Environmental Rapid Assessment

Version 2.1

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Acronyms

B	biomass
B_0	unfished biomass
$B_{CURRENT}$	current biomass
B_{LIM}	biomass limit reference point
B_{MSY}	biomass at maximum sustainable yield
B_{TARGET}	target biomass level
CAB	Conformity Assessment Body
CITES	Convention on International Trade in Endangered Species
CPUE	Catch Per Unit Effort
EEZ	Exclusive Economic Zone
ERA	Environmental Rapid Assessment
ETP	endangered, threatened or protected
F	fishing mortality
FAO	Food and Agriculture Organization [of the United Nations]
FCR	Fisheries Certification Requirements [for MSC]
FIP	Fishery Improvement Project
F_{MSY}	fishing rate at maximum sustainable yield
FS	Fisheries Standard [for MSC, MBA SFW]
FTUSA	Fair Trade USA
HCR	harvest control rule
IUCN	International Union for Conservation of Nature
IUU	illegal, unreported, and regulated
LRP	limit reference point
LTL	lower trophic level
MBA SFW	Monterey Bay Aquarium Seafood Watch
MSC	Marine Stewardship Council
NGO	Non-Governmental Organization
O2	Ocean Outcomes

P1, P2, P3	Principle 1, 2, 3 [MSC]
PI	performance indicator
PRI	point of recruitment impairment
PSA	productivity susceptibility analysis
RBF	Risk Based Framework
SFP	Sustainable Fisheries Partnership
SG	scoring guidepost
TRP	target reference point
UoA	Unit of Assessment, i.e. the fishery being assessed
VME	vulnerable marine ecosystem
VMS	vessel monitoring system
WWF	World Wildlife Fund

Background

Organizations working in the seafood sector use a variety of tools to rapidly evaluate environmental sustainability of fisheries. For example, World Wildlife Fund US (WWF-US) has used a MRAG Americas, Inc. rapid assessment methodology to determine potential improvement time frames for specific fisheries. Ocean Outcomes (O2) developed an internal rapid assessment methodology to scope fisheries and develop fishery improvement projects (FIPs). Sustainable Fisheries Partnership (SFP) assesses fisheries using FishSource. Although all three of these assessment methodologies are based on the Performance Indicators (PIs) of the Marine Stewardship Council (MSC) standard, their approaches are different, making it difficult for stakeholders to compare methodologies and determine which best suits their needs. Thus in 2017, O2, SFP, and WWF-US were funded by the Moore Foundation's Oceans Seafood and Markets Initiative to co-develop this environmental rapid assessment (ERA) tool to address these issues.

The ERA aims to streamline the improvement process, motivate more fisheries to join FIPs, and facilitate the reporting of basic and prospective FIPs on FisheryProgress.org, the global platform for publicly tracking FIPs. In addition, the ERA is a part of the Triple Impact Fisheries Evaluation Framework, developed by Ocean Outcomes and others, which helps users simultaneously evaluate three dimensions of sustainability (environmental, social and financial), to support durable improvement outcomes and reduce risk of FIPs contributing to socio-economic inequities, which can harm fishing communities.

The main update in Version 2.0 of the ERA is inclusion of guidance for assessing performance within the MSC 0 to 60 scoring range based on the 0-60 Fisheries Assessment Tool (2020) developed by MRAG Americas, Inc. for the Certification and Ratings Collaboration. This allows for evaluation of performance and fishery improvement progress below the MSC 60 level, which is applicable to many fisheries around the world, especially those that do not have long-established, formal fisheries management systems. We therefore expect the 0-60 scoring to be particularly relevant to small-scale and developing world fisheries that face additional challenges to reaching their sustainability goals, or that lack performance information because monitoring and evaluation have been limited. There has been growing recognition of the need to make the FIP model more inclusive of and sensitive to small-scale fisheries, including those that may not seek certification as an end goal, or for which certification is a long way off. Development of the ERA version 2.0 was funded by the Certification and Ratings Collaboration and FishChoice, the organization that operates the FisheryProgress.org platform.

This methodology is largely built around MSC's PIs and draws concepts from other certification and ratings standards as well, specifically:

- Marine Stewardship Council. 2014. MSC Fisheries Standard and Guidance Version 2.0 (MSC FS v2.0);
- Marine Stewardship Council. 2014. MSC Fisheries Certification Requirements and Guidance Version 2.0 (MSC FCR v2.0);
- MSC. 2018. MSC Fisheries Standard Version 2.01 (MSC FS v2.01);

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- Monterey Bay Aquarium Seafood Watch (MBA SFW). 2016. Standard for Fisheries Version 3.2 (SFW FS v3.2);
- FishSource. 2017. FishSource Guidance for Analysts Version 5.0;
- FishSource. 2020. FishSource Method for Evaluating Fishery Impact on the Environment SFP Environment Risk Rating System version 3.4 (SFP ERRS v3.4);
- Fair Trade USA. 2017. Capture Fisheries Standard. Version 1.1.0 (FTUSA CFS v1.1.0).

MSC and MBA SFW are currently using newer versions of their standards, but these were the versions that the 0-60 Tool was based on. Although the ERA relies heavily on concepts developed and tested by these organizations, this methodology does not replicate or replace either an MSC pre-assessment or a SFW assessment. For example, it cannot be used as a scoping document for a comprehensive FIP under Conservation Alliance Guidelines for Supporting Fishery Improvement Projects, which specify that an MSC pre-assessment is required. A more detailed assessment may provide more rigor and help identify more specific recommendations.

Objectives

We developed the ERA methodology to achieve the following:

- Efficiently identify major deficiencies in a fishery's environmental sustainability, for general scoping and to evaluate baseline performance;
- Be accepted sustainable seafood organizations for use in the FIP development process, to give sound advice on how the fishery can move forward into an improvement project;
- Be posted on FisheryProgress.org as the Needs Assessment for basic FIPs.

Overall, the goal for this tool is to provide fishery stakeholders and FIP implementers an efficient method to develop science-based guidance, particularly in early stages when funding and information may be limited.

Scope

We have designed this methodology to be applicable across a broad range of performance for wild capture fisheries. Fisheries that use harmful fishing methods such as dynamite or poison can theoretically be improved, so we have not explicitly excluded them and instead consider their impacts under applicable PIs (e.g. Habitat and Ecosystem Outcomes). Some fisheries with special characteristics, such as enhancement, may require a different set of criteria for evaluation, which we mention under the Special Cases section below.

Assessors are expected to have education or training in fisheries science. Experience in evaluating fisheries against sustainability standards, particularly the MSC Fisheries Standard, is also extremely helpful. In accordance with the Conservation Alliance FIP Guidelines, we do not require a third party formally trained in the MSC standard to conduct the ERA. However, we recommend that any assessors with limited MSC experience attend an MSC Capacity Building Training Workshop, or secondarily, use the MSC Online Training platform. Additionally, assessors are expected to be objective when scoring, especially if they are not completely

independent of the assessed fishery. If scores are overly positive, the resulting FIP is at risk of being considered non-credible.

Because the ERA is designed to be efficient, there are some limitations to the areas that are assessed. For instance, we primarily rely on a combination of productivity susceptibility analysis (PSA) and population or catch trend data to score stock status for data-limited species, although such information does not provide a direct assessment of stock status. Other organizations have developed tools that serve complementary purposes to the ERA, such as knowledge sharing platforms and additional guidance for conducting data-limited stock assessments and engaging fisheries stakeholders. We have included information on some of these other resources in the appendix.

There are select MSC PIs that measure more sophisticated aspects of management and therefore may be less relevant to many of the fisheries using this tool. Lower range guidance was not developed for these indicators, which include 1.1.2 (stock rebuilding) and 1.2.3 (harvest strategy information and monitoring). There are also some indicators where scoring below the 60 level was parsed into fewer than three scoring categories because the resolution could not easily be broken down further, such as 1.2.4 (assessment of stock status), 2.2.1 (other species outcome), and 2.2.3 (other species information).

This methodology is subject to continual adaptation and improvement.

Overview of the methodology

General framework

As with an MSC pre-assessment, assessors evaluate indicators under the three main principles: (1) Status of Target Stock(s), (2) Ecosystem Impacts, and (3) Management. To streamline the scoring process, this methodology uses decision trees and questions to determine if a PI has sufficient information to be scored. In cases where information is lacking, the PI will either be skipped, or a default scoring category will be suggested.

An Environmental Rapid Assessment Report Template is provided as a separate document. The assessor can fill out the template to create a report that describes ERA results.

Scoring

This methodology uses the following scoring categories. The green and yellow categories are consistent with those used on FisheryProgress.org. The remaining lower range categories fall under the 'red' (< 60) category on FisheryProgress.org.

Table 1. General definitions of management performance for each scoring category.

Numeric scoring range	General definition of management performance

<20	● No management system or strategy exist, and no control over the fishery is exercised or planned. The fishery may be completely open access with no framework with which to develop management, nor political desire to do so. ● No information on stock status, nor indication of species productivity or susceptibility from basic biological characteristics, exists. There are no scientific or commercial fishery data and no proposed program to collect such data. Relation to MSC assessment: this PI is likely to fail.
20-39	● Management is very poor and/or critically flawed due to either a lack of resources or lack of political will. ● Poor information is available on the fishery's impacts on target stocks, non-target species, ETP (endangered, threatened or protected) species, habitats, and ecosystems. The limited information can only allow for a rudimentary assessment of likely productivity and susceptibility. There is no basis on which to develop reference points. Available information suggests high susceptibility; high overfishing or stock depletion is assumed. Relation to MSC assessment: this PI is likely to fail.
40-59	● Some key aspects of management remain insufficient or ineffective, likely due to a lack of resources but not a lack of will or basic management framework. There is evidence that no local, national, or international laws are being broken. ● Generic stock reference points are available, but available information suggests that target and/or non-target stocks are overfished (below limit reference points) and/or that overfishing is occurring. For data-limited stocks, PSA can be performed, but results suggest low productivity and high susceptibility. Information suggests that the fishery is negatively impacting non-target and/or ETP species, or fishing mortality is unknown. Fishing activities cause some impact to habitats and ecosystems, which are not clearly quantified or mitigated. Relation to MSC assessment: this PI is likely to fail.
60-79	● Some important management aspects may be lacking, but none are sufficient to prevent a certification or passing rating by themselves. Monitoring and enforcement is in place and believed effective. ● Generic reference points are available and show that biomass is likely above PRI (point of recruitment impairment); fishing mortality is fluctuating around F_{MSY} or B_{MSY} (as relevant). Information is available to estimate fishing mortality and impacts on non-target and ETP species. The fishery is unlikely to hinder ETP species recovery. Habitat and ecosystem impacts are possible, though it is unlikely that the fishery causes serious or irreversible harm.

	Relation to MSC assessment: a condition may be needed for this PI.
80+	- Management measures in place are expected to be effective, and precaution is accounted for. - Stock-specific reference points are available and show that biomass is highly likely above PRI and/or MSY related targets (as relevant). Information is available to assess fishing mortality and impacts on non-target and ETP species. The fishery is highly unlikely to hinder ETP species recovery. There is strong evidence that the fishery is not causing serious harm to habitats or ecosystems. Relation to MSC assessment: an unconditional pass for this PI appears likely.

Within the scoring categories for each indicator, there may be multiple bullet points or 'guideposts.' By default, these bullet points are to be treated as 'AND' clauses, where all bullets within a category must be met to achieve that score. Otherwise the lower scoring (higher risk) category should be applied. When bullets are to be treated as 'OR' clauses, the OR will be explicitly mentioned in the scoring category text.

For all indicators, a written rationale for the score must be provided. Figures and tables can also be provided to support scores. Because this is a rapid evaluation tool, several descriptive sentences may suffice as a rationale.

Information gathering

We expect that information will mostly be gathered through desktop research and, time and resources permitting, interviews with fishers and other relevant fishery stakeholders. However, it is up to the assessor to determine the approach used for data collection. To allow for external verification of the information used, information should be publicly available, e.g. posted online or made available upon request. Information sources should be clearly attributed.

