routine use** of artificial production to meet escapement goals as a rebuilding strategy ~~could be described as simply using artificial production to~~ , and therefore mitigate "overfishing" and maintain harvest rates that are not sustainable, ~~and therefore~~ would generally not meet ~~the~~ SG60 ~~guidepost~~.
- **Habitat modification** may be used occasionally ~~used~~ to assist rebuilding.

Given that the focus of the MSC assessment is on ~~the~~ wild ~~stock~~stocks, there should be only limited and temporary use of such methods to rebuild wild stocks, consistent with MSC guidance on scope criteria for enhanced fisheries.

Under exceptional circumstances, use of hatchery production as a rebuilding strategy could be targeted at a specific population within an SMU that is severely depleted and has not responded to other significant management action. In the extreme case, this would include recovery hatchery programs (see GSC2.9) designed to prevent the extirpation of severely depleted populations. It is important that any population where artificial production is used as part of the rebuilding strategy is neither targeted by the fishery nor exposed to non-targeted harvesting that substantially ~~reduces~~hinders rebuilding attempts. ~~In the case where~~

When an artificial production strategy is used, ~~it~~the team should ~~be considered as~~consider it an interim strategy of short, finite duration in order to address immediate demographic risks to the population.

In such a case the team should:

- Assess the circumstances driving the program~~ and ~~.
- Verify that ~~it~~the program has been carefully designed to contribute to the long-term viability of the depleted wild population.

Under these types of ~~programs~~program, addressing demographic risks often ~~result~~results in unintentional interactions between cultured and wild fish that will exceed any routine interaction benchmarks.

The rebuilding plan should:

- Justify the need ~~to use~~for enhancement tools~~ (~~, if used~~),~~ .
- Evaluate the potential risk involved~~,~~ .
- Define the time-bound duration for supplementation~~, and~~ .
- Include monitoring and evaluation of the supplementation effort to assess the natural population response in productivity, abundance, life history, and genetic diversity.

~~(These are~~This is in compliance with the scope criteria for ~~"Hatch and Catch"~~HAC fisheries as defined in SA1~~)~~.

GSC2.3.1 ▲

In the default tree, PI 1.1.2 is triggered for any score below 80 in PI 1.1.1. However, salmon fisheries may score below 80 in PI 1.1.1 ~~for 3 reasons; ~~due to:

- Reduced abundance,~~ due to~~
- A failure to enumerate hatchery origin fish in spawning escapements, or
- A combination of ~~both~~the above.

PI 1.1.2 is only triggered when PI 1.1.1 scores below 80 due to a reduced stock status~~;~~.

PI 1.1.2 is not triggered if the sub-80 score is due solely to a failure to enumerate artificially ~~-~~produced fish on the spawning grounds. In ~~the latter~~this case, the team should add a condition ~~should be added~~ in PI 1.3.3.

GSC2.3.2 ▲

~~There~~The team should ~~be~~have a clear expectation of component population rebuilding except under well-documented exceptional circumstances~~;~~. None should remain chronically depressed relative to their biologically based limits or population-specific reference points~~ (~~, if estimated~~)~~.

Evidence to verify that no fisheries are targeting or otherwise excessively harvesting populations that are below their LRP during the rebuilding period would include the use of specific and effective management strategies, to differentially avoid interception of those SMUs and depleted populations ~~while conducting other fisheries~~during fishing. The rebuilding timeframes for individual populations may exceed those for the SMU.

GSC2.4 Harvest Strategy PI (PI 1.~~2.1)~~ .1)

~~The harvest strategy is an important element in management's maintenance of the diversity and productivity of component populations.~~

GSC2.4.1 ▲

Activities that demonstrate fisheries ~~managers attempt~~managers' attempts to minimise harvest on weak populations include:

- Fisheries are managed to ~~achieve~~meet objectives at the SMU scale, but population-level units are also defined for conservation and research purposes~~;~~.
- Population-specific reference points are established, and stock status against those benchmarks is monitored when stock status problems are perceptible at the SMU level~~; and~~.
- When faced with stock-status problems, provisions linking population status with management of SMUs are enacted. Generally, population-specific reference points have not replaced SMU reference points~~, but harvest control rules~~; however, the team can ~~be adapted~~adapt HCRs to account for component population status.
- Differential harvest; for example, altering the time, location, or effort of the fishery.

GSC2.4.2 ▲

Proven management strategies designed to control exploitation rates on wild stocks include:

- Differential harvest of artificially produced fish at higher rates than wild fish~~, and~~ .
- Ensuring wild harvest rates are consistent with meeting SMU TRPs (escapement goals) for wild fish. This would include fish produced from spawning channels, which even if not marked, could be subject to time and area management strategies to achieve differential harvest rates.

GSC2.5 ~~Harvest control rules~~ HCRs and tools PI (PI 1.2.2) ▲

As a result of the stock structure of salmon, there will likely be a distribution of impacts across populations.

~~Teams~~The team should consider this in terms of:

- The population's natural productivity~~ as well as~~ .
- The differential harvesting from each population.

This may vary over time ~~due to~~as a result of changes in ~~both~~ natural processes~~ and~~, fishery activities, or fishery management.

GSC2.5.2 ▲

~~In the event that it is~~It may not be possible to distinguish component populations while the fishery is operating or to regulate catches of specific populations. If so, the team should evaluate whether fishery managers attempt to ~~utilize~~use differential harvest and selection pressure on fish with different life-history traits~~ (~~, such as return timing and size/age at return~~)~~, which may vary among component populations, in order to ~~minimize~~minimise impact on any one life history.

Further considerations may include:

- Demonstrated understanding that underlying component population structure exists and needs to be conserved within the SMU~~;~~.
- The range in productivity levels of different component populations~~;~~.
- Expected variability in environmental conditions that could differentially affect population capacity and productivity~~; and~~.
- Expected variability in meeting SMU goals ~~due to~~because of natural variation in catchability of fish, non-compliance with regulations by fishing vessels, and management error.

GSC2.6 Information and monitoring PI (PI 1.2.3) ▲

In this PI, ~~Assessment teams~~the team should consider whether the information collected supports the harvest strategy at the SMU level while also maintaining individual component populations.

Scoring issue (a) – comprehensive range of information ▲

"Comprehensive range" of information in SG100 can include~~.~~ information on:

- SMU structure.
- SMU production.
- Fleet composition.
- SMU abundance.
- UoA removals.
- Estimates of the impacts of fishery harvest on the SMU and the majority of wild component populations.
- The environment.

GSC2.6.1 ▲

~~For example, '~~Examples of "sufficient relevant ~~information'~~information" (SG80) ~~might~~ include:

- Evidence that the abundance of wild component populations has been maintained at levels and spatial distributions that show persistence of the populations, as described from aerial and other index survey counts of spawners ~~that show persistence of the populations~~.
- Evidence that the management strategy has incorporated approaches that ~~minimize~~minimise fishery impacts on weak wild populations, for example~~,~~ :
  - Time/area closures to ~~minimize~~minimise harvests of weak populations, and/or
  - Targeting and achieving the upper end of the TRP escapement range for the SMU as a means to maintain populations with lower productivity.
- Explicit trade-off and risk analyses, such as that ~~undertaken~~conducted for the Skeena River Independent Science Review[114] ~~(Walters et al. 2008[115]),~~, which considers how the current definition of SMU reference points and management strategies, combined with possible variability in status and productivity of individual stock components, affects the status of individual populations.

A ~~'~~"comprehensive ~~range'~~range" (SG100) of information would include more rigorous analyses, for instance in addition to the above, stochastic simulations/risk analyses that also explicitly take into account observation error and uncertainty reflected by deviations between management targets and final end-of-season outcomes. An example of such analyses ~~includes~~is the ~~harvest control rules~~HCR recently developed for Fraser River, British Columbia sockeye salmon[116] ~~(Pestal et al. 2012[117]).~~. The ~~paper explored~~study explores alternative ~~harvest control rules~~HCR/guidelines that can respond to decreases in productivity.

[114] Walters, C.J., Lichatowich, J.A., Peterman, R.M. and Reynolds, J.D. (2008) Report of the Skeena Independent Science Review Panel. A report to the Canadian Department of Fisheries and Oceans and the British Columbia Ministry of the Environment.
[115] http://www.psf.ca/sisrp.pdf
[116] Pestal, G., Huang, A-M., Cass, A., and the Fraser River Sockeye Spawning Initiative *(FRSSI)* Working Group. (2012) *Updated methods for assessing harvest rules for Fraser River Sockeye salmon (Oncorhynchus nerka).* Research Document 2011/133, Pacific Region, Canadian Science Advisory Secretariat.
[117] Pestal, G., A-M. Huang, A. Cass and the FRSSI Working Group. *Updated methods for assessing harvest rules for Fraser River Sockeye salmon (Oncorhynchus nerka)*. Research Document 2011/133, Pacific Region, Canadian Science Advisory Secretariat.

GSC2.7 Assessment of stock status PI (PI 1.2.4) ▲

~~The assessment of~~When assessing stock status~~ includes consideration of~~, the team should consider reference points. Reference points in salmon fisheries often differ from those of wholly marine species.

While these reference points may not be expressed in terms of MSY ~~nor~~or PRI, the intent should be consistent with Box GSA3~~Box GSA3~~ in guidance for the default tree.

Scoring issue (b) – assessment approach ▲

In this scoring issue~~ (b), Assessment approach~~, reference points in salmon fisheries may take several forms.

~~Target reference points~~TRPs are required to be consistent with ~~maximum sustainable yield (~~MSY~~)~~, or a proxy that reflects equal or lower risks to one or more component populations.

~~For example, a Biological Escapement Goal (BEG) is defined as the escapement that provides the greatest potential for maximum sustained yield, and is generally developed using the best biological information (ADF&G[118]). Another approach is S_{MSY}, or the spawner abundance at maximum sustainable yield (DFO[119]).~~Examples of these are biological escapement goals (BEGs) or spawner abundance required to achieve MSY (S_{MSY}). Where such quantitative reference points cannot be defined, the following guidance allows for proxies ~~so long as~~provided they are consistent with maintaining high production~~.~~:

- ~~Target reference points~~TRPs may be expressed as escapement goals, target harvest rates, or fishing mortality targets~~.~~:
  - The goals may take the form of ~~Biological Escapement Goals (BEG), Management Escapement Goals (MEG~~BEGs, management escapement goals (MEGs), and sustainable escapement goals (~~SEG~~SEGs), along with conservation unit benchmarks, ~~among others. They may~~etc.
  - The goals can be calculated using a variety of methods~~ such as~~; for example, Ricker spawner recruit analysis, yield analysis, spawning habitat capacity, or sustained yield analysis. ~~Target reference points~~
  - TRPs may be single points or ranges.
  - Any method of analysis is acceptable as long as the goal is maintaining high production or achieving a high probability of maintaining a substantial ~~(e.g., >B_{MSY})~~ population over the long term~~. Examples are provided~~; for example, a population that is > B_{MSY} over the long term. See examples in Table GSC2.
- ~~Limit reference points~~ LRPs are only sometimes explicitly defined in salmon fisheries and may take the form of minimum stock size threshold, S_{gen}, or others as defined by management~~ (~~. See examples in Table GSC2~~)~~.

Where ~~a limit reference point~~an LRP is not defined, a default ~~limit reference point~~LRP should be an escapement of at least 50% of the S_{MSY} escapement goal, or some other proxy of high abundance as described in ~~(a)~~ above[120]~~ (Portley and Geiger 2014[121])~~.

For escapement goals expressed as **ranges**, the team should consider:

- Whether the range is quantitatively derived~~, and~~.

[118] http://www.adfg.alaska.gov/index.cfm%3Fadfg%3Dsonar.escapementgoals
[119] http://www.pac.dfo-mpo.gc.ca/publications/pdfs/wsp-eng.pdf
[120] Portley, N, and Geiger, H.J. (2014) *Limit Reference Points for Pacific Salmon Fisheries*, North American Journal of Fisheries Management. 34:2, 401–410, DOI: 10.1080/02755947.2014.882453.
[121] Portley, N and Geiger, H.J. 2014. *Limit Reference Points for Pacific Salmon Fisheries, North American* Journal of Fisheries Management. 34:2, 401-410, DOI: 10.1080/02755947.2014.882453.

- The logic by which ~~it~~the range was established.

The ~~Assessment~~ team should determine whether:

- The range will maintain the population around S_{MSY} ~~and subsequently whether~~ .
- The default LRP is more appropriately defined as:
  - 50% of the lower bound of the range ~~the lower bound of the range, or~~ .
  - 50% of the midpoint of the range.