Special cases

Assessors can use the following questions to determine if special considerations need to be applied for the fishery:

- **Is the target species a low trophic level (LTL) species?** (See Lower Level Trophic Species List in the appendix for a list of LTL families.) If YES, score indicator 1.1.1A 'Status of LTL stocks.' Additionally, stock reference points for LTL species should be 'buffered' to consider the ecological role of the species and its importance as prey to higher trophic level species. Conceptually, the target reference point should be set at a level consistent with ecosystem needs (e.g. above 75% of virgin biomass, or $75\%B_0$ for a fishery with a moderate level of abundance information), while PRI should be considered the point below which serious ecosystem impacts could occur (e.g. $40\%B_0$ for a fishery with a moderate level of abundance information). Additional information on appropriate reference points for LTL species can be found in the SFW FS v3.2 and MSC FS v2.01 (SA 2.2.13).

- **Is harvest augmented by artificial production?** If YES, a modified assessment (such as the MSC Modified Default Tree structures for enhanced bivalve or salmon fisheries) may be more applicable. The current version of this methodology does not accommodate fisheries that are enhanced by artificial production.

Definitions of terms

This methodology includes a glossary, and we also define terms throughout this document where they are used.

Basic fishery information and defining the UoA

The following pieces of information are used to describe the fishery and determine the Unit of Assessment (UoA). The UoA is defined by the target stock(s) combined with the fishing method/gear and practice (including vessel type/s) pursuing that stock, and any fleets, or groups of vessels, or individual fishing operators or other eligible fishers that are included in this assessment. In some fisheries, the UoA may be further defined based on the specific fishing seasons and/or areas that are included.

- Target species stock(s) and scientific and common names;
- Fishery location, ideally supported with a map;
- Gear type(s);
- Vessel type(s) and/or practices;
- Flag state and management authority (the regulatory authority with fishing management responsibilities; there may be multiple authorities where joint jurisdictional responsibilities occur).

When describing a fishery, it can be useful to describe other characteristics also such as the fishing season and catch quantities over time.

Status of target stock(s) - Principle 1

Criteria under Principle 1 assess the target stock(s) of the fishery (those stocks being exploited by the fishery). Indicators with a 1.1 heading address the outcomes of status and rebuilding of target fishery stocks, while 1.2 indicators address the management of the stock (harvest control rules and tool, harvest strategy) and information to support the management strategy and assessment of stocks. If the fishery under assessment is a multi-species fishery, only exploited stocks should be evaluated under Principle 1; other species should be evaluated under Principle 2. Each known key target stock included in the fishery should be assessed separately. Special consideration is given where the target stock(s) are LTL species. The scoring of key target stocks examines the impact of the fishery on the target stocks and whether those stocks are at sustainable levels.

Stock status outcome (1.1.1)

Intent: evaluate whether the stock is at a level that maintains high productivity and has a low probability of recruitment overfishing.

This indicator evaluates stock abundance following one of two pathways: non data-limited and data-limited. The non data-limited pathway is more applicable for fisheries where stock reference points exist, and stock abundance data have been collected over time (e.g. at least for 5 to 10 years). The data-limited pathway is more applicable for fisheries that lack reference points.

Non data-limited pathway

Under this pathway, stock abundance is evaluated relative to reference points, specifically a target reference point (TRP) and limit reference point (LRP). An abundance indicator is considered 'at' the reference point when it fluctuates around the reference point with no declining trend. Fishery management bodies use a variety of abundance indicators and reference points, so their appropriateness should be considered on a case by case basis. Commonly used indicators include biomass (B), spawning stock biomass (SSB), catch per unit effort (CPUE), and fishing mortality (F).

An appropriate TRP is a stock level at which high production is maintained, e.g. maximum sustainable yield (MSY). Examples of appropriate TRPs include B_{MSY} and $40\%B_0$. An appropriate LRP, also referred to as B_{LIM}, is a level at which a stock has a high probability of persistence in the presence of directed fishing, which is generally considered equivalent to PRI, or the point below which recruitment may be impaired. Examples of appropriate LRPs include ½ B_{MSY} and $20\%B_0$.

Where information is not available on the stock status relative to biomass reference points, assessors may use proxy indicators and reference points such as fishing mortality or CPUE, but they will need to show how the proxies are consistent with MSY or PRI. Examples of proxies include the point of recruitment overfishing for an LRP and F_{MSY} for a TRP. For additional guidance on proxy indicators, please see GSA2.2.3.1 in the MSC FS v2.01.

Data-limited pathway

Under this pathway, a combination of species vulnerability and available information on stock health and/or abundance trends is used to score the indicator, an efficient approach used in SFW FS v3.2 for data-limited fisheries. A PSA score will be estimated and used to determine vulnerability as follows:

1. PSA score < 2.64 = low vulnerability
2. PSA score ≥ 2.64 and ≤ 3.18 = medium vulnerability
3. PSA score < 3.18 = high vulnerability

Examples of evidence suggesting good stock health include: age structure has been stable over time, average body length has been stable over time, or fish abundance/sizes do not differ between fishing areas and well-managed no-take zones.

Examples of evidence suggesting poor stock health include: age structure has shifted to younger ages, landings or CPUE have declined, geographic distribution has become more

constrained for species that are not highly migratory, or fish abundance/sizes are significantly smaller in fishing areas than in well-managed no-take zones.

Although a PSA can provide an indication of likely stock status, it is not a substitute for a stock assessment. A responsible fisheries management strategy should include a robust stock assessment.

Question: Is there information about stock status relative to (biomass or fishing mortality) reference points?

If YES
Score this indicator using the non data-limited scoring categories for stock status outcome.

If NO
Use the Productivity Susceptibility Analysis (PSA) to derive a PSA score for the stock. Use a combination of the PSA score and supporting information to score this indicator, using the data-limited scoring categories for stock status outcome.

Non data-limited scoring categories for stock status outcome

<20	• The current stock biomass indicator ($B_{CURRENT}$) is below 1/3 of the LRP (B_{LIM}; e.g. ½ B_{MSY}, 20%B_0, or other proxy). Or if B_{LIM} is not defined, $B_{CURRENT}$ is below 1/6 of the TRP (B_{TARGET}; e.g. B_{MSY}, 40%B_0, or other proxy). OR • Current fishing mortality ($F_{CURRENT}$) is >2.5 of the target fishing mortality rate (F_{TARGET}; e.g. fishing mortality at maximum sustainable yield F_{MSY}, or other proxy).
20-39	• $B_{CURRENT}$ is between 1/3 B_{LIM} and < 2/3 B_{LIM}. Or if B_{LIM} is not defined, $B_{CURRENT}$ is between 1/6 B_{TARGET} and < 1/3 B_{TARGET}. OR • $F_{CURRENT}$) is between 2 F_{TARGET} and < 2.5 F_{TARGET}. Or it is probable (>50% chance) or suspected that fishing mortality from all sources (including commercial, recreational, subsistence, and ghost fishing, if applicable) is above a sustainable level that is appropriate given the species' ecological role.
40-59	• $B_{CURRENT}$ is between 2/3 B_{LIM} and < B_{LIM}. Or if B_{LIM} is not defined, $B_{CURRENT}$ is between 1/3 B_{TARGET} and < 1/2 B_{TARGET}. OR

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(red)	• $F_{CURRENT}$ is between 1.5 F_{TARGET} and < 2 F_{TARGET}.
60-79	• $B_{CURRENT}$ is < B_{TARGET} but likely above B_{LIM}.
80+	• $B_{CURRENT}$ is at or above B_{TARGET}.

Data-limited scoring categories for stock status outcome

<20	• The stock is determined to be of concern, vulnerable, endangered, or threatened by a state, national, or international scientific body.
20-39	• It is probable that the stock is depleted or overfished. OR • The stock is recognizably in a poor (i.e., severely overfished, unhealthy, depleted) condition.
40-59	• It is probable that the stock is below the LRP. OR • Biomass is unknown and the species is highly vulnerable.
60-79	• The species is highly vulnerable. • There is some evidence suggesting that the stock is healthy with no conflicting information. OR • The species has low or medium vulnerability. • There is no clear evidence suggesting the stock is either healthy or not healthy.
80+	• The species has low or medium vulnerability. • There is some quantitative evidence that the stock is healthy with no conflicting information.

LTL stock status outcome (1.1.1A)

Intent: evaluate whether an LTL stock is above a level where serious ecosystem impacts can occur. This indicator must be evaluated for all P1 stocks that are LTL species.

<60	• It is unclear or unlikely that the stock is above the point where serious ecosystem impacts could occur.
60-79	• It is likely that the stock is above the point where serious ecosystem impacts could occur.

80+	- It is highly likely that the stock is above the point where serious ecosystem impacts could occur. - The stock is at or fluctuating around a level consistent with ecosystem needs.

Stock rebuilding outcome (1.1.2)

Intent: evaluate whether there is evidence of stock rebuilding within a specified timeframe, for stocks that are reduced or depleted.

The MSC defines a generation time as "the average age of a reproductive individual in an unexploited stock" (Box GSA4, MSC FS v2.01). The glossary provides additional detail about calculating generation time.

If such age-related information is lacking, it may also be helpful to consider SFW's definition of a reasonable timeframe for rebuilding: "dependent on the species' biology and degree of depletion, but generally within 10 years, except in cases where the stock could not rebuild within 10 years even in the absence of fishing. In such cases, a reasonable timeframe is within the number of years it would take the stock to rebuild without fishing, plus one generation" (SFW FS v3.2).

Question: Did the target species score 80+ for stock status outcome (1.1.1), or if applicable, 1.1.1A?

If YES

Skip this indicator.

If NO

Score this indicator.

<60	- No or some stock rebuilding measures are in place, but with no intended timeframe or accountability to provide likelihood of outcome. - There is limited monitoring in the fishery that would have some limited use to evaluate stock rebuilding evaluation.
60-79	- A rebuilding timeframe is being implemented for the stock that is the shorter of 20 years or 2 times its generation time. - There is monitoring to assess effectiveness of rebuilding strategies.
80+	- A rebuilding timeframe is being implemented for the stock that is the shorter of 20 years or 2 times its generation time. - There is evidence of the strategy's effectiveness for rebuilding, or it is likely effective based on simulation modelling, exploitation rates or previous performance.

Harvest strategy (1.2.1)

Intent: evaluate whether there is a robust and precautionary harvest strategy in place.

A harvest strategy aims to control fishing mortality to biologically sustainable levels through a combination of monitoring (particularly in relation to stock abundance and exploitation rates), stock assessment, harvest control rules (HCRs) and management actions required for maintaining fishery sustainability.

This PI is closely related with the following three PIs (harvest control rules 1.2.2, information and monitoring 1.2.3, stock assessment 1.2.4). We have kept the four indicators separate to maintain compatibility with FisheryProgress.org, while attempting to minimize overlap in the areas they evaluate. For this PI, the auditor should consider the overall performance of the harvest strategy, which strategy components are present, and how those components contribute to the strategy's responsiveness to the state of the stock.

Key components of harvest strategies include:

- The control rules and tools in place, including the ability of the management system to control fishing effort, taking into account issues such as overcapacity and its causes;
- The information base and monitoring of stock status, and the responsiveness of the management system and fleet to stock status.

<20	• There is no harvest management where it is clearly needed.
20-39	• The fishery targets/retains overfished, depleted, endangered or threatened species and is a substantial contributor to their mortality. Management lacks a strategy to rebuild these species or implement effective practices designed to limit mortality of these species.
40-59	• Harvest management exists, but its effectiveness is unknown or uncertain, and it is **likely** that the fishery is having serious negative impacts on retained populations. OR • There is no or limited harvest management, and it is **unlikely** the fishery is having serious, negative impacts on retained populations.
60-79	• The harvest strategy includes all necessary components (monitoring, stock assessment, HCRs or some other science-based mechanism to limit harvest, and management actions to maintain sustainability). • The harvest strategy is expected to achieve sustainability objectives, such as maintenance of stock biomass around or above a level consistent with B_{MSY} (or other proxy). • The strategy is likely to work based on prior experience or plausible argument. • It is likely shark finning is not taking place.

80+	● As with the yellow scoring category, there isout of place a complete harvest strategy with clear sustainability objectives. ● There is evidence that elements of the harvest strategy work together to meet management objectives. ● The harvest strategy is responsive to the state of stock.

Harvest control rules (1.2.2)

Intent: evaluate whether well defined and effective harvest control rules (HCRs) are in place.

HCRs are a set of defined, pre-agreed rules and management actions that will be taken in response to changes in indicators of stock status with respect to reference points. HCRs are regarded as 'well-defined' when they exist in some written form that has been agreed by the management body, ideally with stakeholders, and clearly state actions that will be taken at specific trigger reference point levels. They should be regarded as only 'generally understood' 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 (MSC FS v2.01).

Under the <80 scoring categories, assessors may accept 'available' HCRs (versus HCRs that are 'in place') in cases where:

1. 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
2. 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 (SA2.5.2, MSC FS v2.01).

<20	● HCRs do not exist. ● There are no regulations to constrain fishing mortality on main target species. OR ● F to be adopted at B_{LIM}, as part of HCR, is >2 times F_{MSY} or similar, and the stock is not depleted.
20-39	● HCRs do not exist. ● Input controls such as fishing licenses or permits exist, but other regulations to constrain fishing mortality on main target species are lacking. OR ● F to be adopted at B_{LIM}, as part of HCR, is >1.5 to 2 times F_{MSY} or

	similar, and the stock is not depleted.
40-59	● HCRs or other harvest control measures exist, but they are unlikely to result in sustainable fishing practices, where exploitation is reduced in response to evidence of stock depletion. OR ● F to be adopted at B_{LIM}, as part of HCR, is >1 to 1.5 times F_{MSY} or similar, and the stock is not depleted.
60-79	● Generally understood HCRs are in place or available, and are expected to reduce the exploitation rate as the point of recruitment impairment (e.g. limit reference point) is approached. ● There is some evidence that the tools used (or available) to implement HCRs are appropriate and effective in controlling exploitation.
80+	● There are well-defined HCRs that ensure reduction of exploitation rates as stock size approaches PRI. ● Evidence clearly shows that management actions/tools in use are effective in achieving the exploitation levels required under the HCRs. ● HCRs are likely to be robust to major uncertainties such as ecological uncertainties.

Harvest strategy information and monitoring (1.2.3)

Intent: evaluate whether relevant information is collected to support the harvest strategy.

<60	● Information related to stock structure, stock productivity, fishery removals, and fleet composition is not collected or is insufficient for supporting the harvest strategy.
60-79	● Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy. ● Information on fishery removals is collected, but there may not be reasonably accurate estimates of all sources of fishery removals (e.g. lack of quantitative estimates of IUU catches).
80+	● Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy. ● There is good information on all sources of fishery removals.

Assessment of stock status (1.2.4)

Intent: evaluate whether there is an adequate assessment of the stock status.

For the <60 scoring categories, we follow SFW guidance for determining whether a stock assessment is considered recent (SFW FS v3.2). Generally, or for species whose generation

time is unknown, stock assessments conducted within the last five years are considered recent. For short-lived species with a generation time of less than five years, a stock assessment conducted within the generation time is considered recent.

<39	• There is no stock assessment, no reference points, and/or no evidence to suggest that the stock is either above or below reference points.
40-59	• General abundance indicators are tracked in the fishery, such that some information exists to determine overfishing status of target species.
60-79	• There is a recent assessment that estimates stock status relative to reference points that are at least somewhat appropriate to the species, and identifies major sources of uncertainty.
80+	• An assessment has been recently conducted that is appropriate to the stock and HCRs. • The assessment estimates stock status relative to appropriate, species- or stock-specific reference points, takes uncertainty into account, and is peer reviewed.

Ecosystem impacts - Principle 2

Information on all of the species caught in the fishery and their catch quantities is necessary for scoring many of the indicators under this principle. If such data are lacking, collection of catch data may be one of the first areas a fishery will need to address when entering an improvement project.

The PIs are presented here in a slightly different order than they are in the MSC standard. Principle 2 includes multiple components (e.g. 'other species' and 'habitat impacts'), each of which has three indicators: outcome, management, and information. In this methodology, we score the information indicator first for each component, because the level of information affects ability to score outcome and also relates to management. For example, if there is no qualitative or quantitative information on habitat impacts from the fishery, then we know that habitat impacts outcome cannot be scored, and habitat impacts management will not receive an 80+ score. This allows the assessment to be conducted more efficiently. The ERA report template is organized with the typical MSC ordering of PIs.

Under the MSC standard, non-ETP (endangered, threatened, or protected) Principle 2 species are classified as either 'primary' or 'secondary.' Primary species have management objectives (e.g. reference points) and stock status monitoring in place, whereas secondary species do not. Version 1.0 of the ERA did not distinguish between primary and secondary species for the following reasons:

- The primary/secondary terminology is specific to MSC, and the terms may be misinterpreted outside of the MSC context;

- Basic FIPs are likely to be in fisheries with less management capacity and data, so there may be no primary species;
- Reducing the number of indicators saves time and effort on scoring.

The 0-60 Fisheries Assessment Tool also does not make a distinction between primary and secondary species. However, because the FisheryProgress reporting platform is based on the MSC standard, it requires users to provide inputs for both primary and secondary species PIs. Thus Version 2.0 of the ERA accommodates these terms. Where both primary and secondary species exist in a fishery, both components should be scored. For data-limited fisheries that have no primary species, the secondary species PIs (2.2.1, 2.2.2, 2.2.3) will need to be evaluated, while the primary species PIs will receive 80+ scores by default, since the fishery does not impact primary species (following SA3.2.1, MSC FS v.2.01). In the less common circumstance where there are primary species but no secondary species, the converse will apply, with primary species PIs being evaluated and secondary species PIs receiving 80+ scores by default.

Important definitions used in Principle 2

For the purposes of scoring P2 indicators, we use the following MSC definitions.

Bycatch - unwanted catch, or catch that the fisher did not intend to catch but could not avoid, and did not want or chose not to use.

We use **non-target** as a general term to refer to primary and secondary species, which are defined as follows:

- **Primary species** - Species where management tools and measures are in place, intended to achieve stock management objectives reflected in either limit or target reference points.
- **Secondary species** – Species that are not considered primary or ETP species.

Definitions for management measures and strategy terms:

- **Measures** - actions or tools in place within the management system that either explicitly manage impacts on the component or indirectly contribute to management of the component under assessment having been designed to manage impacts elsewhere.
- **Partial strategy** - a cohesive arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. It may not have been designed to manage the impact on that component specifically.
- **Strategy or full strategy** - a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which should be designed to manage impact on that component specifically. A strategy needs to be appropriate to the scale, intensity, and cultural context of the fishery and should contain mechanisms for the modification of fishing practices in light of identification of unacceptable impacts.

Exempt gear, as defined in the 0-60 Fisheries Assessment Tool:
Certain gear types used around the world have been shown to have little or no bycatch

associated with them. These include pelagic trawl and seines targeting schooling small pelagics, harpoons, jig fishing (in many circumstances), hand rakes etc. Chuenpagdee et al. 2003,[1] Fuller et al. (2008),[2] and the Safina Center Fishing Gear 101 blog series offer useful guidance on this topic. Gears generally known to produce little bycatch include:

- Harpoon
- Hand or mechanical jigging (for catching squid)
- Hand rake
- Diver/hand harvest
- Pelagic purse seine and mid-water trawl (when used in mid water to target schooling small pelagics)

These gears also typically have minimal risk of impacting habitats. This list is not comprehensive and may be added to as more information becomes available. Also, some fisheries that appear on this list may have bycatch associated with them, so justification for the scores associated with exempt gears should still be provided in the rationale text. Where possible, data and analysis from the fishery being analyzed is always preferred.

Similar fisheries, as defined in the 0-60 Fisheries Assessment Tool:
Often direct information or data from the fishery and gear are not publicly available for the fishery under assessment. Rather than always assigning a low score in such cases, information from a similar fishery in the region may be used. Examples include Barents Sea and Icelandic capelin, where one fishery is information rich while the other has little data available. Both operate on the same species using the same gear in adjacent areas, often by the same vessels. It is up to the assessor to decide if a potentially similar fishery is a) close enough geographically to the fishery being scored, b) is targeting the same or very similar species with closely similar habits, c) if they are using the same or closely similar gear, and d) if there any other substantial differences between the fishery to be scored and the similar fishery. Justification for using a similar fishery should be provided in the rationale text.

Some of the scoring guidance for PIs 2.4.1 and 2.5.1 refers to **best available information**, defined as the most credible, relevant, and unbiased information of what is available. Peer-reviewed scientific papers and peer-reviewed official government reports are considered to be most credible; NGO and industry reports, fishery-dependent data, and non-peer reviewed scientific or government reports should also be considered but weighted less heavily. Analyses based on the specific fishery in question are considered the most relevant, analyses based on very similar fisheries (i.e. same gear type, same region, etc.) are the second best option, while very general assessments (e.g., global overarching conclusions about a type of gear) are the least relevant, and can still be considered but should be weighted less heavily.

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[1] Chuenpagdee, R., Morgan, L.E., Maxwell, S.M., Norse, E.A. and Pauly, D. 2003. Shifting gears: assessing collateral impacts of fishing methods in US waters. Frontiers in Ecology and the Environment, 1(10), pp.517-524.
[2] Fuller, S.D., Picco, C., Ford, J., Tsao, C.F., Morgan, L.E., Hangaard, D., and Chuenpagdee, R. 2008. How We Fish Matters: Addressing the Ecological Impacts of Canadian Fishing Gear.

Principle 2 scoring guidance

Scoring for Principle 2 species can be complex when a fishery catches multiple species. We have laid out several steps below to help guide the assessor and make scoring more efficient.

Primary/Secondary species information (PIs 2.1.3 and 2.2.3) decision tree

Question 1: Is the gear used in the fishery known to have little to no impact on non-target species, or an "exempt gear"?

If YES
PI 2.1.3 and/or PI 2.2.3 will receive a ≥60 score. Score using the PI guidance.

If NO
Proceed to Question 2 in this decision tree.

Question 2: Is there some reliable information for this fishery that is adequate to generally determine fishery impacts on main primary or secondary species encountered?

If YES
Proceed to the *P2 species classification decision tree*.

If NO
Proceed to Question 3 in this decision tree.

Question 3: Is there a **similar fishery** using the same gear type in the same way and targeting the same species in the region, which has some reliable information relating to its fishery impacts on main, non-target species?

If YES
Proceed to Question 4 in this decision tree.

If NO
Proceed to Question 5 in this decision tree.

Question 4: Does monitoring in that similar fishery provide substantial reliable information on fishery impacts on main primary and secondary species?

If YES
PI 2.1.3 and/or PI 2.2.3 will receive a ≥60 score. Assign a score using the PI guidance.

If NO
Proceed to Question 5 in this decision tree.

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Question 5: Is there some reliable information on the **composition** of non-target catch and bycatch in this fishery, or in the similar fishery?

If YES
Proceed to Question 6 in this decision tree.

If NO
PI 2.1.3 and/or PI 2.2.3 will receive a <20 score. Do not score the secondary/primary species outcome PIs.

Question 6: Is there some reliable information on the **amount** of non-target catch and bycatch in this fishery or in the similar fishery?

If YES
PI 2.1.3 and/or PI 2.2.3 will receive a 40-59 score. Proceed to the *P2 species classification decision tree*.

If NO
PI 2.1.3 and/or PI 2.2.3 will receive a 20-39 score. Proceed to the *P2 species classification decision tree*.

Principle 2 species

This section should always be completed. If there are no other species caught in the fishery and no bait species used, or an exempt fishing gear is used, the auditor can simply note this. If there are any P2 species, the auditor will enter them into 'Table 2. Principle 2 species classification table.' P2 species include other species caught in the fishery, regardless of whether they are retained or discarded. Species used for bait should also be listed. If catch amounts aren't known, the relevant columns can be marked as 'n/a.' Classifications for P2 species will be determined in the next step.

Table 2. Principle 2 species classification table.

Species common and scientific names	Annual UoA catch	% of UoA catch (by weight)	Classification
Example: Pacific herring (*Clupea pallasii*)	500 kg	0.25	Main primary

P2 species classification decision tree

Non-ETP Principle 2 species (both primary and secondary) are classified as either **main** or **minor** depending on their proportion in the total catch by weight. For the purposes of the ERA, only main species have to be assessed/scored. We have provided some guidance from MSC for

designating main species below; more detailed guidance can be found in GSA3.4.2 (MSC FS v2.01).

Question: Is the species at least 5% of the total catch by volume?
Where data exist, the 5% should be an average taken across recent years and/or seasons to account for fluctuations in catch composition.