Table GSC2 shows example target and ~~Limit Reference Points~~LRPs for salmon fisheries in selected jurisdictions. This list is not all-inclusive ~~and~~. The team may use other reference points ~~may be used so long as~~if they are consistent with an annual percent harvest rate that achieves ~~maximum sustainable yield or spawner abundances at MSY~~ (MSY or S_{MSY})~~.~~.

Table GSC2: Example ~~Target~~TRPs and ~~Limit Reference Points~~LRPs for salmon fisheries in selected jurisdictions

Management region	Existing ~~Target Reference Points~~TRPs	Existing ~~Limit Reference Points~~LRPs	Suggested proxy limit reference points when LRPs are not established by management
~~1.~~ Alaska	~~Three~~Any of these 3 types of escapement ~~goals~~goal, expressed in numbers of fish ~~all are~~, can potentially ~~useable~~be used based on the data available and the method ~~used~~: • Biological escapement goals ~~(BEGs)~~. • Sustainable escapement goals ~~(SEGs)~~. • Optimal escapement goals ~~(OEGs)~~.	**Minimum stock size thresholds** ~~(~~for stocks harvested by the Southeast Alaska troll fishery~~)~~:: 50% of the escapement goal's lower bound with the exception of those Chinook salmon escapement goals that have been reviewed by the Pacific Salmon Commission's Chinook Technical Committee ~~(~~. For these stocks~~.~~, the minimum threshold amounts to 50% of the midpoint between the escapement goal upper and lower bounds~~)~~.	50% of the escapement goal S_{MSY} point estimate.

Management region	Existing ~~Target Reference Points~~TRPs	Existing ~~Limit Reference Points~~LRPs	Suggested proxy limit reference points when LRPs are not established by management
~~2.~~ British Columbia	Various escapement goals, expressed in numbers of fish, and specific to particular fisheries~~, including~~: • Management escapement goals ~~(MEGs)~~. ~~SC89.1.29 interim escapement goals minimum~~ • Interim escapement goals. • Minimum escapement goals. • Escapement goals. • S_{lim} ~~(~~: 85% of the escapement that produces MSY – for Chinook~~)~~.	• S_{gen} ~~(~~, currently integrated into the ~~harvest control rules~~HCRs for the Barkley Sound, B.C. fishery, and foreseen in other fisheries ~~in the future)~~. • Total allowable mortality rule ~~cutoffs (~~cut-offs for Fraser River, B.C. sockeye~~)~~. • Tyee test fishery escapement ~~cutoff (~~cut-off for Skeena River, B.C. sockeye~~)~~.	• S_{gen} ~~(~~, if a benchmarking result is available~~)~~. • 50% of the escapement goal S_{MSY} point estimate.
~~3.~~ Russia	Escapement goals ~~(~~, generally expressed in terms of habitat capacity~~, i.e.,~~: 70–100% filled habitat capacity~~)~~.	None defined.	35–50% filled habitat capacity.
~~4.~~ Pacific Northwest	Various escapement goals expressed in numbers of fish and specific to particular fisheries, including: • Escapement goals. • Upper management. ~~thresholds~~ • Thresholds.	Minimum stock size thresholds ~~(~~, generally 50% of escapement goals, but with some exceptions described in Amendment 16 of the West Coast Salmon Management Plan~~)~~.	50% of the escapement goal S_{MSY} point estimate.

Scoring issue (f) – stocks with lower productivity ▲

At SG80 and SG100, stocks with lower productivity are those with a higher conservation risk.

Scoring issue (g) – definition of stock management units ▲ ~~(SMUs)~~

In this scoring issue ~~(g), Definition of Stock Management Units (SMUs)~~, the team should consider the following ~~issues could be considered relevant~~ at **SG60**:

- Knowledge of the physical habitat ~~(~~, such as lakes~~,~~ and rivers, ~~etc.)~~ and the wild populations that inhabit them ~~and,~~.
- A rationale for choosing those populations as the basis for an SMU, taking into account the objective of maintaining diversity and productivity of component populations.

Additional information is expected at **SG80** ~~such as~~, including:

- Identification and description of wild populations~~,~~.
- Description of which wild populations have management goals~~,~~.
- Description of which wild populations are monitored ~~and,~~.
- Rationale for the choice of wild populations having goals and monitoring, ~~in respect of~~based on their representativeness of the complete range of productivity and diversity amongst populations in the SMU.

GSC2.7.1 ▲

The team should assess the adequacy of SMU reference points for SMUs with higher numbers of populations, which are ~~characterized~~characterised by substantial population diversity and varying productivities, as compared to simpler and more homogeneous SMUs.

- If the SMU is composed of a single population, ~~then~~ the concepts of single-stock management apply, and the reference points of the SMU should apply to the population.
- If the SMU is composed of multiple populations, ~~then~~ the team may define establishment of reference points ~~may be defined~~ as an aggregate for the components. However, the team should verify that aggregate reference points and management strategies for the SMU ~~should~~ ensure that the wild production components are maintained at a level that ensures a high probability of their persistence over time.

GSC2.7.1.1 ▲

For salmon fisheries that are influenced by artificial production, the team should:

- Base reference points ~~should be based~~ only on natural-origin ~~(~~, wild~~)~~ fish. ~~Evaluation of~~
- When evaluating reference points ~~for enhanced fisheries should~~, consider the potential for artificially produced fish to confound evaluation. ~~The assessment team should consider~~
- Consider the relative abundance of artificially produced versus wild salmon~~;~~ (both presence and abundance of artificially produced fish in the fishery and on the spawning grounds~~. For such fisheries reference points are expected to be based only on natural-origin (wild) fish. Evaluation of reference points for enhanced fisheries should consider the potential for artificially produced fish to confound evaluation.~~).

The intent of management should be to maintain high production of the wild SMU and productivity of component populations to the extent ~~to which~~that the natural environment will allow.

GSC2.7.2 ▲

Within a watershed, geographic proximity and habitat type are predictors of correlations in abundance of component ~~population.~~populations[122].

Therefore, indicator populations should:

[122] Stewart, I. J., Hilborn, R., and Quinn, T. P. (2003) *Coherence of observed adult sockeye salmon abundance within and among spawning habitats in the Kvichak River watershed*. Alaska Fishery Research Bulletin 10:28–41.

- Be distributed geographically throughout the SMU.
- Contain representative numbers of various spawning habitat types found within the watershed ~~and~~.

~~SC90 Be distributed geographically throughout the SMU.~~
In assessing coherence and correlation ~~that team may~~, the CAB should interpret:

- "**Some evidence of ~~coherence'~~coherence**" at the **SG80** level to be a mean pairwise correlation of at least 0.4~~, and~~.
- "**Well ~~correlated'~~correlated**" at the **SG100** level to be a mean pairwise correlation of at least 0.6 or by ~~means with~~ similar ~~outcome and intent~~means that determine the same level of certainty.

GSC2.7.3 ▲

~~The assessment of this indicator includes biological factors as well as how the rationale and definition of the SMUs have informed reference points (PI 1.2.4) and management strategies (PI 1.2.1).~~

A well-defined SMU is one that managers can ~~directly~~ influence directly through management actions and harvest controls, which implies an understanding of how changes to harvest patterns impact escapement.

~~Inclusion of populations within an SMU (since the~~As an SMU is typically defined to aggregate populations for the purpose of defining a management objective for practical fishery decision-making~~)~~, inclusion of populations within an SMU should be based on sharing, to some extent, similar characteristics~~,~~ such as:

- Run timing~~,~~.
- Common region of origin~~,~~.
- Genetic characteristics~~,~~.
- Coastal migration patterns (~~i.e.,~~ exposure to interception fisheries~~),~~).
- Population productivities~~, and~~.
- Exposure to environmental conditions that affect annual survival rates.

GSC2.7.3.1 ▲

Enhancement increases the chance of overharvesting the less-abundant and/or less-productive salmon stocks that migrate through fishing areas at the same time as the artificially -produced fish.

The team should assess whether wild and artificially influenced components are clearly distinguished:

- In defining SMUs ~~and~~ .
- When evaluating their adequacy to support establishment of reference points and management strategies.

In the special case of side-channel enhancement facilities, in order to estimate SMU status, it is important to identify the overall channel and wild stock contributions to catch and escapement. ~~These estimates might be based on~~The team can assess these contributions in a number of ways:

- Using run-reconstruction techniques ~~(e.g.,~~; for example, back calculating relative contributions of component populations at various prior times and areas based on relative spawning escapement abundances~~). Assessment might also include~~.
- By periodic evaluation of juveniles produced from the channels in relation to the number of adults spawning.

- In some cases, depending on the population differences within a river system, ~~it might be possible to estimate~~by estimating the contribution of spawning channel fish by use of genetic stock-identification techniques. ~~The assessment team may also consider~~
- By considering how similar the channel environmental conditions are relative to the natural environmental conditions ~~(i.e.,~~; for example, by looking at flow, temperature, complexity, competitors, and predators~~, etc.)~~.

GSC2.8 General ~~guidance to~~ requirements for enhancement PIs ▲

~~Enhancement activities are assessed against their impacts on the natural reproductive component of the associated wild salmon stock under assessment in Principle 1 (impacts of enhancement activities on other species, the same species outside of the UoA and the receiving ecosystem will be assessed under Principle 2). This mirrors the treatment of salmon in existing MSC fishery assessments and is consistent with FAO's 2010 Guidelines for Ecolabelling of Fish and Fishery products from Inland Capture Fisheries.~~

Table ~~GSC:~~GSC3: Enhancement terms and definitions

Term	Definition
Habitat enhancement	May take the form of spawning channels, lake ~~fertilization~~fertilisation, predator removal, artificial gravel beds, etc.
~~'Integrated'~~"Integrated" hatchery production	This is typically used for supplementation and recovery-type programs.
~~pHOS~~Hatchery-origin fish contributing to the natural spawning population (pHOS)	These fish may be strays or may be the result of returns of hatchery fish that were intended.
~~'Segregated'~~"Segregated" hatchery production	This type is typically used for harvest augmentation hatcheries.

GSC2.9 Enhancement outcomes PI (PI 1.3.1) ▲

~~This performance indicator was added to address the potential for negative effects of enhancement activities on the genetic diversity, local adaptation and reproductive capacity of the wild salmon stocks.~~

Potential negative impacts may include:

- Outbreeding depression due to translocation of dissimilar brood stock into locally adapted populations~~;~~.
- Inbreeding depression or loss of native genetic diversity due to directed or inadvertent hatchery selection or domestication~~;~~.
- Excessive impact on wild fish for hatchery broodstock~~;~~.
- Reduced natural juvenile survival due to predation, competition, and other ecological interactions~~;~~.
- Increased natural adult pre-spawn mortality due to handling and migration delays resulting from effects of weirs~~;~~.
- Changes in spawning distribution due to weir effects resulting in reduced reproductive success~~;~~.
- Increased prevalence and impacts of disease~~, and~~.
- Reduction in smolts per spawner due to increased density-dependent effects.

The risks ~~(~~of these impacts, including probabilities as well as magnitudes of various negative effects~~)~~ ~~of these impacts~~, are a function of:

- Adult broodstock collection sources and their level of influence from natural populations~~;~~.
- Hatchery mating, incubation, and rearing practices~~;~~.
- Juvenile release numbers, life stage at release, size, acclimation, and geographical distribution~~, and~~.
- Straying of returning adults ~~(~~: hatchery fish to natural spawning grounds and natural-origin fish used for hatchery broodstock~~)~~.

Scoring issue (a) – enhancement impacts ▲

In scoring issue (a), the CAB may consider the following situations~~;~~:

- In systems subject to **low levels of artificial production**, the comprehensiveness of the studies required for the team to judge that outcomes are likely being met can be considerably less than in cases with substantial artificial production ~~programs~~programmes. Low-level systems of artificial production will be characterised by~~, inter alia~~ the following, although this not an exhaustive list:
    - The proportion of hatchery releases or production of juveniles from artificial habitat compared to total artificially produced and wild production in a unit of certification is relatively small ~~(<~~, < 10~~%);~~%.
    - The management system has implemented measures and strategies that are known to be effective at limiting the level and spatial extent of straying~~, and~~.
    - Unique wild populations are ~~not likely~~unlikely to interact with hatchery fish spawning naturally.
- **Recovery hatchery programs** ~~(~~are artificial production programs designed for the specific conservation purpose of preventing the extirpation of severely depressed populations~~)~~. These are generally subject to more stringent design characteristics and performance benchmarks than other hatchery programs. The goal of a recovery hatchery is typically to increase the number of naturally spawning adults in the population. Consequently, the standard default assumptions ~~(~~(Box GSC1 below) do not apply. Recovery hatchery programs:
    - ~~Recovery hatchery programs~~ Are implemented only after targeted commercial fishing on the population has been eliminated or severely restricted. ~~These programs~~
    - Are temporary ~~in nature and~~ .
    - Are intended to supplement depressed natural populations or provide fish for artificial recolonisation of streams that have experienced local or brood-year extinctions, to maintain genetic diversity within and among stocks, and to conserve valuable or rare genes and genotypes. ~~They~~
    - May, or may not, rely on captive broodstock to accomplish these goals. ~~Recovery hatcheries~~
    - Attempt to ~~minimize~~minimise or eliminate negative effects common to fish culture, resulting in as close to wild fish as possible ~~(primary success criteria are increased abundance of spawners and/or outmigrants, increased abundance of natural origin spawners, maintained or increased long term fitness (productivity and life history), lowered chance of extinction, recolonisation of a self-sustaining population, and/or brood-year reconstruction, while avoiding negative hatchery impacts as much as possible).~~. Primary success criteria are:
        a. Increased abundance of spawners and/or outmigrants.
        a. Increased abundance of natural origin spawners.
        b. Maintained or increased long-term fitness: productivity and life history.
        c. Lowered chance of extinction.
        d. Recolonisation of a self-sustaining population.

e. Brood-year reconstruction, while avoiding negative hatchery impacts as much as possible.

- **Spawning channels** differ from hatchery programs but ~~they~~the team should ~~be scored~~score them in a similar way.

In these systems, the entire natural reproduction life cycle occurs in a natural habitat, with the main artificial production interventions being enhanced spawning gravel habitat and controlled channel flows. Once fish enter the spawning channel, all reproduction processes ~~(e.g.,~~, such as mate selection, redd building, incubation, and any rearing~~)~~, occur without human intervention~~. Spawning channels differ from hatchery programs but they should be scored in a similar way~~.

~~The potential impacts of spawning channels would not be assessed according to Box GSC 1~~ Because the consequences of straying of adult returns would typically not present the same concerns as hatcheries, ~~as long as the channel was (a) isolated from other spawning populations that were genetically dissimilar to the population being enhanced in the spawning channel or (b) the channel exactly or very closely mimics the natural environment.~~the team should not assess the potential impacts of spawning channels according to Box GSC1 if the channel:

~~However the assessment team should consider the size of the program and similarity with populations in proximity (based on expected straying distances) in~~
- Is isolated from other spawning populations genetically dissimilar to the population being enhanced in the spawning channel, or
- Exactly or very closely mimics the natural environment.

However, when assessing the likelihood that the spawning channel operation could be having a significant impact on genetic and life-history diversity of wild populations, the team should consider the size of the programme and similarity with nearby populations, based on expected straying distances.

GSC2.9.1.1 ▲

~~"~~"Relevant ~~studies'~~studies" may include, but are not limited to~~,~~:

- Studies on the same species as the UoA~~,~~.
- Studies in the same or similar geographic area~~, and/or~~.
- Studies in the same or similar habitat.

GSC2.9.1.2 ▲

Box GSC1 presents default acceptable impact guidelines for artificial production.

The guidance in Box GSC1 establishes default criteria for evaluating whether the proportions of pHOS and ~~proportion~~ of wild populations/spawning areas being affected by artificial production are "likely" to have significant negative impacts on wild stocks. If other system-specific benchmarks have been adopted by the fishery management system, the team should evaluate their appropriateness in ~~terms of~~ delivering similar levels of performance to those in Box GSC1 ~~(see below).~~.

Box GSC1 was developed ~~following~~from specific "best practice" considerations and science developed from fitness modelling and empirical studies of yearling smolts released from ~~the~~ riverine species such as Chinook, coho, and steelhead hatcheries[123] ~~(e.g., Ford 2002, Grant 1997, Paquet et al 2011).~~.

[123] Ford, M.J. (2002) Selection in captivity during supportive breeding may reduce fitness in the wild. Conservation Biology 16:815–825.
Grant, S.W. (ed). (1997) Genetic effects of straying of non-native fish hatchery fish into natural populations: proceedings of the workshop. *U.S. Dep. Commer., NOAA Tech Memo. NMFS-NWFSC-30. (In particular, see 'Conclusions of Panel', 140–157*.
Paquet, P.J., Flagg, T., Appleby, A., Barr, J., Blankenship, L., Campton, D., Delarm, M., Evelyn, T., Fast, D., Gislason, J., Kline, P., Maynard, D., Mobrand, L., Nandor, G., Seidel P., and Smith, S. (2011) Hatcheries,

Specific studies on chum and pink salmon are rare, but the Recovery Implementation Science Team[124] ~~(RIST 2009 [125])~~ concluded that hatchery strategies that involve release of fish at earlier life stages probably lead to smaller genetic changes than strategies that involve release of fish at later life stages. It may therefore be reasonable to modify pHOS criteria for pink and chum salmon because their hatchery rearing is the shortest ~~of all species.~~. While the magnitude of relaxation will be situation-specific, ~~assessment teams~~the team should provide rationale to support ~~their~~its decisions.

~~If~~If the CAB considers additional evidence from species-specific studies ~~is considered by the CAB~~ to be more relevant to a specific situation ~~a reasoned argument~~, it should provide justification for ~~adjusting~~having adjusted the default impact guidelines ~~should be made~~.

Box ~~GSC:~~GSC1: Default acceptable impact guidelines for artificial production

~~**Default acceptable impact guidelines for artificial production**~~

The intent of this guidance is to help ensure that the majority of genetic diversity and productive capacity of the SMU is protected from the risks of enhancement activities in freshwater production areas. The guidelines ~~in the Box~~below are primarily derived from studies on Chinook, coho, sockeye, and steelhead. The team may relax impact guidelines from these levels for pink and chum ~~may be relaxed from these levels~~ with sufficient justification (see above).

~~**At the eSG60 level**~~

For SG60

- Regardless of hatchery production strategy, pHOS at the level of the population should be negligible (< 1%) in ~~greater~~more than ~~(>)~~ 50% of populations, and these populations should be representative of the productivity and genetic diversity of populations within an SMU.
- pHOS at the level of the SMU should be:
  - No more than 10% for segregated hatchery programs~~, such that~~. Individual population pHOS values above 10% would be expected to occur only in areas in closer proximity to hatchery facilities, where values might be affected by smaller wild spawning populations that are not important potential contributors to the wild diversity or productive capacity of the SMU.
  - No more than 33% for integrated hatchery programs.
- The level of enhancement in the remaining populations is unspecified at SG60.

~~At the~~For SG80 ~~level~~

Further **pHOS at the level of the SMU** should be:

- For segregated hatchery programs:
  - No more than 5~~%;~~%.
- For integrated hatchery programs ~~(These limits are presented graphically in):~~:
  - Where ~~pNOB < 5%,~~ the proportion of natural-origin, wild fish contributing to the hatchery broodstock (pNOB) is no more than 5~~%~~%.
  - Equal or less than pNOB, where 10% > pNOB > 5~~%~~%.
  - No more than 10% for programs where pNOB is ~~less than~~< 20~~%;~~%.
  - No more than 0.5 x pNOB for programs operating between 20% and 40% pNOB~~;~~.
  - No more than 20% for programs operating at pNOB > 40%.

conservation, and sustainable fisheries—achieving multiple goals: results of the Hatchery Scientific Review Group's Columbia River basin review. Fisheries 36:11, 547–561.

[124] RIST (2009) Hatchery reform science: a review of some applications of science to hatchery reform issues.

[125] RIST, 2009 http://www.nwfsc.noaa.gov/trt/trt_documents/RIST_RME_Review_2009_09_16_09_cor.pdf

~~Figure GSC2 below~~The limits for integrated hatchery programs are presented graphically in Figure GSC2.

Figure GSC2 depicts the maximum allowable average ~~proportion of hatchery origin fish in natural spawning populations (~~pHOS~~)~~ within an SMU at SG80, in relation to the ~~proportion of natural origin (wild) fish contributing to the hatchery broodstock (pNOB).~~pNOB. These guidelines are based primarily on studies of riverine species such as Chinook, coho, and steelhead. ~~They~~The team may ~~be modified~~modify these guidelines for pink and chum salmon, and for other species, with sufficient reasoned ~~argument and~~ justification.

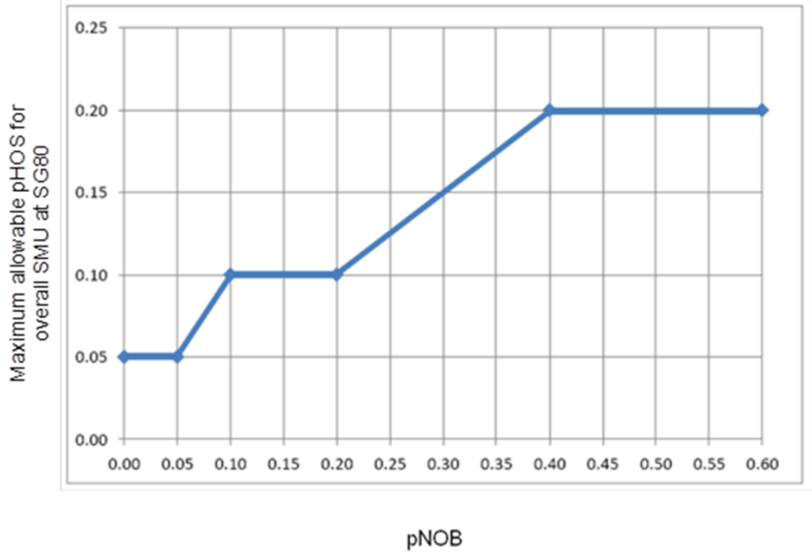
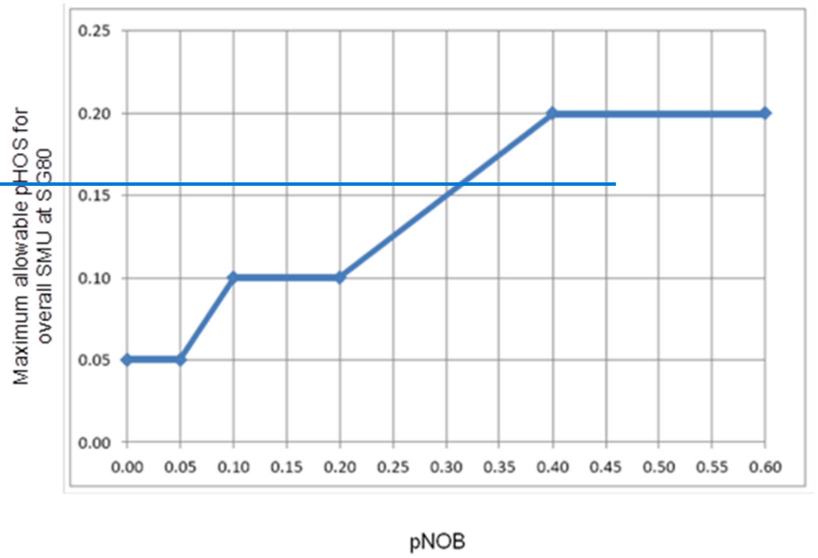


Figure GSC2: Maximum allowable pHOS for overall SMU at SG80



At the SG100 level

pHOS should be ~~negligible (<~~≤ 1~~%)~~% in all populations in an SMU.

Further guidance in application of Box GSC1:

~~SC91 pHOS at the level of the SMU is intended to reflect an estimate of the proportion of hatchery-origin fish spawning naturally in the SMU divided by the total natural spawning escapement in the SMU, which may be calculated as the simple 4-yr arithmetic mean of these estimates.~~

- ~~Where~~ If there are both segregated and integrated hatchery fish spawning naturally within the SMU, the ~~assessment~~ team should consider the limits above in ~~their~~its assessment.
- ~~Where~~ If there are hatchery-origin spawners on the spawning grounds of the SMU under assessment that originate from outside this SMU, the ~~SMU under assessment, they~~team should ~~be assessed at~~assess them using the segregated criteria limits above. Strays from outside the SMU present a greater genetic risk than those originating within the SMU and are therefore only permitted at lower limits.

GSC2.9.1.3 ▲

~~In the event that~~If there are no scientific studies available and no information or estimates of pHOS ~~nor pBNOB exist~~or pNOB, the team should carefully consider the potential impact based on:

- The magnitude of hatchery origin fish released, or
- The percentage of hatchery fish in the harvest of the SMU.