If YES
The species is classified as main and will be scored.

If NO, answer the following question.

Question: Is the species considered **less resilient**, known to be depleted (poor stock status), and/or are catches sufficiently large to be a significant risk to the population?
A species is considered less resilient if a productivity analysis (e.g. the productivity portion of the PSA) indicates it has low or medium productivity. Alternatively, a species may be considered less resilient, even if its intrinsic resilience is high, if existing knowledge suggests that its resilience has been lowered due to anthropogenic or natural changes to its life-history.

If YES
The species is classified as main if the species is at least 2% of the total catch by volume. Where data exist, the 2% should be an average taken across recent years and/or seasons to account for fluctuations in catch composition.

If NO
The species is not classified as main.

After all primary and secondary species have been classified as main or minor, proceed to the primary and secondary species decision tree.

Primary and secondary species decision tree

Question: Are there any main primary and/or secondary species?

If NO
Score the applicable species information, outcome, and management indicators (2.1.1, 2.1.2, 2.1.3, and/or 2.2.1, 2.2.2, 2.2.3) as 80+ (green), noting that no main non-target species are caught. We recommend providing comments about any minor non-target species that are caught, especially if those species are known to be or are potentially depleted.

If YES, answer the following question.

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Question: Are stock status reference points (e.g. limit and target reference points for primary species, biological limit or point of recruitment impairment for secondary species) available for main non-target species?

If YES
Proceed to the *non data-limited decision tree* for primary and secondary species.

If NO
Proceed to the *data-limited decision tree* for primary and secondary species.

Non data-limited decision tree for primary and secondary species indicators
Question: Is qualitative or quantitative information regarding fishery impacts on main primary and/or secondary species being collected? Examples of impacts information include stock assessments and species-specific estimates of catch and/or discard quantities.

If NO
Score the applicable species information indicator (PI 2.1.3 and/or 2.2.3) as <39 or 40-59, depending on information availability. Don't score the applicable species outcome indicator (PI 2.1.1 and/or 2.2.1) and mark the indicator(s) as data deficient, mentioning the lack of information in the rationale. Score the applicable species management indicator (PI 2.1.2 and/or 2.2.2), which will score no better than 60.

If YES
Score the applicable species information, outcome, and management indicators.

Data-limited decision tree for non-target species indicators
The vulnerability of main other species to fishing will be evaluated using PSAs where possible.

Question: Is there sufficient qualitative information to conduct a PSA on the main non-target species?

If NO
Score the applicable species information indicator (PI 2.1.3 and/or 2.2.3) as red (40-59). Do not score the applicable species outcome indicator (PI 2.1.1 and/or 2.2.1) and mention the lack of information in the rationale. Score the applicable species management indicator (PI 2.1.2 and/or 2.2.2), which will score no higher than 60.

If YES
Score the applicable species information, outcome, and management PIs.

Scoring multiple species within a Principle 2 PI

Multiple species may be evaluated within each primary, secondary, and ETP species PI. When this occurs, each species is considered a 'scoring element.' The assessor will assign a score to

each scoring element, then combine scoring for all scoring elements within each PI, using the following table.

Table 3. Combining scores for scoring elements.

Score	Combination of individual scoring elements
<60	At least one element scores < 60 (red). Use the lowest sub-60 scoring category of the elements as the overall PI score.
60-79	All elements score at least 60 (yellow), no element scores <60.
80+	All elements score 80+ (green), no element scores <80.

Primary/secondary species information (2.1.3, 2.2.3)

Intent: evaluate whether information on the nature and amount of main non-target species taken is adequate to determine the risk posed by the UoA, and the effectiveness of the strategy to manage the non-target species.

Either PI 2.1.3 or 2.2.3 should always be scored. You can use the *Primary and secondary species decision tree* to help with scoring.

<20	- There is no reliable information on the composition of non-target catch in the fishery, and no similar fishery using the same gear type in the same way and targeting the same species in the region which has this level of data on its non-target catch; thus the composition of non-target cannot be inferred. - The gear as used in the fishery is not an "exempt" gear.
<39	- There is some reliable information on non-target catch composition (either from this fishery or a similar fishery), but no reliable information on the amount of non-target catch, and no similar fishery using the same gear type in the same way and targeting the same species in the region which has this level of data on its non-target catch; thus the amount of non-target cannot be inferred. - The gear as used in the fishery is not an "exempt" gear.
40-59	- There is some reliable information on both composition and amounts of main non-target species from this fishery or a similar fishery, but monitoring does not provide reliable information on fishery impacts to main non-target species. - The gear as used in the fishery is not an "exempt" gear.
60-79	Qualitative information is adequate to estimate the impact of the UoA on the main non-target species with respect to status. OR

	● If PSA is used to evaluate the vulnerability of other species to fishing: Qualitative information is adequate to estimate productivity and susceptibility attributes for main non-target species. AND ● Information is adequate to support measures to manage main non-target species.
80+	● Some quantitative information is available and is adequate to assess the impact of the UoA on the main non-target species with respect to status. OR ● If PSA is used to evaluate the vulnerability of secondary species to fishing: Some quantitative information is adequate to assess productivity and susceptibility attributes for main non-target species. AND ● Information is adequate to support a partial strategy or full strategy to manage main non-target species.

Question: Does the non-target species information PI (2.1.3 and/or 2.2.3) have a <20 score?

If YES

Do not score non-target species outcome and management PIs (2.1.1, 2.1.2 and/or 2.2.1, 2.2.2) and describe the data deficiency in the rationale text.

If NO

Score the non-target species outcome and management PIs (2.1.1, 2.1.2 and/or 2.2.1, 2.2.2).

Primary/secondary species outcome (2.1.1, 2.2.1)

Intent: evaluate whether the UoA aims to maintain non-target species abundance above the point where recruitment could be impaired (PRI), and whether the UoA may hinder recovery of non-target species that are below the PRI.

Important definitions:

Jeopardize main non-target species: The impact of the UoA fishery on these species is high. Current UoA fishery removals of the non-target species are, or are highly likely to be, impacting stock status or recruitment. When reference limits for catches (or catch indicators) of non-target species catches have been set, catches are above those limits. A fishery does not jeopardize the main non-target species if the impact of the fishery is low enough to not hinder improvement of the species status, in situations where the status of that species can improve. It does not require evidence that the status of the species is actually improving.

Substantially impact main non-target species: The fishery impacts the species, but in a less severe manner than 'jeopardize.' A fishery substantially impacts main non-target species if: the impact from the fishery alone does not jeopardize the non-target species, but the cumulative level of fishing mortality/removal is impacting stock status improvement; AND this fishery is a main contributor, or one of multiple contributors of a similar magnitude, to this cumulative impact.

A **biologically based limit** is defined as the abundance indicator level below which a stock or population is considered to experience serious or irreversible harm. Acceptable examples include the PRI (point of recruitment impairment) for a single species, a minimum viable population size (number of individuals required to have a specified probability of persistence over a given time period), and potential biological removal (maximum number of animals that may be removed from a stock while allowing for optimum sustainable population to be maintained; often used for cetaceans and seabirds; see Table SA8 in MSC FS v2.01).

Definitions of **depleted** and **overfished** are in the Glossary. Under this PI these terms are used as descriptors of the status of main non-target species, rather than as descriptors of the level of fishing impact.

The 80+ scoring category for this PI diverges to some extent from that in the MSC standard. Specifically, if main non-target species are below biologically based limits, under the standard it is possible to achieve an 80 score if there is evidence of recovery or a demonstrably effective partial strategy such that the UoA does not hinder recovery. Requirements are slightly more stringent if the catches of the species are considerable (MSC's rule of thumb for defining 'considerable' is ≥ 10% of the catch by weight). Fisheries with depleted, main non-target species are much more likely to fit under the 60-79 scoring category than the 80+ scoring category. For this reason, and for the sake of efficiency, we did not include the 'evidence of recovery' exception in the 80+ scoring category. This makes our scoring potentially more conservative than the scoring for an MSC pre-assessment.

If PSAs are used to evaluate the vulnerability of non-target species to fishery impacts, the score for this performance indicator will be based on PSA scores for all main non-target species combined. The assessor will assign a score to each scoring element (each element being a single main non-target species) using the 'PI 2.2.1 PSA' sheet in the MSC RBF worksheets tool, and then combine scoring for all scoring elements following the guidance in Table 3. If at least one scoring element receives a high risk score, the overall indicator score should be <60.

If the UoA does not impact non-target species, this PI will receive an 80+ score by default.

<20	● There is at least one main non-target species in the UoA fishery that is **likely** to be depleted or overfished, and non-target species removals from this fishery (or a similar fishery, if the data are not available from this fishery) are likely to jeopardize that species' viability or rebuilding.
20-39	● It is likely that mortality from this fishery (or a similar fishery, if the data are not available from this fishery) jeopardizes the viability of at least

	one main non-target species, but that species is **not likely** to be currently depleted or overfished.
40-59	• Removals from this fishery (or a similar fishery, if the data are not available from this fishery) are not likely to currently jeopardize the status of any main non-target species. • The current level of fishing removal from this fishery substantially impacts at least one main non-target species.
60-79	• Main secondary species are likely to be above biologically based limits. OR • If main secondary species are below biologically based limits, management measures are in place within the UoA that are expected to ensure the UoA doesn't hinder recovery.
80+	• Main secondary species are highly likely to be above biologically based limits.

Primary/secondary species management (PIs 2.1.2, 2.2.2)

Intent: evaluate whether there is a strategy in place that is designed to maintain or to not hinder rebuilding of non-target species; and whether the UoA regularly reviews and implements measures, as appropriate, to minimize the mortality of unwanted catch.

Here, **appropriate management measures** are those that address the most significant fishing-related concerns for non-target species.

MSC defines **alternative measures** as alternative fishing gear and practices that have been shown (experimentally or otherwise) to minimize the rate of incidental mortality of the species to the lowest achievable levels (SA3.5.3.1, MSC FS v2.01). For this PI, scoring for alternative measures should only be considered when bycatch (unwanted catch) occurs.

For this indicator, 'if necessary' refers to cases where catches of main non-target species occur. If the UoA does not impact non-target species, this PI will receive an 80+ score by default.

<20	• The gear as used in the fishery is not an "exempt gear," and there are no management measures in place in the UoA for the purpose of bycatch mitigation. OR • There is evidence that shark finning is taking place.
20-39	• The gear as used in the fishery is not an "exempt gear." • The fishery has some measures in place for bycatch mitigation, but they are not appropriate management measures.

40-59	● The gear as used in the fishery is not an "exempt gear." ● Appropriate management measures are in place to mitigate bycatch, but compliance or enforcement are problematic.
60-79	● Measures are in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of main non-target species at/to levels which are likely to be above biologically based limits. ● The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/species). ● It is likely that shark finning is not taking place. ● If there is bycatch: there is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main non-target species.
80+	● A partial strategy is in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of main non-target species at/to levels which are highly likely to be above biologically based limits. ● There is some objective basis for confidence that the measure/partial strategy will work, based on some information directly about the UoA and/or species involved. ● There is some evidence that the measures/partial strategy is being implemented successfully. ● It is highly likely that shark finning is not taking place. ● If there is bycatch: there is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main non-target species, and they are implemented as appropriate.

ETP species information (2.3.3)

Intent: evaluate whether adequate relevant information is collected to support management of UoA impacts on ETP species.

This performance indicator should always be scored. ETP species refers to endangered, threatened or protected species, which under this methodology includes the following:

- Species of concern recognised by national legislation and/or binding international agreements to which the jurisdictions controlling the fishery under assessment are party, such as Appendix I of CITES and binding agreements concluded under the Convention on Migratory Species.
- Species listed as "vulnerable," "endangered" or "critically endangered" by the International Union for the Conservation of Nature (IUCN).

This definition differs slightly from that used by MSC, which classifies IUCN-listed species as ETP only when they are 'out of scope' (amphibians, reptiles, birds, and mammals). More recent or more regional data can override these determinations, for example when it can be shown that the particular population or stock impacted by the UoA fishery is not ETP. Another difference

from the MSC standard is that the ERA de-emphasizes use of PSAs for evaluating risks to ETP species. PSAs are often of limited utility for ETP species since most of them are vulnerable from a productivity standpoint; additionally, a PSA designed around fish species is not biologically calibrated for use with other taxa that are commonly evaluated as ETP species, such as seabirds, sea turtles and marine mammals.