Scoring should be precautionary~~, and~~. The team should provide sufficient justification ~~provided~~ as to why the magnitude or percentage of hatchery fish is "likely" to have a small impact with minimal hatchery origin fish reaching the spawning grounds (i.e.~~,~~. a small pHOS). ~~Factors that~~The team might ~~be considered include~~ consider:

- Whether the hatchery type is an integrated or segregated hatchery program~~,~~.

- Whether there is differential harvesting to avoid hatchery fish ~~on~~ appearing on the spawning grounds~~,~~.
- The location of the hatchery~~,~~.
- The release site~~, and~~.
- Where the fish are eventually harvested~~, and~~.
- Whether the management agency ~~remove~~removes hatchery fish prior to accessing the spawning grounds.

GSC2.10 Enhancement management PI (PI 1.3.2)

~~Management is expected to address the potential for negative effects of enhancement activities on the local adaptation, genetic diversity and reproductive capacity of the wild salmon stocks.~~

Scoring issue (a) – management strategy in place ▲

~~For scoring issue (a), 'Management strategy in place', in achieving~~To achieve the **SG80** outcome, the team should reasonably expect the management system ~~would reasonably be expected~~ to design and manage its hatchery-program outcomes with an understanding of:

- The wild population structure ~~and~~.
- Characteristics that its hatchery programs could be expected to affect~~, as well as the development of some~~.

The management system should also develop basic hatchery management objectives with respect to limits on impacts within this context. ~~It could~~The team should consider~~, inter alia,~~:

- Identification and description of populations within the SMU~~;~~.
- The level and spatial distribution of genetic and life-history diversity ~~(e.g.,~~; for example, run timing, spawning timing, age structure, juvenile life-history forms, and other unique phenotypic traits~~)~~~~;~~.
- Populations with unique characteristics~~;~~.
- The relative abundance of wild populations ~~(~~: magnitude~~,~~ and spatial distribution~~)~~~~;~~.
- Expected spatial distribution and magnitude of natural spawning of hatchery returns in relation to wild population abundance and diversity~~; and~~.
- Objectives/Intent for limiting the magnitude and spatial distribution of pHOS consistent with protecting the diversity and productive capacity of the SMU and its component wild populations.

GSC2.10.1 ▲

~~A likelihood of minimizing~~The team should expect the use and evaluation of proven artificial production and harvest management strategies to help minimise the numbers and proportions of hatchery fish interbreeding with wild fish in natural spawning areas ~~is expected to be supported by the use and evaluation of proven artificial production and harvest management strategies.~~. Common examples typically include:

- Siting of hatchery facilities in areas that are isolated from areas of high wild salmon abundance and diversity for the species being produced~~;~~.
- Ensuring release at sites and with strategies that are likely to ~~maximize~~maximise imprinting and homing~~;~~.
- Identifying high-value watersheds where hatcheries are not used~~;~~.
- Fishing strategies that result in differential harvest rates between hatchery and wild fish to ~~both~~ limit straying and ensure sustainable wild harvest rates~~;~~.

- Marking hatchery fish releases so that the distribution and composition of hatchery and wild fish can be monitored in fisheries, spawning grounds, and in hatchery broodstock~~;~~.
- Active exclusion of marked hatchery fish from spawning in the wild through management of passage through weirs~~;~~.
- Scaling hatchery release numbers to a level that is consistent with not exceeding hatchery stray benchmarks in concert with other strategies.

GSC2.11 Enhancement information PI (PI 1.3.3) ▲

~~This performance indicator was added to address information needed to evaluate the potential for negative effects of enhancement activities on the genetic diversity and reproductive capacity (such as density-dependent competition for spawning habitat) of the wild salmon stocks consistent with the direction identified in MSC guidance on scope criteria for enhanced fisheries (). Guideposts address the same potentially damaging enhancement effects identified under PI 1.3.1. Specific guideposts in this indicator are based on those identified in other comparable P1 indicators regarding collection of relevant information (PI 1.2.3) and assessment adequacy (PI 1.2.4).~~ Marking and monitoring programs will be particularly relevant to evaluations of sufficiency for this indicator. The ~~reason for this monitoring is to enable the management system to effectively meet wild stock escapement goals, evaluate harvest strategies to meet these goals and evaluate the interaction between hatchery and wild fish on spawning grounds. It is acknowledged that there are no such marking requirements for fish produced in artificial habitat, but~~team should expect that important information, such as the amount of fry emigrating from these habitats ~~are expected to be~~, is monitored annually to help gauge the potential impact on wild populations.

Scoring issue (a) – information adequacy ▲

- ~~At~~ For **SG60**~~: '~~**, the team should interpret "some relevant ~~information~~**' ~~should be interpreted~~**information"** to mean that some artificially produced fish carry ~~recognizable~~recognisable marks ~~(e.g.,~~, such as fin clips, coded-wire tags, otolith marks, parent-based tagging (PBT~~)~~), or thermal marks~~) such that~~. These should enable the team to make approximate estimates ~~can be made~~ of contributions of hatchery salmon to harvests, hatchery broodstocks, and spawning populations.
  - It is reasonable to expect these contribution estimates are ~~either~~ being made or can ~~been~~be reasonably inferred from an understanding of the dynamics of the fishery and enhancement programs, including from an existing understanding of size, location, and general release-to-adult contribution rates.
- ~~At~~ For **SG80**~~: '~~**, the team should interpret "sufficient relevant qualitative and quantitative ~~information~~**' ~~should be interpreted~~**information"** to mean a large representative fraction of artificially produced fish-carry ~~recognizable~~recognisable marks ~~(e.g.,~~, such as fin clips, coded-wire tags, otolith marks, ~~parent-based tagging (~~PBT~~)~~, or thermal marks~~)~~, to accurately estimate contributions of hatchery salmon to harvests, hatchery broodstocks, spawning populations, and escapes. For large hatchery programs this may be up to 100%. ~~A~~
  - It is reasonable ~~expectation is~~to expect that these estimates are currently being made via data collected through associated harvest, hatchery, and escapement monitoring programs at a level of precision and accuracy necessary to support the harvest management strategy. As the levels of hatchery-origin spawners approach the limits stated in Box GSC1~~Box GSC1~~, the necessary sampling frequency increases to achieve the required accuracy of estimates of pHOS. The team should supplement direct estimates ~~are supplemented by~~with other analytical methods.
- ~~At~~ For **SG100**~~: '~~**, the team should interpret "comprehensive range of relevant quantitative ~~information~~**' ~~should be interpreted~~**information"** to mean that all artificially produced fish, regardless of program size, carry marks ~~(e.g.,~~, such as fin clips, coded-wire tags, otolith marks, ~~parent-based tagging (~~PBT~~)~~, or thermal marks~~)~~, allowing highly accurate and precise estimates of hatchery salmon to harvests, hatchery broodstocks, spawning populations ~~and escapes. A~~

~~reasonable expectation is that these estimates of hatchery and wild contributions are currently made through associated harvest, hatchery and escapement monitoring programs, at a scale and intensity of temporal and spatial coverage that provides comprehensive information and understanding.~~, and escapes.

  - It is reasonable to expect that these estimates of hatchery and wild contributions are currently made through associated harvest, hatchery, and escapement monitoring programs, at a scale and intensity of temporal and spatial coverage that provides comprehensive information and understanding.

- "Total escapement" in SG60, SG80, and SG100 should be interpreted to mean both wild and enhanced.

GSC2.11.1 ▲

The team should expect artificially produced fish ~~are expected~~ to be marked~~,~~ and monitored in catch and escapement, in sufficient quantities ~~in order~~ to enable the fishery to define ~~target reference points~~TRPs for wild salmon populations and SMUs ~~(e.g., escapement goals),~~, implement harvest strategies, and evaluate levels of interaction between hatchery and wild fish on spawning grounds. Requirement of this information is implicit within the evaluation of stock status and reference points, which do not include artificially produced salmon.

~~However, the explicit scoring of~~Only enhancement information should ~~only~~ be explicitly scored in this PI.

GSC2.11.~~1.1~~2 ▲

The marking requirements described above ~~in the guidance on specific scoring issues~~ do not routinely apply to fish produced from artificial spawning channels, because ~~the same~~:

- The monitoring and information tools ~~generally~~available for hatcheries are not available for spawning channels ~~as compared to hatcheries.~~ .
- The absence of confined hatchery methods for incubation and rearing within a spawning channel limits the practical marking tools available. ~~Nevertheless, in situations~~

However, where there is an increased likelihood of interactions between spawning channel strays and dissimilar wild populations in areas of potential interaction, ~~there would be an expectation~~the team should expect that the management system would assess those risks via:

- Visual marking of juveniles at emigration from the weir, or ~~perhaps via the use of~~
- Genetic marking techniques.

The need for such information and monitoring would be greater where:

- The conditions of spawning channels differ greatly from the natural environment, or ~~where~~
- The magnitude of adult production originating from the spawning channel exceeds the natural production of wild populations with which the spawning channel fish might interact.

GSC3 Principle 2

~~GSC3.1 General requirements on Principle 2~~

~~GSC3.1.1~~

~~In Principle 2 only ETP (PI 2.3.*), Habitats (PI 2.4.*) and Ecosystem (PI 2.5.*) are modified for salmon assessments.~~

~~Primary species (PI 2.1*) and secondary species (2.2.*) should still be scored as in . Additionally, all Annex SA requirements and Annex GSA guidance should be consulted in addition to the modifications in Annex SC and the supplemental guidance in Annex GSC.~~

~~GSC3.1.2~~

~~In Principle 2 modifications to the Default Assessment Tree in require the impact of enhancement activities on Principle 2 components is assessed.~~

~~All Performance Indicators and scoring issues should be scored even in the absence of enhancement activities.~~

GSC3.13 Habitats outcome PI (PI 2.4~~4~~3.1)

~~Enhancement activities typically operate under a wide range of environmental regulations and monitoring requirements intended to minimize their impacts on aquatic habitat important for local biota in the ecosystems where the facilities are located. Like other land and water uses that can negatively impact fishery resources, enhancement facilities often must be authorized through a variety of environmental permits or reviews.~~

Scoring issue (~~d~~c) – impacts due to enhancement activities within the UoA ▲

In this scoring issue ~~(d), Impacts due to enhancement~~, the team should consider the following as examples to demonstrate that hatchery facilities are "**highly unlikely**" to have adverse impacts at the **SG80 level**:

- Facility design, construction, and operations limit effects on the riparian corridor and are consistent with fluvial geomorphology principles ~~(~~; for ~~instance,~~example, they avoid bank erosion or undesired channel modification~~)~~.
- Water withdrawals and in-stream water diversion structures for artificial production facility operation do not:
  - Prevent access to natural spawning areas~~,~~.
  - Affect spawning behaviour of natural populations~~, or impact~~.
  - Impact the juvenile-rearing environment.

  For ~~instance~~example, in-stream flows between diversion and discharge return points, as well as further flow impacts downstream, are not significantly diminished.
- Effluents from artificial production facilities conform with accepted or required levels that do not detrimentally affect natural populations.
- Weir/trap operations used to collect hatchery broodstock do not:
  - Prevent access to natural spawning areas~~, do not~~.
  - Affect spawning behaviour or success of wild fish~~, and do not~~.

  - Result in significant stress, injury, or mortality in natural spawners.
- A record of compliance with applicable environmental laws that are designed to protect natural populations and habitats from potential adverse impacts of artificial production program operation.

GSC3.13.1.c ▲

For example, physical features, spawning and rearing flows, and water temperatures.

GSC3.13.2.1 ▲

Habitat modifications due to salmon enhancement activities can include ~~both~~ :

- Physical changes to the river course ~~(e.g.,~~, such as spawning channels~~),~~ .
- Changes to water quality due to hatchery discharge~~, and~~ .
- The use of a range of man-made structures associated with the rearing habitat.

Examples of adverse impacts include:

- Delay in reaching spawning grounds that reduces spawning success~~;~~.
- Blockage of access to spawning habitat from weirs used for hatchery broodstock collection~~;~~.
- Dewatering of downstream water channels used for spawning and rearing~~;~~.
- Increased water temperature from human activities ~~such~~ that increases fish mortality rate ~~increases~~.
- Improper screening of water-intake systems that cause mortality or entrainment of wild fish~~, and~~.
- Discharge of effluents or pollutants contrary to water quality standards.

~~The team should identify the types and extent of habitat modifications that are associated with enhancement activities, and determine that they are unlikely to have adverse impact.~~

GSC3.14 Habitats management strategy PI (PI 2.43.2) ▲

Enhancement facilities typically operate under a wide set of environmental regulations and review requirements with respect to their potential impacts on aquatic habitat, such as ~~use of drugs, fish passage requirements, water discharge permits, and water withdrawal authorization.~~ :

- Use of drugs.
- Fish-passage requirements.
- Water-discharge permits.
- Water-withdrawal authorisation.

The team should examine evidence to determine whether these requirements are in place and are being met as part of the overall strategy for meeting the habitat status outcome.

Scoring issue (b) – management strategy effectiveness ▲

For scoring issue (b) at the SG60 level, some examples of “plausible argument” are general experience, theory, or comparison with similar UoAs or habitats.

GSC3.14.1 ▲

Physical features, spawning and rearing flows, and water temperatures can be affected by enhancement activities.

The team should expect to see management strategies that seek to ~~achieve~~meet the typical outcomes in GSC3.13.

Examples of such strategies could include:

- Facility design or maintenance plans and construction permit applications that specifically consider and avoid known impacts~~;~~.
- Routine~~ (e.g., daily)~~, regular inspections~~,~~; maintenance and assessment activities of physical parameters such as flows, screen, and weir operations; and a record of taking actions in response to these activities~~;~~.
- Implementation of withdrawal permit operating requirements~~ are being implemented, and~~. Or, if the system does not operate under a formal permitting system, similar operating criteria are being applied~~;~~.
- Implementation of regular fish-passage procedures based on explicit hatchery objectives~~ to~~, which pass naturally spawning fish above any hatchery weir ~~to enable sustaining~~and sustain natural production consistent with available habitat capacity~~;~~.
- Implementation of fish-handling protocol, and staff provided with associated training/guidelines~~,~~; for ~~instance~~example, to ensure that captured adult wild fish are not injured and that upstream migration delays are ~~minimized;~~minimised.
- Active implementation and maintenance of water quality management strategies to meet effluent discharge requirements~~;~~.

Annual or periodic reports that demonstrate review and mitigation actions for any such impacts can be used to confirm that these strategies are being utilised.

Enhanced salmon fishery interventions may also include~~ lake fertilization~~:

- Lake fertilisation to enhance natural food production~~, and~~ .
- Removal of predators or competitors to ~~maximize~~maximise early-stage salmon survival.

The team should evaluate these impacts ~~should be evaluated in accordance with~~as per PI 2.~~5~~4.1.

GSC3.15 Habitats information PI (PI 2.~~4~~3.3)

GSC3.15.1 ▲

~~Examples of~~The team may expect information ~~that may be expected for~~ on enhancement activities to include:

- The proportion of diversion of total stream flow between intake and outfall water~~;~~.
- Withdrawals compared to applicable passage criteria and to juvenile-screening criteria~~;~~.
- Discharge water quality monitoring data required by, or equivalent to, any environmental permit provisions~~;~~.
- Water flow and temperature data above the hatchery intake and below the discharge~~;~~.
- Logs of periodic inspection above any hatchery weirs to ensure the passage of fish upstream is not being impeded~~;~~.
- The number of adult fish aggregating and/or spawning immediately below water-intake ~~point~~points, compared to the number of adult fish passing water intake ~~point;~~points.
- Records of any fish mortalities or injuries ~~occurring~~ of fish or other aquatic resources in the hatchery weir/traps, and in the natural habitat near ~~(~~or within a zone of influence~~)~~ of the hatchery.

GSC3.16 Ecosystem outcome PI (PI 2.~~5~~4.1)

~~Ecological interaction risks between artificially produced salmon, non-ETP wild salmon populations and other non-ETP species are evaluated in the Ecosystem PIs. Salmon ecosystem components include effects of disease transmission, as well as intra- and inter-specific competition (including that which arises from ecosystem carrying capacity) and predation within and among salmon species in freshwater, near shore and high seas ocean waters. Generally, impacts on Principle 1 target species in the UoA are assessed in PI 1.3.1–1.3.3 and not explicitly considered in this section. Impacts on the same species outside of the UoA or impacts on other salmonid species within the UoA are considered in this section.~~

Scoring issue (b) – impacts due to enhancement ▲

In this scoring issue ~~(b), Impacts due to enhancement~~, the team should consider:

- The scale and size of the programs being assessed as part of creating a general risk framework ~~alongside~~ .
- Objective evidence for negative interactions, or lack of negative interactions.

In this context, the team may consider the ~~following factors:~~

~~The~~ magnitude of releases and returns of artificially produced fish in the area being assessed, compared to the wild production from the same area.

~~In situations where~~If artificially -produced fish constitute a significant proportion of either juveniles or returning adults to an area, the team should require a higher level of evidence ~~should be required~~ to make a judgment about likelihood~~.~~, taking into account:

- The likelihood that hatchery releases coincide in space and time with the presence of juvenile wild salmon.
- The level of total species production in the UoA compared to historic levels ~~while also considering~~ ;
- Potential changes in current habitat conditions and natural reproduction capacity compared to ~~those~~historic levels.
- Indicators of any density-dependent processes that could potentially be related to the enhancement program ~~by virtue of~~ , because they are known ~~temporal and spatial~~to overlap in space and time with species or stocks that are exhibiting demonstrated changes in population dynamics.

GSC3.16.1 ▲

~~Evaluation of ecological and ecosystem effects of enhancement activities includes the potential effects on both wild salmon and other aquatic species. Note that impacts on the wild stock(s) under assessment (UoA) are considered in PI 1.3.1.~~

The team should consider interactions at any life stage in both freshwater and marine habitats. ~~Consideration~~

The team should ~~be given to~~consider the ecosystem impacts of enhancement activities across the entire geographic range of the salmon populations.

GSC3.16.2 ▲

Field Code Changed

Disease transmission and predation/competition are ~~different issue areas that have~~issues requiring very different levels of active management and information, monitoring and compliance requirements, and capacities.

The team should assess the degree of likelihood that enhancement activities have minimal negative effect on the productive capacity of wild salmon and other aquatic populations as a result of predation and competition for resources, such as prey or spawning habitat.

GSC3.17 Ecosystem management ~~performance indicator~~ PI (PI 2.~~5~~4.2) ▲

Current "best practice" for disease management in enhancement facilities ~~reflects~~involves a very rigorous monitoring and adaptive management system using well-established policies, guidelines, performance indicators, benchmarks, and procedures, which are designed to carefully protect hatchery and natural fish populations from the importation, dissemination, and amplification of fish pathogens and disease conditions.

The team should assess and verify the degree to which the hatchery management system is implementing an approved, proven protocol in a manner that ensures the likelihood of meeting these objectives and related outcome for PI 2.~~5~~4.1.

Scoring issue (b) – "plausible argument" ▲

Examples of "plausible argument" used in scoring issue (b) may include general experience, theory, or comparison with similar UoAs/ecosystems.

Scoring issue (d) – management of enhancement activities ▲

In this scoring issue ~~(d), 'Management of enhancement activities'~~, the team should ~~devote particular attention to~~focus on management of potential impacts of the release of fish from large-scale artificial production operation; in particular, the strategies for avoiding adverse competition and predation effects on the receiving ecosystems, including ~~inter-~~:

- Inter-species and intra-species competition, both inshore and offshore~~, including~~.
- Issues of carrying capacity.

GSC3.17.1 ▲

~~The team should consider management of the impact of the fishery on the ecosystem as well as management of any enhancement activity on the receiving ecosystem, in particular the management of disease and competition/predation. For example,~~Management measures could include practices that ~~minimize~~minimise overlap in time and space between hatchery releases and the wild component ~~could be implemented~~.

Examples~~:~~

Examples of strategies for ~~minimizing~~minimising ecological risk include:

- Methods to ~~minimize~~minimise disease transmission.
- Hatchery programs scaled to fit carrying capacity of the watershed or basin.
- Coordination with other hatcheries to limit releases at a regional scale ~~(i.e.,~~; for example, the North Pacific, Columbia Basin, or major sub-basins~~)~~.
- Releasing only smolts that will promptly out-migrate, unless the release of other life stages is part of a specific biological objective.
- The use of acclimation ponds and volitional releases as a means to ~~minimize~~minimise residual fish and straying of returning adults.
- Careful timing of releases; ~~e.g.,~~for example, release of predatory hatchery fish after wild salmon ~~reach~~reaches large enough sizes to avoid being consumed.
- Careful consideration of both the timing and magnitude of releases because high concentration of hatchery fish in time and space may attract predators~~, but~~ and may ~~also~~ have an offsetting effect to some unknown extent by ~~"~~“swamping~~"~~” the predators with so ~~many~~much prey that the percent mortality on wild fish is also reduced.
- Rigorous marking and monitoring of hatchery fish and adaptive management.

GSC3.18 Ecosystem information PI (PI 2.~~5~~4.3)

GSC3.18.1 ▲

~~With respect to~~ For hatchery operations, ~~relevant information to understand~~ the team may use the following to enable its understanding of the impacts on the receiving ecosystem ~~may include~~:

~~the collection of~~

- Information on environmental health conditions~~,~~.
- Culture and general health histories~~,~~.
- Information on pathogen detection collected at a relevant level of accuracy ~~and coverage throughout the~~.
- Information covering the complete artificial production cycle consistent with requirements of implementing the disease management strategy.
- Information on the distribution and size of artificially produced and wild fish at various life-cycle stages in freshwater and marine areas ~~that may be used~~, to identify the times and areas where artificially produced fish could compete with or prey upon wild fish of the same species or with other aquatic species~~, with~~. These potential interactions need to be understood at a level of detail relevant to the scale and size of the enhancement programs.

~~GSC4 Principle 3~~

~~GSC4.1 General requirements for Principle 3~~

~~GSC4.1.1~~

~~In Principle 3 the following Performance indicators have modifications to the requirements; PI 3.1.2, 3.1.3, 3.2.1, 3.2.2, 3.2.3 and 3.2.4. PI 3.1.1 should still be scored in accordance with .~~

~~Further, all Annex SA requirements and Annex GSA guidance should be consulted in addition to the modifications in Annex SC and the supplemental guidance in Annex GSC.~~

~~GSC4.1.2~~

~~The team is required to assess the features of each modified indicator that have relevance to the fishery and associated enhancement activities to ensure there is an institutional and operational framework for these activities, appropriate to their size and scale, for implementing the related provisions of Principles 1 and 2 capable of delivering sustainable outcomes. This additional assessment would include examining specific relevant evidence and documenting its consideration relative to the scoring process.~~

~~The size and scale of enhancement activities (to gauge the appropriateness of the institutional and operational framework) can be simply considered by a rough comparison of the magnitude of releases and returns of artificially produced fish in the area being assessed compared to the wild production.~~

~~GSC4.4Consultation, roles and responsibilities PI (PI 3.1.2)~~

~~GSC4.4.1~~

~~The team should assess whether the management system has effective consultation processes that are open to stakeholders related to aspects of both the fishery and the enhancement activities.~~

~~GSC4.5 Long term objectives PI (PI 3.1.3)~~

~~GSC4.5.1~~

~~It is necessary for the salmon management agency to demonstrate that its key ecological objective for its enhancement activities is managing sustainable wild salmon populations while minimizing potentially adverse effects of enhancement activities. The high level or broad management policy context with respect to the fisheries enhancement activities incorporates a **precautionary approach** which places the burden on the enhancement programs to demonstrate that they are minimizing adverse impacts identified in Principle 1 and 2 indicators, and that this burden increases as the size of the enhancement activities, individually and cumulatively, increase. That burden of proof will also be higher for hatcheries than for other forms of artificial production that generally have lower impacts.~~

~~GSC4.7Fishery-specific objectives PI (PI 3.2.1)~~

~~GSC4.7.1~~

~~'Clear objectives' may be interpreted to mean whether a management system, with any significant level of enhancement, has documented enhancement objectives and operational requirements related to minimizing various impacts on natural population components and ecosystem function in a clear operational plan.~~

~~GSC4.8 Decision-making processes PI (PI 3.2.2)~~

~~GSC4.8.1~~

~~In cases where enhancement programs are significant and uncertainties exist about the level of program impacts, the team should consider whether the management system is making these decisions about production, measures and strategies in a precautionary manner.~~

~~For example the team may consider decisions about increasing or decreasing release levels, whether measures are being implemented and evaluated that could be expected to reduce the scale and magnitude of potential interactions between wild and enhanced populations, and whether monitoring and evaluation programs are being initiated and/or maintained to collect essential information to inform future decisions.~~