When data on fishery impacts on ETP species are limited, we suggest focusing on the availability of information regarding the species' susceptibility to fishing-related mortality. Qualitative and quantitative information about fishery impacts on ETP species may include the following:

- Local knowledge from fishers, government agencies, research scientists, or environmental NGOs;
- Plausible arguments based on knowledge or studies of the fishing gear;
- Maps of ETP species distributions and fished areas;
- Fisher or observer logbooks with records of ETP species encounters;
- Direct monitoring or video surveillance;
- Empirical modelling or scientifically robust studies.

It can also be useful to refer to the Susceptibility Table of the PSA (see Table 5) for guidance. If information about fishery impacts on ETP species is lacking, the assessor should assume high vulnerability.

<20	• The gear as used in the fishery is not an "exempt gear." • There is no reliable information on the composition of ETP bycatch in the fishery, and no similar fishery using the same gear type in the same way and targeting the same species in the region that has this level of data on its ETP interactions; i.e. the composition of ETP bycatch cannot be inferred.
20-39	• The gear as used in the fishery is not an "exempt gear." • There is some reliable information on ETP bycatch composition (either from this fishery or a similar fishery) but no reliable information on the amount of ETP bycatch, and no similar fishery using the same gear type in the same way and targeting the same species in the region which has this level of data on its ETP bycatch; i.e. the amount of ETP bycatch cannot be inferred.
40-59	• The gear as used in the fishery is not an "exempt gear." • There is some reliable information on both composition and amounts of ETP bycatch from a similar fishery, but monitoring does not provide reliable information on UoA fishery impacts on ETP species.
60-79	• Qualitative or quantitative information is adequate to estimate the impact of the UoA on ETP species. • Information is adequate to support measures to manage impacts on ETP species.

80+	• Some quantitative information is adequate to assess the impact of the UoA on ETP species and to determine whether the UoA may be a threat to protection and recovery of the ETP species. • Information is adequate to measure trends and support a strategy to manage impacts on ETP species.

Question: Does ETP species information (2.3.3) have a <20 score?

If YES

Do not score the ETP species outcome PI (2.3.1) and mention the data deficiency in the rationale text. Score the ETP species management PI (2.3.2), which will receive a score no higher than 60-79.

If NO

Score the ETP species outcome and management PIs (2.3.1, 2.3.2).

ETP species outcome (2.3.1)

Intent: evaluate whether the UoA meets national or international requirements for protection of ETP species, or whether the UoA hinders recovery of ETP species.

ETP impact limits or requirements refer to requirements for the protection of ETP species that have been identified as vulnerable (susceptible) to the UoA fishery, set by national legislation or international agreements (e.g. a requirement that no more than 30 individuals of the species can be caught per year). The first bullet within the 60-79 and 80+ scoring categories applies only when ETP impact limits or requirements have been set.

Direct effects on ETP species include capture, entanglement and fishery mortality, while **indirect effects** include competition for resources, pollution, and habitat loss.

If there are multiple ETP species, the score for this performance indicator will be based on scores for all ETP species combined. The assessor will assign a score to each scoring element (each element being a single ETP species) and then combine scoring for all scoring elements following the guidance in Table 3.

< 60	• ETP interactions from the UoA fishery (or ETP interactions from a similar fishery, if data from the UoA fishery are not available) are likely to jeopardize the viability or rebuilding of one or more ETP species.
60-79	• Where fishery impact limits on ETP species have been set: the effects of the UoA on the population/stock are known and likely to be within these limits. • Known direct effects of the UoA are likely to not hinder recovery of ETP species.
80+	• Where fishery impact limits on ETP species have been set: the combined effects of fishing mortality from all sources (including commercial, recreational, subsistence, and ghost fishing, if applicable)

<td style="background-color:#a8d08d"></td>	on the population/stock are known and highly likely to be within these limits. ● Direct effects of the UoA are highly likely to not hinder recovery of ETP species. ● Indirect effects have been considered for the UoA and are thought to be highly likely to not create unacceptable impacts.

ETP species management (2.3.2)

Intent: evaluate whether the UoA has in place precautionary management measures or strategies designed to: (1) meet national or international requirements or (2) ensure the UoA does not hinder recovery of ETP species. This PI also considers whether the UoA regularly reviews and implements measures, as appropriate, to minimize mortality of ETP species.

For this PI, **appropriate management measures** are defined as those that are designed to reduce catch of ETP species and to not hinder their recovery. The first bullet within the 60-79 and 80+ scoring categories applies only when ETP impact limits or requirements have been set.

<20	● The gear as used in the fishery is not an "exempt gear," or the gear may have ETP species interactions. ● No management measures are in place for the purpose of ETP species bycatch mitigation.
20-39	● The gear as used in the fishery is not an "exempt gear," or the gear may have ETP species interactions. ● The fishery has some measures in place for the purpose of ETP species bycatch mitigation, but these are not appropriate management measures.
40-59	● The gear as used in the fishery is not an "exempt gear," or the gear may have ETP interactions. ● Appropriate management measures are in place to mitigate ETP bycatch, but compliance or enforcement are problematic.

60-79	● If ETP requirements are in place:
	   ○ Measures are in place that minimise the UoA-related mortality of ETP species;
	   ○ The measures are expected to be highly likely to achieve national and international requirements for the protection of ETP species.
	
	OR
	
	● If ETP requirements are not in place:
	   ○ Appropriate measures are in place that are expected to ensure the UoA does not hinder the recovery of ETP species.
	
	AND

	• The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). • There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.

80+	• If ETP requirements are in place:
	    ○ A strategy is in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which are designed to be highly likely to achieve national and international requirements for the protection of ETP species.
	
	OR
	
	• If ETP requirements are not in place:
	    ○ A strategy is in place that is expected to ensure the UoA does not hinder the recovery of ETP species.
	
	AND
	• There is an objective basis for confidence that the partial strategy/ strategy will work, based on information directly about the UoA and/or the species involved.
	• There is some evidence that the measures/strategy is being implemented successfully.
	• There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA related mortality of ETP species, and they are implemented as appropriate.

Habitats information (2.4.3)

Intent: evaluate whether information is adequate to determine the risk posed to habitats by the UoA, and whether the strategy to manage impacts on habitats is effective.

This performance indicator should always be scored. **Commonly encountered habitats** are those that regularly come into contact with the gear used by the UoA fishery, considering the geographic overlap of fishing effort with the habitat's range within the management area(s) covered by the UoA's relevant governance body(s).

<60	• There is no reliable information to at least generally characterize fishery impacts on habitat. • The gear as used in the fishery may impact habitat (e.g. is not an "exempt gear," or is a gear that may contact bottom habitat or other natural habitat features such as seagrass beds and reefs).
60-79	• The types and distribution of the commonly encountered habitats are

	broadly understood. ● Information is adequate to broadly understand the nature of the main impacts of gear use on the commonly encountered habitats, including spatial overlap of habitat with fishing gear and potential for ghost fishing.
80+	● The nature, distribution and vulnerability of the commonly encountered habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. ● Information is adequate to allow for identification of the main impacts of the UoA on the commonly encountered habitats, including ghost fishing, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. ● Adequate information continues to be collected to detect any increase in risk to the commonly encountered habitats.

Question: Does habitats information (2.4.3) have a <60 score?

If YES

Do not score the 'habitats outcome' and 'management' PIs (2.4.1, 2.4.2) and describe the data deficiency in the rationale text.

If NO

Score the 'habitats outcome' and 'management' performance indicators (2.4.1, 2.4.2).

Habitats outcome (2.4.1)

Intent: evaluate whether the UoA causes serious or irreversible harm to habitats structure and function.

MSC defines 'serious or irreversible harm' as "...changes caused by the UoA that fundamentally alter the capacity of the habitat or ecosystem to maintain its structure and function.
For the habitat component, this is the reduction in habitat structure, biological diversity, abundance and function such that the habitat would be unable to recover to at least 80% of its unimpacted structure, biological diversity and function within 5-20 years, if fishing were to cease entirely" (Table SA8, MSC FS v2.01).

For the 20-59 scoring category, characteristics that indicate a fishery is likely to cause serious or irreversible harm in the future include:

● The fishery operates in a way that threatens to damage seafloor habitats;
● Fishing activity is growing over time, e.g. due to increasing capacity or increasing demand, and cannot be easily constrained;
● Measures to limit habitat impacts, such as an ability to close fishing areas, cannot be readily implemented.

Vulnerable marine ecosystems (VMEs) have features that are physically or functionally fragile, and the most vulnerable are both easily disturbed and are very slow to recover. VMEs include seamounts, hydrothermal vents, cold water corals and sponge fields; additional guidance for

recognizing VMEs is provided in GSA3.13.3.2 (MSC FS v2.01).

<20	• The gear as used in the fishery is not an "exempt gear." • Best available information suggests the UoA fishery currently reduces structure and function of habitats within the footprint of the fishery to a point where it causes them serious or irreversible harm. OR • Dynamite or poisons are used to harvest fish.
20-59	• The gear as used in the fishery is not an "exempt gear." • Best available information suggests the UoA fishery currently does NOT reduce structure and function of habitats within the footprint of the fishery to a point where it causes serious or irreversible harm, but is likely to do so in the future.
60-79	• The UoA is unlikely to reduce structure and function of the commonly encountered to a point where there would be serious or irreversible harm. • The UoA is unlikely to reduce structure and function of VME habitats to a point where there would be serious or irreversible harm.
80+	• Based on some type of evidence, the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm. • Based on some type of evidence, the UoA is highly unlikely to reduce structure and function of VME habitats to a point where there would be serious or irreversible harm.

Habitats management (2.4.2)

Intent: evaluate whether there is a strategy in place designed to ensure the UoA does not pose a risk of serious or irreversible harm to habitats.

The MSC Standard (v2.01) does not require explicit evaluation of gear loss management or ghost fishing impacts within individual PI scoring guideposts. However, they are mentioned in Box GSA7, and as of October 2021 the MSC is proposing adding explicit requirements for ghost gear management under SGs 60, 80, and 100 for PIs 2.1.2, 2.2.2, 2.3.2, and 2.4.2. Considering the potential impacts of lost gear on habitats, the fact that fishing gear management is relatively feasible to evaluate, and these potential upcoming changes to the MSC Standard, we suggest that assessors investigate gear management when evaluating this PI and have included recommended guidance under the 60-79 and 80+ scoring categories.

For this indicator, 'if necessary' refers to cases where impacts on commonly encountered and VME habitats are thought to be a potential concern; or in the case of ghost gear, to cases where the risk of ghost fishing or ghost gear impacts are not demonstrably absent or negligible.

Appropriate management measures as evaluated under this PI are those that prevent or mitigate negative impacts on habitats from fishing activities.

<20	• The gear as used in the fishery is NOT an "exempt gear" (a gear known to have little or no habitat interactions). • The fishery does not have only minimal interactions with habitat. • No management measures are in place to mitigate or reduce habitat interactions.
20-39	• The gear as used in the fishery is NOT an "exempt gear." • The fishery does not have only minimal interactions with habitat. • Management measures are in place to mitigate or reduce habitat interactions, but they are not appropriate management measures.
40-59	• The gear as used in the fishery is NOT an "exempt gear." • The fishery does not have only minimal interactions with habitat. • Appropriate management measures are in place to mitigate or reduce habitat interactions, but compliance or enforcement are problematic.
60-79	• There are habitat measures in place, if necessary, that are expected to ensure the UoA is highly unlikely to reduce structure and function of the commonly encountered and VME habitats to a point where there would be serious or irreversible harm. • The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/ habitats). • If the fishery impacts a VME: there is qualitative evidence that the UoA complies with its management requirements to protect VMEs. • Recommended: there are measures in place, if necessary, for the UoA that are expected to minimise ghost gear and its impact on habitats.
80+	• There is a partial strategy in place, if necessary, that is expected to ensure the UoA is highly unlikely to reduce structure and function of the commonly encountered and VME habitats to a point where there would be serious or irreversible harm. • There is some objective basis for confidence that the measures/ partial strategy will work, based on information directly about the UoA and/or habitats involved. • There is some quantitative evidence that the measures/ partial strategy is being implemented successfully. • If the fishery impacts a VME: there is some quantitative evidence that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs or non-MSC fisheries, where relevant. • Recommended: there is a partial strategy in place, if necessary, for the UoA that is expected to minimise ghost gear and its impact on habitats.