~~It is widely recognized internationally in marine fisheries that an ideal way to increase the chance of meeting management objectives, improving future decision making, and increasing fairness is to conduct, through probabilistic simulation models/risk assessments, thorough evaluations of a wide range of management options, data collection procedures, and in some cases methods of data analysis (Walters and Martell 2004 [126]). Some such analyses, variously called Management Strategy Evaluations (Sainsbury et al. 2000 [127]) and closed-loop simulations (Walters 1986 [128]), have been done for Pacific salmon (Walters 1986; Collie et al. 2012 [129]; Pestal et al. 2012). The most comprehensive examples of Management Strategy Evaluations take into account not only time dynamics of fish populations, but also dynamics of the fishery, observation error, implementation uncertainty (reflecting when regulations are followed imperfectly), and other sources of uncertainty. The outcome of such evaluations is identification of state-dependent decision-making rules that will best meet complex management objectives in the presence of these uncertainties. For a given fishery, the state-dependent rules are identified prior to the fishing and/or enhancement-activity season, and are the agreed-upon method for altering regulations based on in-season updates to the states of the system. Those rules are not subject to change in-season based on lobbying by special interest groups.~~

~~Most decisions in salmon management involve trade-offs between long-term conservation objectives and short-term fish-harvesting objectives, as well as trade-offs among user groups. Learning which decisions work best at meeting such complex objectives can be facilitated by decision makers publicly documenting the reasons for various decisions on fishing regulations and enhancement activities and comparing the expectations against outcomes.~~

~~The assessment team should consider whether such public documentation is provided in their scoring.~~

[126] Walters, C.J. and S.D. Martell. 2004. Fisheries Ecology and Management. *Princeton University Press, Princeton, N.J., 399 pp.*
[127] Sainsbury K.J., A.E. Punt, A.D.M. Smith. 2000. Design of operational management strategies for achieving fishery ecosystem objectives. *ICES Journal of Marine Science* 57: 731–741.
[128] Walters, C.J. 1986. Adaptive Management of Renewable Resources. *MacMillan, New York, 374 pp.*
[129] Collie, J.S., R.M. Peterman, and B.M. Zuehlke. 2012. A fisheries risk-assessment framework to evaluate trade-offs among management options in the presence of time-varying productivity. *Canadian Journal of Fisheries and Aquatic Sciences. 69(2):209-223, plus supplement.*

~~GSC4.9 Compliance and enforcement PI (PI 3.2.3)~~

~~No modifications to Annex GSA~~

~~GSC4.10 Monitoring and management performance evaluation PI (PI 3.2.5) Scoring issue (b) – Internal and/or external review ▲~~

~~In scoring issue (b) Internal and/or external review:~~

~~SC92 At the **SG60 level**, information should be available **internally** for hatchery program performance review.~~

~~SC93 At the **SG80 level**, information should be available e**xternally and publicly** to enable external scrutiny of the hatchery performance.~~

~~GSC5 Weighting to be Applied in Enhanced Salmon Fisheries~~

~~Default weighting is applied in the MSC scoring spreadsheet, adjusted as appropriate for the additional PIs in salmon fisheries.~~

~~GSC6 Allowances for Inseparable or Practicably Inseparable (IPI) Catches in Salmon Fisheries~~

~~GSC6.1.1~~

~~Different from other wholly marine species, in salmon fisheries there may be two different types of IPI catch. These are 'non-target' and 'non-local' IPI as described below. Both types may qualify for IPI allowances so long as the stocks are not certified separately.~~

a. ~~Non-target IPI: This type of IPI will be a different species than that being assessed in Principle 1.~~

a. ~~Non-local IPI: This type of IPI is the same species as that being assessed under Principle 1, but it originates from outside of the UoA.~~

> **~~Example: Salmon IPI catches~~**
> ~~In British Columbia the P1 target species is Chinook. Other species such as coho may be incidentally caught at small percentages and thus may fall under IPI allowances. Furthermore, some Chinook originating from the United States may be caught as they migrate past the fishing ground in Canada.~~

~~GSC6.1.1.1 The limitations applied under SC6.1.1.1 mean that IPI salmon stocks are only eligible for consideration as IPI if they are less than 5% by weight of the catches. These IPI stocks must meet the additional requirements of Annex SA as normal.~~

~~GSC6.1.1.2The intention of this clause and subclauses is to demonstrate that the UoA is not hindering recovery of the IPI stocks and rationale should be consistent with .~~
~~As such, "a significant portion of the total catch" may be interpreted as 30% or more of the total removal of the stock and 'not to significantly hinder' should be consistent with .~~

~~GSC6.1.3~~

~~This amendment to the normal requirement to use the most recent year's data reflects the multi-cohort nature of salmon species.~~

~~For pink salmon, which have a two year life history, the average catch should be calculated across the most recent years of each cycle line.~~

~~For longer-lived salmon species, average recent catches may be calculated across periods appropriate to their life history in the region of the fishery.~~

~~In cases where different salmon species are in consideration as target and IPI species, average catches should first be calculated based on data from the number of years appropriate to each species; after which the percentage catches should be determined.~~

End of Annex SC Guidance

~~Annex~~

Section GSD: Introduced species ~~Based Fisheries (ISBF) – Guidance~~-based fisheries ▲

Background

~~Background~~

~~Fisheries that are based on non-native species were previously ineligible for certification to the MSC standard.~~

~~The MSC acknowledges that there are longstanding cases of fisheries introductions wherein the introduction of the non-native species occurred prior to the existence of guidelines and regulations on introduction of exotic species into new locations and that in many instances these introductions are now irreversible and that the fisheries in their current state are subject to management measures that are designed to ensure sustainable use of the target species and associated ecosystems.~~

~~In light of this and in recognition of the increasing number of these types of fisheries seeking to be evaluated against the MSC's standard, the MSC has developed a set of scope criteria to define the conditions under which an ISBF may be considered within scope of the MSC standard and programme.~~

~~Consistent with best international practice, the intent of this policy is to enable participation in the MSC of fisheries with longstanding introductions which are irreversible and which are subject to management measures that promote sustainable use of the resources.~~

~~There are certain ecological considerations which may be pertinent to fisheries and management systems where introductions of non-native species have occurred. Such considerations may require modifications to the guidance and default tree used in their assessment. Initial guidance on aspects of the assessment that may require such modifications is provided.~~

~~Annex SD is expected to be applicable over a pilot phase period of 18-24 months after which it is expected that the scope criteria and associated assessment guidance will be subject to review and revision.~~

Assessment of introduced species at Principle 1 is potentially complicated because of the varying, but valid ecological objectives that can exist for fisheries that are based on introduced species.

In most ~~ISBFs~~introduced species-based fisheries, objectives are set to ensure optimum productivity of the target ~~(~~introduced~~)~~ species. In certain other fisheries, objectives may be set to keep populations of the introduced species at a level that ensures wider ecosystem objectives are met. These wider ecosystem objectives may include keeping the target stock at sub-MSY levels in order to allow for some level of restoration of biodiversity.

GSC4 ~~GSD2.1.1~~

~~ISBFs are required to meet the intent of~~ Principle 3

GSC4.1 General requirements for Principle 3

GSC4.1.1 ▲

In Principle 3, the following Performance Indicators have modifications to the requirements: PI 3.1.2, 3.1.3, 3.2.1, 3.2.2, 3.2.3, and 3.2.4. PI 3.1.1 should still be scored in accordance with Section SA.

The CAB should apply:

- All Section SA requirements.
- All Section GSA guidance.

- Modifications in Section SC.
- Supplemental guidance in Section GSC.

GSC4.1.2 ▲~~, which~~

This requirement is to ensure there is an institutional and operational framework for these activities, appropriate to their size and scale, for implementing the related provisions of Principles 1 and 2 capable of delivering sustainable outcomes. When undertaking this additional assessment, the team should:

- Examine specific relevant evidence.
- Document its consideration of this evidence relative to the scoring process.

The team may assess the size and scale of enhancement activities by considering a rough comparison of the magnitude of releases and returns of artificially produced fish in the area being assessed, compared to the wild production.

GSC4.4 Consultation, roles, and responsibilities PI (PI 3.1.2)

GSC4.4.1 ▲

The team should assess whether the management system has effective consultation processes that are open to stakeholders and related to aspects of both the fishery and the enhancement activities.

GSC4.5 Long-term objectives PI (PI 3.1.3)

GSC4.5.1 ▲~~exploited~~

It is necessary for the salmon management agency to demonstrate that its key ecological objective for its enhancement activities is managing sustainable wild salmon populations while minimising potentially adverse effects of enhancement activities. The high-level or broad management policy context should incorporate a **precautionary approach** that places the burden on the enhancement programs to demonstrate that:

- They are minimising adverse impacts identified in Principle 1 and 2 indicators.
- This burden increases as the size of the enhancement activities, individually and cumulatively, increases.

That burden of proof will also be higher for hatcheries than for other forms of artificial production that generally have lower impacts.

GSC4.7 Fishery-specific objectives PI (PI 3.2.1)

GSC4.7.1 ▲

The CAB should interpret “clear objectives” to mean that a management system with any significant level of enhancement has documented enhancement objectives and operational requirements, which are designed to minimise various impacts on natural population components and ecosystem function. These are to be contained in a clear operational plan.

GSC4.8 Decision-making processes PI (PI 3.2.2)

GSC4.8.1 ▲

If enhancement programs are significant, and uncertainties exist about the level of program impacts, the team should consider whether the management system is making decisions about production, measures, and strategies in a precautionary manner.

For example, the team may consider:

- Decisions about increasing or decreasing release levels.
- Whether measures are being implemented and evaluated that could be expected to reduce the scale and magnitude of potential interactions between wild and enhanced populations.
- Whether monitoring and evaluation programs are being initiated and/or maintained to collect essential information to inform future decisions.

In marine fisheries, it is widely recognised internationally that an ideal way to increase the chance of meeting management objectives, improving future decision making, and increasing fairness is to conduct thorough evaluations of a wide range of management options, data collection procedures, and in some cases methods of data analysis[130]. These are done through probabilistic simulation models/risk assessments. Some such analyses, variously called management strategy evaluations[131] and closed-loop simulations[132], have been done for Pacific salmon 2012[133].

The most comprehensive examples of management strategy evaluations take into account:

- Time dynamics of fish populations.
- Dynamics of the fishery.
- Observation error.
- Implementation uncertainty, reflecting when regulations are followed imperfectly.
- Other sources of uncertainty.

The outcome of such evaluations is the identification of state-dependent decision-making rules that will best meet complex management objectives in the presence of these uncertainties. For a given fishery, the state-dependent rules are identified prior to the fishing and/or enhancement-activity season and are the agreed-upon method for altering regulations based on in-season updates to the states of the system. Those rules are not subject to in-season change based on lobbying by special interest groups.

Most decisions in salmon management involve trade-offs between long-term conservation objectives and short-term fish-harvesting objectives, and trade-offs between user groups. Learning which decisions work best for meeting such complex objectives can be facilitated by decision-makers publicly documenting the reasons for various decisions on fishing regulations and enhancement activities, and comparing the expectations against outcomes.

The team should, in its scoring, consider whether such public documentation is provided.

GSC4.9 Compliance and enforcement PI (PI 3.2.3) ▲

No modifications to Section GSA.

130 Walters, C.J., and Martell, S.D. (2004) *Fisheries Ecology and Management*. Princeton University Press, Princeton, N.J., 399 pp.
131 Sainsbury K.J., Punt, A.E., and Smith, A.D.M. (2000) Design of operational management strategies for achieving fishery ecosystem objectives. *ICES Journal of Marine Science* 57:731–741.
132 Walters, C.J. (1986) *Adaptive Management of Renewable Resources*. MacMillan, New York, 374pp.
133 Collie, J.S., Peterman, R.M. and Zuehlke, B.M. (2012) A fisheries risk-assessment framework to evaluate trade-offs among management options in the presence of time-varying productivity. *Canadian Journal of Fisheries and Aquatic Sciences*. 69(2):209–223, plus supplement.

GSC4.10 Monitoring and management performance evaluation PI (PI 3.2.4)

Scoring issue (b) – Internal and/or external review ▲

At SG60, information should be available internally for hatchery program performance review.

At SG80, information should be available externally and publicly to enable external scrutiny of hatchery performance.

GSC5 Allowances for inseparable or practicably inseparable catches in salmon fisheries

GSC5.1.2 ▲

For pink salmon, which have a 2-year life history, the team should calculate the average catch across the most recent years of each cycle line.

For longer-lived salmon species, the team should calculate average recent catches across periods appropriate to their life history in the region of the fishery.

Where different salmon species are in consideration as target and inseparable or practicably inseparable (IPI) species, the team should first calculate average catches based on data from the number of years appropriate to each species and then determine the percentage catches.

End of Section SC Guidance

GSD1 General ▲

The team does not need to follow FCP 7.10.5 when adding an additional scoring issue and corresponding guideposts, as per SD3.1.3 and/or SD3.1.4.

GSD2 Principle 1

GSD2.1 General requirements for Principle 1

GSD2.1.2 ▲

A fishery may choose to set its TRPs for the introduced species either at levels consistent with MSY, or at lower levels aimed at mitigating the impact on other species. SD2.1.2.1 requires that where TRPs are adjusted in this way, it may be appropriate to make a modification to the default tree to reflect that modification (in PI 1.1.1 scoring issue (b) and PI 1.2.2). SD2.1.2.1.a~~high abundance levels~~ further requires that the levels should not be set below the "PRI", because in this case, the fishery would not be able to maintain sustainable catches.

GSD3 Principle 2

GSD3.1 General requirements for Principle 2

GSD3.1.2–4 ▲

SD3.1.2 requires that CABs revise PI 2.4.2 (ecosystem management) in order to be able to evaluate the efforts of the fishery to minimise the impacts of the introduced species. Additionally, SD3.1.3 requires CABs to address the collection of information important to understanding and preventing further impact of the introduced species on biodiversity. In cases where no actual measures are in place and there is no corresponding ecosystem information being collected, SD3.1.4 allows CABs to provide a rationale as to why this is the case and the additional scoring issues are not required. The team should provide a robust rationale in this situation. The team should support this rationale with scientific evidence or logical argument that no more impacts are occurring and that further impact is unlikely. The rationale should justify why measures are not necessary.

Ecosystem stability

For introduced species that have been in place for long enough that the ecosystem has stabilised, but the new system is dramatically different from the original, SD3.1.2-4 are still relevant. The spread of the species to new areas is still a possibility, even if the ecosystem of the current area has stabilised.

End of Section SD Guidance

Section GSE: Principle 1 for stocks managed by Regional Fisheries Management Organisations

GSE1 General requirements for section SE

GSE1.1.1 ▲

Section SE applies to stocks managed by the following RFMOs[134]:

- CCAMLR: Commission for the Conservation of Antarctic Marine Living Resources.
- CCSBT: Commission for the Conservation of Southern Bluefin Tuna.
- GFCM: General Fisheries Commission for the Mediterranean.
- IATTC: Inter-American Tropical Tuna Commission.
- ICCAT: International Commission for the Conservation of Atlantic Tunas.
- IOTC: Indian Ocean Tuna Commission.
- IPHC: International Pacific Halibut Commission.
- NAFO: Northwest Atlantic Fisheries Organization.
- NEAFC: North-East Atlantic Fisheries Commission.
- NPFC: North Pacific Fisheries Commission.
- SEAFO: South East Atlantic Fisheries Organization.
- SIOFA: South Indian Ocean Fisheries Agreement.
- SPRFMO: South Pacific Regional Fisheries Management Organization.
- WCPFC: Western and Central Pacific Fisheries Commission.

The list of RFMOs above has been modified from Løbach et al. (2020)[135] and represents the relevant RFMOs recognised by the FAO at the time Section SE was developed (i.e. 2022). RFMOs that manage salmon stocks are not included in this list because salmon fisheries are scored within Section SC.

The assessment team can use Section SE on a voluntary basis to score UoAs that include P1 stocks not managed by the above RFMOs. Applying Section SE voluntarily would be particularly relevant to:

- Multi-jurisdictional or shared stocks, or
- Stocks managed by RFMOs that become established after the release of these requirements.

GSE1.1.2.2 ▲

The MSC's intent is that whilst the decision would apply to UoAs and UoCs, only UoCs are responsible for deciding if to apply Section SE.

[134] Løbach, T., Petersson, M., Haberkon, E. and Mannini, P. (2020) Regional fisheries management organizations and advisory bodies. Activities and developments, 2000–2017. FAO Fisheries and Aquaculture Technical Paper No. 651. FAO. https://doi.org/10.4060/ca7843en
[135] Løbach, T., Petersson, M., Haberkon, E. and Mannini, P. (2020) Regional fisheries management organizations and advisory bodies. Activities and developments, 2000–2017. FAO Fisheries and Aquaculture Technical Paper No. 651. FAO. https://doi.org/10.4060/ca7843en

GSE1.1.3 ▲

If the target stock(s) is not managed by an RFMO but undertakes the scoring of Section SE voluntarily (SE1.1.2), evidence should come from the management agency responsible for the target stock. Evidence that the RFMO/management agency is committed to the development and adoption of a harvest strategy that includes an MP tested within an MSE framework, is a key piece of information to demonstrate the milestones within Section SE are achievable.

GSE2

GSE2.1.1 Harvest Strategy PI 1.2.1 ▲

As used in PI 1.2.1 scoring issue (b) (Table SA4) at the 100 level, "evaluated" means quantitative management strategy evaluation as appropriate to the fishery.

For evaluating scoring issue (b) at the harvest-strategy level, the team should consider the full interactions between different components of the harvest strategy, including:

- The HCRs.
- Use of information.
- Assessment of stock status.

GSE2.2 HCRs and tools PI (PI 1.2.2) ▲

For LTL species, the TRPs and LRPs need to take into account the ecological role of the stock for the fishery to score 60 or above under PI 1.1.1A. The harvest strategy, HCRs, information requirements, and assessment need to be consistent with this distinction. When PI 1.1.1A is scored, references to PI 1.1.1 in the guidance below should interpreted as PI 1.1.1A and the objectives required therein.

There may be conceptual differences in the reference points when scoring PI 1.1.1 and PI 1.2.2. This is because fisheries may use different reference points for measuring stock status and as triggers in the HCRs[136]. For example, a fishery that uses an explicit B_{MSY} reference point as a target for the fishery biomass may have TRPs for adjusting F at values of biomass either at B_{MSY}, or above or below B_{MSY}. The focus in this PI is thus on the reference points used in a fishery to trigger changes in management actions, and how they work in combination to achieve the outcomes required in PI 1.1.1.

Scoring issue (a) – HCR design and application ▲

The team should consider the basis for plausibility and practicality of design in relation to the scale and intensity of the fishery; for example, using:

- Empirical information.
- Relevant science.
- Model-based approaches, such as management procedures and management strategy evaluation.

The team should score HCRs against their ability to deliver the levels expressed in scoring issue (a).

- At SG**60**, HCRs should be "likely" to ensure that stocks will be maintained above the PRI.
- At SG**80**, HCRs should also ensure that the stock is "likely" to fluctuate around a B_{MSY} level. Testing may show that this is achieved by the inclusion of a B_{MSY} consistent reference point as a

[136] Dowling, N.A., Dichmont, C.M, Haddon, M., Smith, D.C., Smith, A.D.M., Sainsbury, K. (2015) Guidelines for developing harvest strategies for data-poor species and fisheries. Fisheries Research 171 pp 130-140. Dowling, N.A., Haddon, M., Smith, D.C., Dichmont, C.M., and Smith, A.D.M. *Harvest Strategies for Data-Poor Fisheries: A Brief Review of the Literature*. CSIRO.

trigger in the HCRs, such as an inflection in a "hockey stick" form, at a point that would deliver B_{MSY} in the long term.

- At SG**100**, greater certainty is required. The team should regard fisheries with HCRs that target stock levels above B_{MSY}, for example B_{MEY}, as at least meeting the 80 level. Projections in the fishery may show that the HCR would "likely" achieve the higher SG100 score by fluctuating more above than around B_{MSY}.

HCRs will usually include some form of dynamic rule, requiring that a change of some sort will be made in response to a fishery indicator moving above or below one of the TRPs. In lightly exploited fisheries, it may be that some reference points are set to trigger changes in data collection or assessment approaches, as certain thresholds are reached[137].

HCRs are often applied on a frequent basis, such as with the annual setting of TAC or effort restrictions.

- Such HCRs respond dynamically to the monitoring data from the fishery with regular adjustments to input/output type management measures.
- In data-poor fisheries that are managed without such input/output controls, management may comprise only technical measures such as size limits, gear restrictions, closed seasons, and closed areas.
    - In these cases, the specific terms of the technical measures are usually set and fixed for a relatively long period of time (several years), based on occasional strategic stock assessments that are shown to deliver defined TRPs or LRPs.
    - The team may regard such an arrangement as equivalent to a dynamic HCR operating over a longer time scale in cases where some indicators are monitored to confirm that the HCRs are delivering the intended targets for the stock.
- For "highly productive" species, the design of the HCR should consider life history, as this can affect performance of the control rule[138]. Given the propensity for changes in productivity with these species, adaptive and responsive control rules are key to assist with detecting and responding to changes in biomass[139].

At SG80 in scoring issue (a), the team should expect "well-defined" HCRs to explicitly include the conditions under which the technical measures in the fishery would be expected to be revised in the future.

Example

Relatively sedentary bivalves often have fishery management trigger points based on population densities collected through systematic surveys, where these index densities are established based on the species population dynamics and the inherent productivity of the habitat and environmental conditions.

There may be no formal stock assessment, but yield is calculated on a proportion of the observed biomass, and the harvested fraction determined on empirical evidence from historical catches and their consequences.

The team should note that, while such arrangements can work, HCRs based on taking a constant percentage of the year's estimated biomass should not be regarded as meeting the requirement of avoiding the PRI unless some lower threshold is defined.

[137] Dowling, N.A., Dichmont, C.M, Haddon, M., Smith, D.C., Smith, A.D.M., Sainsbury, K. (2015) Guidelines for developing harvest strategies for data-poor species and fisheries. Fisheries Research 171 pp 130-140
[138] Siple, M., Essington, T, & Plaganyi, E. (2018). Forage fish fisheries management requires a tailored approach to balance trade-offs. Fish and Fisheries. 20.
[139] Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. (2012). Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp..

The CAB should not always interpret the requirement that an HCR reduces exploitation rates as the LRP is approached as requiring the control rule to deliver an exploitation rate that is a monotonically decreasing function of stock size:

- Any exploitation rate function may be acceptable if it acts to keep the stock above an LRP that avoids possible recruitment failure and attempts to maintain the stock at a TRP that is consistent with B_{MSY} or a similar "highly productive" level.
- This outcome includes the requirement that the HCR should act to cause stocks to rebuild to the TRP when they are below it. Maintenance of a stock at a level just above the LRP would not be acceptable.
- A reduction of exploitation rate may not always mean that the control rule requires a reduction in "total" exploitation rate, but instead could involve reducing exploitation rate on parts of the stock; for example, by age or sex.
- The team should assume that reductions in exploitation rate refer primarily to reductions in catches and effort, and not to gear modifications unless these have the effect of reducing catches/effort.

As noted in the guidance on PI 1.1.1, HCRs may include both explicit and implicit reference points.

Example

If a management strategy is based solely around a TRP, the HCR, when combined with TRP, should ensure that the stock remains well above the PRI. This should ensure that the exploitation rate is reduced as this point is approached. This is an implied LRP.

Equally, a management strategy based solely around an LRP should imply that there is a TRP close to or at B_{MSY}, or some other measure or surrogate that maintains the stock at high productivity, and at a level that is well above the LRP.

"Generally understood" HCRs at SG60 vs "well-defined" HCRs at SG80

For "generally understood" and in-place HCRs, there should be at least some implicit agreement supported by past management actions that demonstrates that "generally understood" rules exist. There should be the expectation that management will continue to follow such "generally understood" rules in future and act when changes in explicit or implicit reference points are identified.

When determining whether a "generally understood" HCR is in place in the fishery under assessment, the team needs to determine whether the fishery will in future take appropriate management action in line with what they perceive as the "generally understood" rule. The team should consider evidence of positive action being taken in the past as evidence that there is a "generally understood" rule in place. The team should provide clear reference to documents or other evidence that actions were taken on specific dates.

The team should provide evidence and examples of the positive actions taken in response to "generally understood" HCRs for the target stock, in the case that "generally understood" HCRs are "in place" or for other stocks in the case that they are "available".

The team should apply a precautionary approach to scoring when there is uncertainty over whether an HCR meets the requirements of "generally understood" and whether there is sufficient evidence to support this. Note, the full definition for HCRs in the MSC-MSCI Vocabulary should only apply at the SG80 level, given the term 'well-defined' is used in this definition.

The team should not consider the following as evidence that an HCR is in place:

- A poorly defined commitment such as "we agree to implement an HCR sometime in the future".
- General regulations, such as convention texts or references to the Fish Stocks Agreement.
- However, binding commitments such as those in national law may be used as evidence, if supported by evidence of management action.
  - Scientific recommendations on HCRs or reference points that have not yet been adopted by the actual management agency.