Ecosystem information (2.5.3)

Intent: evaluate whether there is adequate characterization of the ecosystem (e.g. information on the natural species composition, trophic interactions, etc.), in addition to understanding of the UoA fishery's impact on the ecosystem.

This performance indicator should always be scored. **Key ecosystem elements** are the features of an ecosystem considered crucial to giving the ecosystem its characteristic nature and dynamics. They may include trophic structure and function (in particular key prey, predators, and competitors), community composition, productivity pattern (e.g. upwelling or spring bloom, etc.), and characteristics of biodiversity. This and the other ecosystem indicators are not intended to repeat evaluation of fishery impacts on habitats and other species caught in the fishery, including ETP species.

<60	• There is no reliable information to at least generally characterize the ecosystem and the UoA fishery's impacts on the ecosystem.
60-79	• Information is adequate to identify the key ecosystem elements. • Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but have not been investigated in detail.
80+	• Information is adequate to broadly understand the key ecosystem elements. • Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and some have been investigated in detail. • The main functions of the components (i.e., target species, other species, ETP species, and habitats) in the ecosystem are known. • Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred. • Adequate data continue to be collected to detect any increase in risk level.

Question: Does the ecosystem information PI (2.5.3) have a <60 score?

If YES

Do not score the ecosystem outcome and management PIs (2.5.1, 2.5.2) and describe the data deficiency in the rationale text.

If NO

Score the ecosystem outcome and management PIs (2.5.1, 2.5.2).

Ecosystem outcome (2.5.1)

Intent: evaluate whether the UoA causes serious or irreversible harm to the key elements of ecosystem structure and function.

For this PI, MSC defines 'serious or irreversible harm' as "...changes caused by the UoA that fundamentally alter the capacity of the habitat or ecosystem to maintain its structure and function…. For the ecosystem component, this is the reduction of key features most crucial to maintaining the integrity of its structure and functions and ensuring that ecosystem resilience and productivity is not adversely impacted. This includes, but is not limited to, permanent changes in the biological diversity of the ecological community and the ecosystem's capacity to deliver ecosystem services" (Table SA8, MSC FS v2.01).

<20	● Best available information suggests the fishery currently disrupts key elements of ecosystem structure and function to a point that serious or irreversible harm occurs. OR ● Dynamite or poisons are used to harvest fish.
20-59	● Best available information suggests the fishery currently does NOT disrupt key elements of ecosystem structure and function to a point that serious or irreversible harm occurs, but is likely to do so in the future.
60-79	● The UoA is unlikely to disrupt the key ecosystem elements to a point where there would be a serious or irreversible harm.
80+	● The UoA is highly unlikely to disrupt the key ecosystem elements to a point where there would be a serious or irreversible harm.

Ecosystem management (2.5.2)

Intent: evaluate whether there are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.

This performance indicator should always be scored. Good practice requires that management explicitly consider fishery impacts on functionality of the ecosystem and has a strategy to address those impacts. Full ecosystem based approaches with ecosystem models, though of value, are not required.

For this PI, 'if necessary' refers to cases where existing management measures for other P1 and P2 components are not adequate for effectively addressing ecosystem impacts from the UoA. **Appropriate management measures** are those used to mitigate negative impacts on the ecosystem from fishing activities.

<20	● No measures are in place to manage the impacts of the fishery on the

	ecosystem.
20-39	● Measures are in place to manage the impacts of the fishery on the ecosystem, but they are not appropriate management measures.
40-59	● Appropriate management measures to manage impacts of the fishery on the ecosystem are in place, but compliance or enforcement is problematic.
60-79	● There are measures in place, if necessary, which take into account the potential impacts of the UoA on key ecosystem elements. ● If measures are in place, they are considered likely to work based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/ ecosystems).
80+	● There is a partial or full strategy in place, if necessary, which takes into account available information and is expected to restrain fishing impacts such that the UoA is highly unlikely to disrupt the key ecosystem elements to a point where there would be a serious or irreversible harm. ● If measures or a strategy are in place, there is some objective basis for confidence that they will work, based on some information directly about the UoA and/or the ecosystem involved. ● There is evidence that the measures/strategy is being implemented successfully.

Management system - Principle 3

Under this principle it is important to look for evidence of a precautionary approach in management. The precautionary approach involves the application of prudent foresight, taking into account the uncertainties in fisheries systems and considering the need to take action with incomplete knowledge.

Legal and/or customary framework (3.1.1)

Intent: evaluate whether the management system exists within an appropriate and effective legal and/or customary framework that ensures it: (1) is capable of delivering sustainability in the UoA, (2) observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and (3) incorporates an appropriate dispute resolution framework.

A legal framework is defined as a broad system of rules that governs and regulates decision making, agreements, laws etc. At a minimum, a legal framework for fisheries should define who can fish, where, when, for what species and under what conditions. The framework should also define management responsibilities. The applicable framework is generally assumed to be at the national level, although there may be some exceptions. For example, the applicable framework for fisheries targeting transboundary stocks (e.g. highly migratory tuna) will include mechanisms for multi-national management.

<60	● There is no legal or customary framework in place for the fishery. OR ● A national legal system exists, but there are concerns about effectiveness of the system to deliver management outcomes, manage legal disputes arising within the system, and respect the legal or customary rights of people dependent on fishing for food or livelihood.
60-79	● There is an effective national legal system and a framework for cooperation with other parties, where necessary, to deliver the management outcomes consistent with the following: 1) management of the stock to an appropriate biological target level (e.g. MSY) and 2) minimising impacts on other species, habitats, and wider ecosystem components. ● 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 has a mechanism to 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 two management outcomes described above.
80+	● There is an effective national legal system and organised and effective cooperation with other parties, where necessary, to deliver the management outcomes consistent with the following: 1) management of the stock an appropriate biological target level (e.g. MSY) and 2) minimising impacts on other species, habitats, and wider ecosystem components. ● 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 context of the UoA. ● 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 two management outcomes described above.

Consultation, roles, and responsibilities (3.1.2)

Intent: evaluate whether (1) roles and responsibilities of organisations involved in the management process are clear, and (2) there are effective consultation processes open to interested and affected parties.

<20	● Organisations or individuals involved in the management process have not been identified.

	OR ● The management system does not have consultation processes to obtain relevant information from the main affected parties, including local knowledge, to inform the management system.
20-59	● Organisations or individuals involved in the management process may be identified, but their functions, roles and responsibilities are not well defined, such that it is unclear who makes fisheries management decisions. ● The management system may have consultation processes to obtain relevant information from the main affected parties, including local knowledge, to inform the management system. However, these are used inconsistently, or there is no evidence that consultation informs management system decisions.
60-79	● Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood. ● The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.
80+	● Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction. ● 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 consultation process provides opportunity for all interested and affected parties to give input regarding decisions.

Long term objectives (3.1.3)

Intent: evaluate whether management policy has clear long-term objectives to guide decision-making that are consistent with sustainability outcomes and that incorporate the precautionary approach.

Long-term management objectives are typically contained at a high or broad level in government policy, beyond the specific fishery being assessed. Examples of such objectives include 'avoidance of overfishing' or 'sustainable use of resources.' Here **appropriate management** is considered that which is consistent with achieving sustainability outcomes expressed under MSC Principles 1 and 2.

<20	● There are no long-term objectives for fishery management.
20-59	● There are some implicit, long term objectives within management policy, which have the potential to partially guide decision making, but they are not adequate to be consistent with the precautionary approach, or they are not appropriate for management of target stocks and ecosystem impacts.
60-79	● Long term objectives to guide decision making, consistent with the precautionary approach and appropriate management of target stocks and ecosystem impacts, are implicit within management policy.
80+	● Clear long term objectives that guide decision-making, consistent with the precautionary approach and appropriate management of target stocks and ecosystem impacts, are explicit within management policy.

Fishery-specific objectives (3.2.1)

Intent: evaluate whether the fishery-specific management system has clear objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.

This indicator focuses on fishery-specific management objectives, which provide direction for management measures or regulations that directly apply to the assessed fishery. Such objectives can often be found in a management plan for the fishery.

<20	● There are no management objectives for the stock.
20-59	● A management plan or objectives for the UoA fishery resource is in place, but it has been assessed by scientific experts to be 'not precautionary'.
60-79	● Objectives, which are broadly consistent with the precautionary approach and appropriate management of target stocks and ecosystem impacts, are implicit within the fishery specific management system.
80+	● Short and long term objectives, which are consistent with the precautionary approach and appropriate management of target stocks and ecosystem impacts, are explicit within the fishery specific management system.

Decision-making processes (3.2.2)

Intent: evaluate whether the fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve objectives, and whether the system has an appropriate approach to resolve disputes in the fishery.

Effective decision-making processes should include mechanisms for stakeholders to provide input on management decisions and be informed about the decisions made.

<20	● Management decisions are not made transparently.
20-39	● Decision-making processes are unclear. OR ● There is no mechanism in place to effectively address conflicts between fishery users/stakeholders or user groups.
40-59	● There are some decision-making processes in place, but they are unlikely to result in measures and strategies to achieve the fishery-specific sustainability objectives. ● Decision-making processes do not respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner, nor do they take some account of the wider implications of decisions. ● Information on the fishery's performance and management action is not easily obtained by stakeholders.
60-79	● There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific sustainability objectives. ● 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. ● Some information on the fishery's performance and management action is generally available on request to stakeholders. ● 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.
80+	● There are established decision-making processes that result in measures and strategies to achieve the fishery-specific sustainability objectives. ● 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 use the precautionary approach and are based on best available information. ● Information on the fishery's 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 from research, monitoring evaluation and review activity. ● The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.

Compliance and enforcement (3.2.3)

Intent: evaluate whether monitoring, control, and surveillance (MCS) mechanisms in the fishery are enforced and complied with.

MCS mechanisms aim to enforce compliance with regulations and may involve tools such licensing, vessel registration, logbooks, port and dockside monitoring, vessel monitoring systems (VMS), fisheries observer programs, at sea monitoring, boarding and inspection, and IUU vessel listing. For small-scale fisheries with limited financial capacity for implementing MCS, community-based mechanisms (e.g. fisher patrols, clear enforcement protocols and codes for behavior) or cost-effective technologies (e.g. vessel registration, smartphone applications for tracking vessels and their catches) can be useful.

<20	● MCS mechanisms or fishery regulations are absent.
20-39	● Fishery monitoring is lacking or believed to be inadequate. ● Enforcement is lacking or believed to be inadequate, or compliance with regulations is known to be poor. OR ● The scientific body that officially conducts regular stock assessments highlights that the magnitude of IUU fishing is unknown or flags it as a real problem for the stock.
40-59	● Some MCS mechanisms exist and are implemented in the fishery, but there is some uncertainty about their effectiveness. OR ● Some sanctions to deal with noncompliance may exist, but there is no clear evidence that they are applied, or they are not significant enough to deter non-compliance. OR ● Fishers may not consistently comply with the management system under assessment, including, when required, providing information of importance for effective management of the fishery.
60-79	● MCS mechanisms exist and are implemented in the fishery, and there is a reasonable expectation that they are effective. ● Sanctions to deal with noncompliance exist and there is some evidence that they are applied. ● Fishers are generally thought to comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.

80+	● An MCS system has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules. ● Sanctions to deal with noncompliance exist, are consistently applied, and are thought to provide effective deterrence. ● Evidence exists to demonstrate that fishers comply, including, when required, providing information important to the effective management of the fishery. ● There is no evidence of systematic noncompliance.

Monitoring and management performance evaluation (3.2.4)

Intent: evaluate whether there is an effective system for monitoring and evaluating the performance of the fishery-specific management system against its objectives, and for reviewing the overall management system.

MSC has not explicitly defined the 'key' parts of a management system, but they likely include monitoring and evaluation of stock status, management of ecosystem impacts, and performance of the compliance and enforcement system. Other parts of the management system may include those relating to effectiveness of consultation (including use of scientific information) and decision-making processes.