The team should not expect that "in place" arrangements require formal indefinite binding agreement. For example, CMMs approved by RFMO Commissions are regarded as "active" resolutions and may thus be accepted as in place even though they may be overturned in the future.

Scoring issue (b) – scoring uncertainty in the HCRs ▲

The SGs reflect the degree of confidence there is in the HCR performance in relation to risks caused by known and unknown factors.

Known factors include:

- Observation and process errors that are often accounted for in stock assessments.

Unknown factors include:

- Unpredictable effects from climate.
- Environmental or anthropogenic non-fishery related factors, which could, for example, lead to periods of low recruitment or growth.
- High natural mortality.
- Migration.

These and other changes to the population dynamics may not have been fully accounted for in the stock assessment or projections. Another important reason for limited confidence in an HCR is that it has not been fully agreed by stakeholders, and it is uncertain whether the fishing community will comply with the HCR. This last issue is important to ensure HCRs are not only theoretical rules on paper but are applied in practice.

The team can use testing to support the requirement that the control rules and/or management actions are designed to take into account uncertainty. Testing can include:

- The use of experience from analogous fisheries.
- Empirical testing; for example, practical experience of performance or evidence of past performance.
- Simulation testing; for instance, using computer-intensive modelling such as management strategy evaluation.

It may generally be the case that limit reference points are set at the point that reproductive capacity starts to be appreciably impaired, for some fisheries, especially those for small pelagic species and annual species where the stock recruit relationship is very steep. However, management may choose to set a limit reference point above this level. Maintaining a buffer can allow for adaptability to changes in production[140]. Where this results in more precautionary management, it may assist the fishery in meeting SG80 or SG100 for scoring issue (b).

HCRs in small-scale fisheries may still achieve high scores if uncertainties are well considered. The team may thus score simple HCRs linked to reliable indices of stock status highly on this issue without management strategy evaluations.

PI 1.2.2 scoring issue (c) – Evaluating the effectiveness of HCRs ▲

For Section SE, scoring can consider the overall history of effectiveness of the tools used in the fishery prior to the implementation of the harvest strategy that was "designed". At SG80, the team should also assess the effectiveness of the implemented HCR within the "designed" harvest strategy (see SE3), in terms of:

- The likelihood of achieving the desired exploitation rates and biomass levels.

[140] Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. (2012). Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp.

- The current status.

If under scoring issue (a) the “available” language is used, effectiveness should be assessed in terms of the HCR applied to the other U

oA. If $F < F_{MSY}$ is demonstrated in the other fishery, this is not sufficient evidence on its own that HCRs and tools are effective in that other fishery. Additional explanation is needed of how $F < F_{MSY}$ has been achieved.

In this scoring issue, the team is required review the ability of the tools associated with the HCRs to achieve the exploitation levels. Such tools include:

- Management measures like TACs and fishing limits.
- Arrangements for sharing TACs between participants in the fishery, including between states in shared stock fisheries.

For this examination, the team may consider the overall history of effectiveness of the tools used in the fishery, in terms of their ability to achieve the desired exploitation rates and biomass levels, and the current status.

SE2.2.7 requires that the team examine the current exploitation levels in the fishery, as part of the evidence that the HCRs are working; for example, through evidence that current F is equal to or less than F_{MSY}. The team may also accept current F levels greater than F_{MSY} in cases where:

- Stock biomass is currently higher than B_{MSY}, or
- Stock assessment information is comprehensive, and it is appropriate to treat F_{MSY} as a TRP (see Box GSA5.

However, the team should not use $F < F_{MSY}$ as the sole evidence for the existence of an effective HCR. F could, for example, be lower than F_{MSY} just because effort is currently low, even though there has been no management commitment or attempts to actually control effort at a level that would constrain F to F_{MSY} by the HCR. However, if F has been constrained at $F < F_{MSY}$ by the tools, the team could accept this as part of the evidence that the HCRs are being effective. Evidence for the effectiveness of an HCR should in fact require the consistent achievement of the target exploitation level, which may be well below F_{MSY} if stocks are currently below B_{MSY}. The team should take particular care when assessing the effectiveness of capacity limitation measures in fisheries, for example, in comparison to well-monitored effort controls and catch limits, in terms of their likely ability to meet management goals and target exploitation levels.

To avoid severe socio-economic impacts in a fishery, the team may also make allowance for the gradual adjustment of F down to appropriate levels in cases where the pace of change is limited. In these cases, projections of stock status should confirm that the expected future adjustments in F will still lead to fluctuations around MSY levels within a reasonable timescale.

If proxy indicators and reference points are used in the fishery instead of explicit estimates of F and F_{MSY} (as allowed in SA2.2.3), the team should assign higher scores where greater confidence is provided by the proxy information, similar to the scoring of PI 1.1.1. Where higher scores are justified by the use of 2 or more proxy indicators, they should be independent of each other and expected to be proxies of the quantity of interest, such as mean fish size in the case of exploitation rates. The team should present a rationale for how the proxies conform to these principles.

As with the case of using proxies for scoring stock biomass in PI 1.1.1, it may sometimes be argued that 1 good proxy is better than 2 or more weak proxies.

Examples: SG60, SG80, and SG100 levels

Examples of how the team may justify SG60, SG80, and SG100 in these situations:

- At least SG60 is justified if 1 proxy indicates that "overfishing" is not occurring.
- At least SG80 is justified if 1 or more proxies indicate that it is "likely" that "overfishing" is not occurring. In this case, the extra confidence may be due to the availability of a second proxy indicator, or when a minimum 70% probability level can be assigned to the single indicator used, as compared to the SG60 level where this probability level may not be demonstrated.
- SG100 is justified if 2 or more proxies indicate it is "highly likely" that "overfishing" is not occurring.

Scoring "available" HCRs at SG60 ▲

The team may provide a rationale under SE2.2.4.a that this could reasonably be "expected" for the target species in cases where HCRs are currently being "effectively" used by the same management agency on at least 1 other species of similar importance, at similar average catch levels and value.

Alternatively, the team may provide a rationale under SE2.2.4.b in cases where there is some sort of arrangement in place that clearly requires that management will put HCRs in place as and when the fishery reaches some pre-defined trigger level within the vicinity of B_{MSY}. Such arrangements:

- Would normally relate to lightly exploited fisheries that are still in the development stage.
- Should be explicit in requiring action at some defined point.

Although potentially driven by information and triggers, the arrangements are different to the actual HCRs as they relate to the development of the HCRs themselves, while the HCRs define how management measures will be adjusted in response to changes in fishery status.

Any commitment that will clearly deliver an HCR before the stock declines below B_{MSY} is sufficient. However, lack of evidence is not acceptable (for example, "there is no evidence that the stock will be below BMSY at this point"). Positive evidence is required, otherwise the precautionary approach applies.

In cases where the stock has not yet been reduced and "available" HCRs are scored as meeting SG60, the condition assigned to this PI may allow longer than the normal 5-year time period for delivery. While there will be advantages in designing and putting into place a "well-defined" HCR during the certification period, it may also be acceptable to do this over a longer time period; for example, if other conditions are being delivered first. The scoring of "available" HCRs is made on the basis that the stock remains abundant and the criteria given in SE2.2.3 are still met. As soon as these criteria are no longer met, the fishery will need to have at least "generally understood" HCRs in place to meet SG60.

Similar to the situation with the rebuilding PI (see GSA2.3), the team should allow fisheries 1 year to put HCRs in place. The team should not fail the fishery immediately if SG60 is not met in this 1st year. If such fisheries fail to put in place either "generally understood" or "well defined" HCRs within 1 year, the CAB should score the fishery as not meeting the SG60 level.

"Available" HCRs must be at least "generally understood" in nature. If the HCRs are "well-defined" in the other stock, there would be more confidence that they are 'available' to the fishery in assessment.

CABs should note that the references to "other UoAs" in SE2.2.4.a and "other named UoAs" in SE2.2.6.a is not meant to imply that such UoAs are necessarily in assessment or certified as MSC fisheries. Although this may be the case, they may also just be other species or stocks that are also managed by the same management body and considered in the assessment.

If HCRs are only regarded as "available" in scoring issue (a), it is not possible to score more than 60 for issue (c) because the SG80 refers to the tools "in use" in the fishery in assessment, not the tools "in use or available".

Assessing informal approaches to HCRs

Within Section SE, informal approaches to HCRs are only appropriate at SG60 for scoring issue (a) and (c).

Metapopulations

The team should address uncertainties relating to the metapopulation structure. The team should note the descriptions of different types of metapopulation in GFCP G7.5.

GSE3

GSE3.1.1 Setting conditions ▲

The condition-setting requirements in Section SE are specific to setting conditions for PI 1.2.1 and PI 1.2.2 when Section SE is applied and therefore may differ from the condition setting requirements in the FCP. Differences between Section SE and the FCP are intentional. The intent of SE 3.1.1 and SE3.1.1.1 is to ensure the CAB follows the condition-setting requirements under Section SE rather than the condition-setting requirements in the FCP.

GSE3.2.3.2.d Maintaining phase 1 outcomes ▲

The preferred harvest strategy that is scored at the completion of the first phase does not necessarily need to be the same one that is adopted at the completion of the second phase. However, if they do change, the final adopted harvest strategy still needs to meet the required scoring criteria.

GSE3.2.4 Milestones ▲

Within the first milestone of the first phase, the management objectives should:

- Outline what the harvest strategy is aiming to achieve.
- Reflect the achievement of SG80 in PI 1.1.1.

The performance indicators should reflect these management objectives and include the desired level of risk and timelines for meeting those performance indicators. Ultimately, the performance indicators, trade-offs, and reference points etc. are determined by the stakeholders involved in the management strategy evaluation process.

The data needs within the first phase should outline:

- The type of data required.
- The assessment model that is to be used to inform the management procedure.

In this phase, a pre-agreed cut-off date should be considered for the data that will be used to inform the management strategy evaluation process, including the operating models and the candidate(s) and adopted management procedure.

The completion of the first phase involves the identification of a preferred harvest strategy adhering to a management procedure approach. The evidence for this identification includes endorsement from the management agency or relevant body, such as a Commission.

With respect to developing and implementing a catch or effort resource-sharing agreement, this could exist in numerous forms. These include a pre-defined stock-wide reduction or individual fleet or country-based allocation schemes. The key objective is that the harvest strategy has a mechanism to reduce catches, when necessary.

GSE3.2.5 and 3.2.6 Milestone timeframes ▲

Where possible, the milestones for the phased condition pathway should be completed sequentially. The expectation is that the CAB should assess the milestones throughout each phase and not wait until the end of each phase to assess progress.

GSE3.3.2 & GSE3.3.4.1 Condition deadline and milestone timeframes ▲

The MSC's intent is that CABs use the results of the gap analysis to set a condition deadline and milestone timeframes that are commensurate with the time it would take to achieve the milestones, within the time appropriate for the target stock. It is not the MSC's intent that the maximum time is given as a default for the condition to be closed, regardless of the milestones that need to be achieved.

GSE3.5.1 Evaluating progress against the condition ▲

The requirements for evaluating progress against the condition in section SE are specific to the condition set for PI 1.2.1 and PI 1.2.2 when Section SE is applied. Therefore, the requirements may differ from the requirements for evaluating progress against conditions in the FCP. Differences between Section SE and the FCP are intentional. The intent of SE3.1.1 and SE3.1.1.1 is to ensure the CAB follows the requirements for evaluating progress against the condition in Section SE rather those in the FCP.

GSE3.5.3 "Behind target" ▲

"Behind target" means actions, outcomes, or milestones have fallen behind the timeframes specified in a condition. Remedial action can include the CAB setting new milestones, provided these are still expected to achieve the condition within the timeframes identified at the time of setting the condition.

GSE3.5.3, GSE3.5.5, GSE3.5.6 & GSE3.6.2 Full assessment after suspension related to conditions ▲

The MSC's intent is that if a fishery has failed to achieve a condition by its deadline, the fishery client is not allowed to enter the same UoCs, or entities in the UoC(s), into (re)assessment under either the same or an alternative name or alias where the intention is to extend the duration of the condition into a new certification period.

GSE3.5.4 Back "on target" ▲

Back "on target" means meeting the original milestones within 12 months of falling behind.

GSE3.5.7 Reporting condition progress ▲

Such reports include the Surveillance Reports, Announcement Comment Draft Report, Client and Peer Review Draft Report, Public Comment Draft Report, Final Draft Report, and the Public Certification Report.

End of Section SE Guidance

End of Guidance to the Fisheries Standard