<60	● Mechanisms for monitoring and evaluating performance of the fishery-specific management system are absent, or if they exist, they are not used. ● The fishery-specific management system is not subject to internal or external review.
60-79	● There are mechanisms in place to evaluate some parts of the fishery-specific management system. ● The fishery-specific management system is subject to occasional internal review.
80+	● There are mechanisms in place to evaluate all parts, or at least key parts, of the fishery-specific management system. ● The fishery-specific management system is subject to regular internal and occasional external review.

Appendices

Much of the material in the appendices below, including the definitions, were taken from other sources. Superscripts denote source material as follows:

> F - [FAO Glossary and Term Portal](#)
> M - MSC Fisheries Standard (v 2.01)
> S - Monterey Bay Aquarium Seafood Watch Fisheries Standard (v 3.2)

Lower trophic level species

For certain taxa that have an exceptionally important role in the ecosystem, reference points should be based on ecosystem considerations (i.e. maintaining enough biomass to allow the species to fulfill its ecological role), rather than MSY or single-species considerations.[S] Forage species, which often belong to lower trophic levels, are generally considered to be exceptionally important within ecosystems. MSC has identified families of lower trophic level (LTL) fish species, described in Box SA1 in the MSC Fisheries Certification Requirements (FCR) v 2.0.

Species types that are defined by default as "key LTL stocks" for the purposes of an MSC assessment.

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

A potentially useful resource is the [ASFIS List of Species](#), which provides information on species included in different families and orders.

It is also possible to identify LTL species on the basis of biological and ecological criteria. For example, MSC suggests that assessors treat species as LTL if the species feeds predominantly on plankton, has a trophic level 2-4, is characterized by small body size/early maturity/high fecundity/short lifespan, and meets at least two of the following criteria (see SA2.2.9 in the MSC FS v2.01):

1. A large proportion of the trophic connections in the ecosystem involve this stock, leading to significant predator dependency
2. A large volume of energy passing between lower and higher trophic levels passes through the stock
3. 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

Productivity Susceptibility Analysis (PSA)

Instructions for conducting a PSA

These instructions are adapted from the MSC and SFW standards.

1. To conduct a PSA, the assessor needs to use the MSC Risk Based Framework (RBF) Worksheet, which can be downloaded at:
https://www.msc.org/docs/default-source/default-document-library/for-business/program-documents/chain-of-custody-supporting-documents/msc-rbf-worksheets-v2-04.xlsx?sfvrsn=224fc7d6_8

2. For each data-deficient stock combination (gear type, location, body of water) that is assessed using PSA, a separate PSA score will be calculated. Both productivity and susceptibility will be scored on a three-level risk scale: low, medium and high. Where there is limited or conflicting information for a productivity or susceptibility attribute, use the more precautionary (higher value) score.

3. For Productivity: See Table 4 below for guidance. Note that lower productivity corresponds to higher risk (and vice versa). Additional information below for certain attributes:

- Score the average maximum size and average size at maturity for fish species only.
- Score density dependence for invertebrate species only.

Attribute information for fish species can generally be found at Fishbase.org

Table 4. Productivity table[M]

Productivity attribute	High productivity (Low risk, score=1)	Medium productivity (Medium risk, score=2)	Low productivity (High risk, score=3)
Average age at maturity	< 5 years	5-15 years	> 15 years
Average maximum age	< 10 years	10-25 years	> 25 years
Fecundity	> 20,000 eggs per year	100-200,000 eggs per year	< 100 eggs per year
Average maximum size (not to be used when scoring invertebrate species)	< 100 cm	100-300 cm	> 300 cm
Average size at maturity (not to be used when scoring invertebrate species)	< 40 cm	40-200 cm	> 200 cm

Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer
Trophic level	< 2.75	2.75 - 3.25	> 3.25
Density dependence (to be used only when scoring invertebrate species)	Compensatory dynamics at low population sizes demonstrated or likely	No depensatory or compensatory dynamics demonstrated or likely	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely

4. For Susceptibility: See Table 5 below for guidance. The Susceptibility Table was originally developed by MSC, and then MBA SFW made edits to the table for their own standard because mathematically, the original scoring was such that a low score in any one of the susceptibility attributes would almost always lead to a low or medium vulnerability rating, even in cases where other susceptibility attributes were medium to high risk, and even if the species productivity was very low. As an example, a fishery targeting mature individuals or spawning aggregations would usually score a "low risk" of susceptibility, but in practice there are ecologically unsustainable fisheries that target mature fish, such as some bluefin tuna fisheries. We have used the SFW Susceptibility Table because it is important to score conservatively, especially when data are limited.

Note that lower susceptibility corresponds to lower risk (and vice versa). Additional information for certain attributes is described below:

- "Areal overlap" and "vertical overlap" should be scored with consideration of all fisheries impacting the species.
- "Selectivity" and "post-capture mortality" should be scored with reference to the fishery under assessment only.
- Default values are provided in the table. Default values should be used unless there is evidence indicating that a different risk score is more appropriate.

Susceptibility will generally be high for target species because fishing gear and effort will be aimed at maximizing catches.

Table 5. Susceptibility table[S]

Susceptibility attribute	Low susceptibility (Low risk, score=1)	Medium susceptibility (Medium risk, score=2)	High susceptibility (High risk, score=3)
Areal overlap (availability) Overlap of the fishing effort with	Vast majority (>90%) of species concentration	Most (70%-90%) of species concentration is	>30% of the species concentration is

a species concentration of the stock	(main geographic range) is unfished. (Must have evidence.)	unfished by any fishery. (Must have evidence.)	fished, considering all fisheries. **Default score for target species, or if unknown.**
Vertical overlap (encounterability) The position of the stock/species within the water column relative to the fishing gear	Low overlap between fishing depths and depth range of species, i.e. most of the species depth range (>=66%) is unfished. (Must have evidence; unlikely for any "main species.")	Medium overlap between fishing depths of depth range of species, i.e. species has considerable portion (>=33%) of depth range that is unfished. (Must have evidence.)	High degree of overlap between fishing depths and depth range of species. **Default score for target species, as well as any air-breathing animal, or when unknown.**
Selectivity of gear type Potential of the gear to retain species	Species is not targeted AND is not likely to be captured by gear (e.g., average body size at maturity is smaller than mesh size (net fisheries), or species is not attracted to the bait used (line fisheries), or is too large to enter trap (pot/trap fisheries), etc. (if known, <33% of individuals of this species encountering gear are captured). Must have evidence.	Species is targeted, or is incidentally encountered AND is not likely to escape the gear, BUT conditions under 'high risk' do not apply. **Default score when conditions under 'high risk' do not apply.**	Species is targeted or is incidentally encountered AND attributes of the fishery, in combination with the species' biology or behavior, increase its susceptibility to the gear. E.g., net mesh size allows retention of individuals below size at maturation, or fishery targets spawning aggregations or large fecund females. If effective management measures are in place to mitigate the effect of the

			behavior or requirement, the behavior and/or requirement need not be considered.
Post-capture mortality (PCM) The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival	Evidence of majority of captured individuals (>66%) released and survive post-capture.	Evidence of some released post-capture and survival.	Retained species or majority dead when released. **Default score for retained species.**

5. Enter scores into the appropriate sheet within the MSC RBF Worksheet, using one row for each species. Check the 'Automated scores' tab for indicator-level (PI) scores.

Glossary

Alternative measures - fishing gear and practices that have been shown (experimentally or otherwise) to minimize the rate of incidental mortality of the species to the lowest achievable levels.[M]

Biologically based limit - the abundance indicator level below which a stock or population is considered to experience serious or irreversible harm.[M]

B_{LIM} - biomass limit reference point below which recruitment may be impaired

B_{MSY} - biomass necessary to produce maximum sustainable yield

$B_{40\%}$ - 40% of estimated unfished biomass

Bycatch - unwanted catch, or catch that the fisher did not intend to catch but could not avoid, and did not want or chose not to use

Commonly encountered habitats - habitats that regularly come into contact with a gear used by the UoA, considering the geographic overlap of fishing effort with the habitat's range within the management area(s) covered by the governance body(s) relevant to the UoA.[M]

Data-limited or data-poor - refers to fisheries for which there are no estimates of MSY, stock size, or certain life history traits. There may be minimal or no stock assessment data, and uncertainty measurements may be qualitative only.[S]

Depleted - in reference to stocks, at a very low level of abundance compared to historical levels, with dramatically reduced spawning biomass and reproductive capacity. Stocks should be classified as "depleted" if the stock is likely to be below an appropriate limit reference point.[S]

Ecological role - the trophic role of a stock within the ecosystem under assessment.[M]

Ecosystem elements - 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.[M]

Effective - management or mitigation strategies are defined as "effective" if a) the management goal is sufficient to maintain the structure and function of affected ecosystems in the long-term, and b) there is scientific evidence that they are meeting these goals.[S]

Endangered, Threatened or Protected (ETP) Species - species recognised as "threatened," "endangered" or "critically endangered" by national legislation and/or binding international agreements to which the jurisdictions controlling the fishery are party.

Relevant binding international agreements include:[M]

 a. Appendix 1 of the Convention on International Trade in Endangered Species (CITES), unless it can be shown that the particular stock of the CITES listed species impacted by the UoA under assessment is not endangered.
 b. Binding agreements concluded under the Convention on Migratory Species (CMS), including:
- Annex 1 of the Agreement on Conservation of Albatross and Petrels (ACAP);
- Table 1 Column A of the African-Eurasian Migratory Waterbird Agreement (AEWA);
- Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS);
- Annex 1, Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS);
- Wadden Sea Seals Agreement;
- Any other binding agreements that list relevant ETP species concluded under this Convention.

ETP species also include those classified as 'out-of scope' (amphibians, reptiles, birds and mammals) that are listed in the IUCN (International Union for the Conservation of Nature) Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE).[M] To be precautionary, the ETP classification should also include non 'out-of scope' taxa (i.e. fish and shellfish) listed as EN or CE.[S]

Fishery - FAO defines a fishery as a unit determined by an authority or other entity that is engaged in raising and/or harvesting fish. Typically, the unit is defined in terms of some or all of the following: people involved, species or type of fish, area of water or seabed, method of fishing, class of boats and purpose of the activities.[M]

Fishing mortality (*F*) - the rate at which animals are removed from the stock by fishing.[F]

Generation time (*G*) - the average age of a reproductive individual in an unexploited stock, consistent with the definition of Goodyear:[3]

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[3] Goodyear, C.P. 1995. Red snapper in U.S. waters of the Gulf of Mexico. NMFS/SEFSC. Cited by Thompson, G. G., Mace, P. M., Gabriel, W. L., Low, L. L., Maccall, A. D., Methot, R. D., ... Witzig, J. F. (1998). Technical Guidance On the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson- Stevens Fishery Conservation and Management Act.

$$G = \frac{\sum_{a-1}^{A} a E_a N_a}{\sum_{a-1}^{A} E_a N_a}$$

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.

Ghost gear - fishing gear that has been abandoned, lost or otherwise discarded in the ocean. Ghost gear has negative impacts on marine life and habitats, including through incidental 'ghost fishing.'

Habitat - the chemical and bio-physical environment, including biogenic structures, where fishing takes place.[M]

Harvest control rules (HCRs) - a set of well-defined pre-agreed rules or actions used for determining a management action in response to changes in indicators of stock status with respect to reference points.[M]

Harvest strategy - the combination of monitoring, stock assessment, harvest control rules and management actions.[M]

Likelihood - The definitions below can be based on quantitative assessment, plausible argument or expert judgment. The MSC provides quantitative definitions of likelihood that vary by PI (nee Table SA9 on p. 128 of MSC Fisheries Certification Requirements v2.0.) Below are the most frequently occurring definitions.

- Highly unlikely - less than 30% chance.[M]
- Unlikely - less than 40% chance.[M]
- Likely - 70% chance or greater.[M,S]
- Highly likely - 80% chance or greater.[M]

Limit reference point (LRP) - the point beyond which the state of a fishery and/or a resource is not considered desirable and which management is aiming to avoid.[M] To be considered appropriate, biomass LRPs should generally be no less than half of B_{MSY}, or half of an appropriate target reference point such as $B_{40\%}$.

Management system - the framework of processes and procedures used to ensure that an organisation can fulfil all tasks required to achieve its objectives. In a fisheries context includes agencies involved in the management of the fishery, the legislative framework within which the fishery is undertaken and the core management measures implemented.[M] An appropriate management system uses the best available science to implement policies that minimize the risk of overfishing or damaging the ecosystem, taking into account species vulnerability along with scientific and management uncertainty.[S]

Management strategies or measures:

- *Measures* - actions or tools in place within the management system that either explicitly manage impacts on the component or indirectly contribute to management of the component under assessment having been designed to manage impacts elsewhere.[M]
- *Partial strategy* - a cohesive arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the

need to change the measures should they cease to be effective. It may not have been designed to manage the impact on that component specifically.[M]

- *Strategy or full strategy* - a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which should be designed to manage impact on that component specifically. A strategy needs to be appropriate to the scale, intensity, and cultural context of the fishery and should contain mechanisms for the modification of fishing practices in light of identification of unacceptable impacts.[M]

Maximum sustainable yield (MSY) - The highest theoretical equilibrium yield that can be continuously taken (on average) from a stock under existing (average) environmental conditions without affecting significantly the reproduction process.[M]

Overfished - a stock is considered overfished when human-induced mortality has reduced the abundance or bio-mass of a stock below the point where recruitment may be impaired. This value may often be referred to as B_{LIM}, 1/2 B_{MSY}, $B_{20\%}$ or some other reference point for a managed fish stock.

Overfishing - a generic term used to refer to a level of fishing effort or fishing mortality such that a reduction of effort would, in the medium term, lead to an increase in the total catch; or, a rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce the maximum sustainable yield on a continuing basis.[F]

- *Biological overfishing*: Catching such a high proportion of one or all age classes in a fishery as to reduce yields and drive stock biomass and spawning potential below safe levels. In a surplus production model, biological overfishing occurs when fishing levels are higher than those required for extracting the Maximum Sustainable Yield (MSY) of a resource and recruitment starts to decrease.[F]
- *Recruitment overfishing*: the rate of fishing above which the recruitment to the exploitable stock becomes significantly reduced. This is characterized by a greatly reduced spawning stock, a decreasing proportion of older fish in the catch, and generally very low recruitment year after year. Recruitment may lead to stock collapse if prolonged and combined with poor environmental conditions.[F]
- *Growth overfishing*: Occurs when too many small fish are being harvested too early through excessive fishing effort and poor selectivity (e.g., excessively small mesh sizes), and the fish are not given enough time to grow to the size at which maximum yield-per-recruit would be obtained from the stock. Reduction of fishing mortality among juveniles, or their outright protection, would lead to an increase in yield from the fishery. Growth overfishing occurs when the fishing mortality rate is above Fmax (in a yield-per-recruit model). This means that individual fish are caught before they have a chance to reach their maximum growth potential. Growth overfishing, by itself, does not affect the ability of a fish population to replace itself.[F]
- *Economic overfishing*: Occurs when a fishery is generating no economic rent, primarily because an excessive level of fishing effort is applied in the fishery. This condition does not always imply biological overfishing.[F]

Precautionary approach - approach involving the application of prudent foresight, taking into

account the uncertainties in fisheries systems and considering the need to take action with incomplete knowledge. The precautionary approach requires, inter alia: (i) consideration of the needs of future generations and avoidance of changes that are not potentially reversible; (ii) prior identification of undesirable outcomes and measures to avoid or correct them promptly; (iii) initiation of any necessary corrective measures without delay and on a timescale appropriate for the species' biology; (iv) conservation of the productive capacity of the resource where the likely impact of resource use is uncertain; (v) maintenance of harvesting and processing capacities commensurate with estimated sustainable levels of the resource and containment of these capacities when resource productivity is highly uncertain; (vi) adherence to authorized management and periodic review practices for all fishing activities; (viii) establishment of legal and institutional frameworks for fishery management within which plans are implemented to address the above points for each fishery, and (ix) appropriate placement of the burden of proof by adhering to the requirements above.[S,F]

Principle - a fundamental element, in the MSC's case, used as the basis for defining a well-managed and sustainable fishery.[M]

Productivity-Susceptibility Analysis (PSA) - this semi-quantitative approach examines several attributes of each species that contribute to or reflect its productivity or susceptibility, in order to provide a relative measure of the risk to the scoring element from fishing activities.[M]

Qualitative data - data describing the attributes or properties that an object possesses. The properties are categorized into classes that may be assigned numeric values. However, there is no significance to the data values themselves, they simply represent attributes of the object concerned.[M]

Quantitative data - data expressing a certain quantity, amount or range. Usually, there are measurement units associated with the data, e.g. metres, in the case of the height of a person. It makes sense to set boundary limits to such data, and it is also meaningful to apply arithmetic operations to the data.[M]

Recent stock assessment - as a rule of thumb, stock assessments or updates conducted within the last five years are considered to be recent. If the stock assessment is very out of date – as a rule of thumb, >10 years old – the stock status should be considered unknown and rated accordingly.[S]

Recruitment impairment - Situation where fishing activity impacts the stock—either through reduced abundance, changes in size, sex or age distribution, or reduction of reproductive capacity at age—to a degree that will diminish the growth and/or reproduction of the population over the long-term (multiple generations); or, the stock is below an appropriate limit reference point.[S]

Reference points - reference points used to define management action in response to stock biomass, stock status, or fishing mortality. Appropriate reference points are designed with the goal of maintaining stock biomass at or above the point where yield is maximized (target reference points; TRPs) and safely above the point where recruitment is impaired (limit reference points; LRPs). Fishing mortality reference points should be designed with the goal of ensuring that catch does not exceed sustainable yield and has a very low likelihood of leading to

depletion of the stock in the future.[S]

Reliable data or information - data produced or verified by an independent third party. Reliable data may include government reports, peer-reviewed science, audit reports, etc. Data are not considered reliable if significant scientific controversy exists over the data, or if data are old or otherwise unlikely to represent current conditions.[S]

Retained species - species that are retained by the fishery (usually because they are commercially valuable or because they are required to be retained by management rules).[M]

Shark finning - the practice of removing any of the fins of a shark (including the tail) while at sea and discarding the remainder of the shark at sea.[M]

Species of concern - species about which management has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species as endangered.[S]

Stakeholder - any person or group (including governmental and non-governmental institutions, traditional communities, universities, research institutions, development agencies and banks, donors, etc.) with an interest or claim (whether stated or implied) which has the potential of being impacted by or having an impact on a given project and its objectives. Stakeholder groups that have a direct or indirect "stake" can be at the household, community, local, regional, national, or international level.[M]

Standard - a document established by consensus and approved by a recognised body that provides for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.[M]

Stock - the living resources in the community or population from which catches are taken in a fishery. Use of the term stock implies that the particular population is a biologically distinct unit, i.e. not strongly linked to other populations through interbreeding, immigration, or emigration.[M,S] Some species form a single stock (e.g. southern bluefin tuna) while others are composed of several stocks (e.g. albacore tuna in the Pacific Ocean comprises separate Northern and Southern stocks).[F]

Stock assessment - an integrated analysis of information to estimate the status and trends of a population against benchmarks such as reference points.[M]

Strategy - a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which should be designed to manage impact on that component specifically. A strategy needs to be appropriate to the scale, intensity and cultural context of the fishery and should contain mechanisms for the modification fishing practices in the light of the identification of unacceptable impacts.[M]

Susceptibility - a stock's capacity to be impacted by the fishery under consideration, depending on factors such as the stock's likelihood to be captured by the fishing gear.[S]

Sustainable level (of fishing mortality) - a level of fishing mortality that will not reduce a stock below the point where recruitment is impaired, i.e., above F reference points, where defined. The F limit reference points should be around either FMSY or $F_{35\%}$ to $F_{40\%}$ for moderately productive stocks; low productivity stocks like rockfish and sharks require F in the range of

F50–60% or lower. Higher F values require a strong scientific rationale. The F reference points are limit reference points, so buffers should be used to ensure that fishing mortality does not exceed these levels. Where F is unknown but MSY is estimated, fishing mortality at least 25% below MSY is considered a sustainable level (for fisheries that are at or above BMSY).

Target reference point (TRP) - the point which corresponds to a state of a fishery and/or resource which is considered desirable and which management is trying to achieve.[M] To be considered appropriate, biomass TRPs should generally not be lower than B_{MSY} or $B_{35\%}$ to $B_{40\%}$.[S]

Tools - mechanisms for implementing fishery management strategies. For example, total allowable catches, mesh regulations, closed areas, etc. could be used to implement harvest control rules.[M]

Uncertainty - lack of perfect knowledge of many factors that affect stock assessments, estimation of biological reference points and management, and the consequence of this lack of perfect knowledge.[M]

Vulnerable marine ecosystem (VME) - VMEs have features that are physically or functionally fragile, and the most vulnerable are both easily disturbed and are very slow to recover. VMEs include seamounts, hydrothermal vents, cold water corals and sponge fields.[F] MSC also provides guidance on identifying VMEs in GSA3.13.3.2 (MSC v2.01, pp. 435-436).

Additional resources

Data-limited Methods Toolkit

The Data-limited Methods Toolkit, or DLM Tool, was developed by a collaboration between the University of British Columbia's Fisheries Centre and the Natural Resources Defense Council (NRDC). It can be used to identify appropriate data-limited management procedures for fisheries that lack the data to conduct a conventional stock assessment, and includes the following three components:

- Management Strategy Evaluation (MSE) – compares management procedures through simulation testing and identifies acceptable harvest control rules.
- Management Procedure Application – recognizes which methods can be applied with the actual data available for the stock to provide guidance for fisheries managers.
- Value-of-Information Analysis – identifies which operating model and observation parameters are most important based on the MSE results, to assist with prioritization of data collection in the future.

The DLM Toolkit can be useful for setting harvest control rules, if the rapid assessment identifies a need for their development. It can also be used to provide recommendations on fisheries data to be monitored.

FishPath

The Nature Conservancy supported development of FishPath and describes the tool as "A Decision Support System for Assessing and Managing Data- and Capacity- Limited Fisheries." FishPath was developed by a team of scientists and is designed to help managers of

data-limited fisheries identify appropriate monitoring, assessment and decision rules for their system. The tool can be useful for engaging with fisheries that have identified a need to improve management practices, and to provide them with specific recommendations.

Framework for Integrated Stock and Habitat Evaluation (FISHE)

The FISHE framework developed by EDF provides scientific guidance for the management of data-limited fisheries. FISHE includes several tools for assessing stocks and setting management goals, including harvest control rules. Below are descriptions of some of these tools that may be relevant for fishery evaluation and FIP development.

Principle 1

- Step 4 of FISHE provides guidance on a handful of the simplest, quickest, most common data-limited methods for obtaining information on stock status, which can be applied rapidly and paired with the PSA outcomes to inform Principle 1 evaluation, particularly for the stock status outcome and stock rebuilding outcome indicators.
- For stocks with more data, Step 9 of FISHE may be useful for evaluating stock status outcome.
- Step 8 of FISHE provides guidance on setting harvest control rules, which relates to the harvest strategy and harvest control rules indicators.
- The FISHE Method Matrix can help inform which stock evaluation methods are appropriate for a given fishery, based on data availability.
- FISHE also includes guidance for designing a data collection/ monitoring system, which could be improve the information and monitoring indicator.

Principle 2

- Step 2 of FISHE provides tools that can be used to assess habitat and ecosystem health and vulnerability.
- Step 5 of FISHE gives guidance on prioritizing species for further assessment.

Principle 3

- Step 11 of FISHE could be valuable to users wanting more information on what types of management "measures" are available to them.
- Step 1 of FISHE is about setting management goals, which could be helpful both to users and designers of this assessment for the long term and fishery-specific objectives indicators.

Triple Impact Fisheries Evaluation Framework

The Triple Impact Fisheries Evaluation Framework, developed by Ocean Outcomes and others, helps users evaluate needs, plan improvements, and monitor progress against environmental, social and financial dimensions of sustainability. It is built around three tools:

- Environmental Rapid Assessment (ERA)
- Social Responsibility Assessment Tool for the Seafood Sector (SRA)

- [Financial Rapid Assessment (FRA)](#)

Small Scale Fisheries Hub

The [Small-Scale Fisheries Resource and Collaboration Hub](#) is an online, interactive, and multilingual platform for small-scale fishers, fish workers, and their communities and allies. It provides access to free tools and resources to strengthen small-scale fisheries governance and community development. As a collaborative space, the SSF Hub is meant to be used by those working in and with small-scale fishing communities to implement the [Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines)](#).